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Cover
HMS General Hunter
 off Fort Malden,
 by Peter Rindlisbacher.



**NORAD IN 2012 –
 EVER EVOLVING,
 FOREVER RELEVANT**



**CULTURAL IRREGULAR
 WARFARE:
 THE CROSSROADS
 BETWEEN STRATEGIC
 CULTURE AND
 NON-KINETIC
 STRATEGIES EMPLOYED
 BY NON-STATE ACTORS**

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PHYSICAL OPERATING ENVIRONMENTS: HOW THE CYBER-ELECTROMAGNETIC ENVIRONMENT FITS



BY AIR, LAND, AND SEA: CANADA RESPONDS TO HURRICANE KATRINA



HIGHER EDUCATION AND THE PROFESSION OF ARMS: EXPLAINING THE LOGIC

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NOTE TO READERS

As a bilingual journal, readers should take note that where citations in endnotes are translated from their original language, we will use the abbreviation 'TOQ' at the end of the note to indicate that readers can find the original citations in the other language version of the Journal.

Welcome to yet another summer edition of the *Canadian Military Journal* in this bicentennial year of commemoration of the War of 1812. In keeping with this theme, Canadian Amherstburg Ontario artist Peter Rindlisbacher graces our cover with his depiction of the brig HMS *General Hunter* off Fort Malden, Amherstburg, Upper Canada, near the mouth of the Detroit River, 17 August 1812, in advance of an approaching squall. The *General Hunter*, built in the Amherstburg Navy Yard the year prior, was first rigged as a topsail schooner, then was converted to an armed brig, and, as a warship of the Provincial Marine, she fought with Commodore Barclay's British squadron on the Great Lakes. In Rindlisbacher's painting, the ship is returning from Major-General Sir Isaac Brock's victory over Brigadier General William Hull at the Siege of Detroit, 15-16 August 1812, where she was used in support of the battle. The *General Hunter* was eventually captured by the Americans at the Battle of Lake Erie in 1813. Her hull was discovered buried in the sand of the public beach at Southampton, Ontario, during the spring of 2001, and was positively identified four years later.

With respect to our current issue, Lieutenant-General Tom Lawson, the Deputy Commander-in-Chief of the North American Aerospace Defence Command, (DCINCNORAD) leads the way with an update on this highly successful and enduring binational alliance, now about to enter its 55th year in being. While the mission has been modified somewhat over the years to accommodate changing strategic realities, General Lawson contends that NORAD remains just as relevant today as it was when it was created back in 1958, and that it "... represents the best of what can be produced when Canada and the United States seek similar goals."

He is followed by Juan Castillo, a very articulate and well-educated Reservist who works for a consultancy firm that specializes in intelligence, due diligence, and cyber and physical security. In offering a valuable instructional tool for present and future interventionists, Castillo examines today's concept of Cultural Irregular Warfare, "... how different armed non-state actors employ non-kinetic doctrines and tactics to influence civilian populations as they seek to erode the normative power of the state."

Next, Major Jim Gash, a member of the Future Concepts Team at the Army's Directorate of Land Concepts and Design, discusses today's cyber environment, arguing that it is "nothing new," and that it is "... simply a unique manifestation of the electromagnetic operating environment – a familiar component of military operations, with integral operating concepts and principles that lend themselves well to cyber." He concludes that, in examining the *future* security environment, astute planners must fully understand just what cyber *is*, how it fits into the *traditional* environments, and the full range of force enhancement capabilities that it offers.

It is certainly 'a given' that today's international security market is "... uncertain, volatile, and fraught with risk." Lieutenant-Colonel John Anderson of the Canadian Forces Aerospace Warfare Centre acknowledges these realities, and opines that, as surely as Globalization and the Information Age have added a new measure of complexity to modern con-

flict, new and emerging technologies have spawned networked approaches to comprehensive operational planning and design. In this article, Anderson offers "... that these new approaches apply in the cognitive realm as well, in the way in which staffs design and plan military actions to deal with the complexity of modern conflict." He demonstrates, through a three-year experiment with an alternative approach to operational design, that, when dealing with today's complex, irregular, and asymmetric operational problems, the old 'tried and true' methods may no longer constitute the optimum approach to campaign planning and design.

This issue contains two articles dealing humanitarian aid considerations. In the first, a team of Canadian Forces/Sunnybrook Hospital surgeons reviews the literature dealing with the principles surrounding humanitarian relief surgery practices, analyzes the Canadian Forces surgical response to the 2010 Haitian earthquake, compares the CF response to contributions made there by other military forces and NGOs, then proposes a new humanitarian relief surgery doctrine that will achieve recently-identified mission objectives. In the second article, this one of an historical nature but with lessons for the future, Professor Joseph Scanlon and Commodore Elizabeth Steele recount the experiences of Canadian Forces Joint Task Group 306, Canada's multi-service task force deployed to help our neighbours to the south recover from the effects of Hurricane *Katrina* in September 2006. Many valuable lessons were learned and then applied downstream in Haiti, and the value added from being able to operate with our American counterparts was second-to-none.

In our Views and Opinions section, Captain Alan Lockerby, the Tactical Air Control Party Officer at CFB Gagetown's Combat Training Centre, recounts his experiences as a Strike and Armed Reconnaissance Coordinator aboard CP 140 *Aurora* aircraft flying operational missions over Libya in support of Operation *Mobile* and UN Security Council Resolution 1973 during the autumn of 2011. Next, Professor Bill Bentley and Colonel Bernd Horn examine the 'value added' of higher education for senior officers in today's armed forces, and offer that while the investment is undisputedly high, "... the responsibility of senior officers to navigate the institution through an often ambiguous, perpetually changing, and always complex and dangerous world imposes the obligation on its stewards." Closing out this section, Michael Rostek, long-time soldier and currently the Executive Director of the Royal Military College Club of Canada, examines the future of alumni organizations, and argues that "... they must proactively engage in future analysis in order to remain relevant to their membership."

Martin Shadwick is taking a brief hiatus this time out, due to particularly demanding marking responsibilities at York University (I can empathize), but he promises to be back in full form for his many readers in the autumn issue. As always, we close with the usual clutch of book reviews for your consideration.

Until the next time.

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

LETTER TO THE EDITOR

Comments on Wyss and Wilner article, Vol. 12, No. 2, Spring 2012

by W. Don Macnamara

The excellent and most logical analytical paper by Messrs Wyss and Wilner should help some of those whose thinking on this program is clouded by not understanding some more of the background, including the strategic and political rationale. However, although making reference to political and economic factors in procurement projects, there is neither discussion nor even mention of the uniqueness of the F35 project in terms of industrial opportunities and subsequent benefits.

Clearly, a consortium development of an aircraft can and should lead to increased effectiveness through sharing consolidation of new and emerging avionics, structures, and engine technologies that may not be either feasible or even available individually. In addition, the cost reduction benefits of a longer production run and common supply chain both during initial production and over the life of the aircraft should yield additional savings, as well as the benefits of shared experience that can lead to timely adjustments or modification, if necessary.

For Canada, as a signatory to the Memorandum of Understanding (MOU), the industrial benefits are particularly attractive and are already yielding solid results.

As of mid-April 2012, Canada has paid the U.S. Government a total of \$203.7 Million USD in support of the F-35 Program. Starting in 1997 through 2002, during the Concept Demonstration Phase, \$10.6 million was paid, followed by \$94.35 million contributed for the System Development and Demonstration Phase that covers the period 2002-2016, and then a further \$98.72 million for the Production, Sustainment, and Follow-On Development phase for the period 2007-2051.

Because of Canada's participation in the multi-national agreement, 70 Canadian companies have successfully competed for \$435 million in contracts related to the F-35, and

more are pending. This is a return-on-investment of over 2:1 – difficult to find anywhere these days. In addition, under the MOU, Canadian companies contract not only for Canadian purchases, but also all aircraft produced – as well as spares through the life of the aircraft - resulting in royalties to Canadian companies by other purchasers. It is also important to note that these contracts represent significant leading edge technologies and software applications involving an innovative and highly-skilled workforce – the stuff of which increased productivity is a result. Furthermore, these contracts place Canadian companies in contact with other U.S. and international companies, expanding their networks and synergistic opportunities – some of which have already occurred. Various estimates of total industrial contract benefits may meet or exceed the expected acquisition costs.

Because of the 'hue and cry' over this much-misunderstood project, the essence of the Next Generation Fighter Aircraft in terms of needs, requirements, opportunities, and benefits has been missed – and especially the matter of the Memorandum of Understanding and its impact. Should this MOU not have been signed at the outset, and should Canada have decided later to purchase this aircraft and lost out on the MOU opportunities, just imagine the 'hue and cry' then.

Analysts – whether supporters or critics of the F35 Program, should avail themselves of the opportunity to review the facts in detail through the following websites:

MOU and production details: www.F35.com

Project details including program expenditures: <http://www.forces.gc.ca/site/pri/2/pro-pro/ngfc-fs-ft/faq-eng.asp>

Industrial Participation: <http://www.ic.gc.ca/eic/site/ad-ad.nsf/eng/ad03863.html>.

Brigadier-General (Ret'd) Don Macnamara, OMM, CD, served for 37 years in the Canadian Air Force, then did 20 years as a professor in the Queen's University School of Business. He has taken refuge in Sidney-by-the-Sea, British Columbia, where he is now President of the Royal United Services Institute Vancouver Island.



Lockheed Martin photo LW-5704643956



NORAD/USNORTHCOM photo

NORAD IN 2012 – EVER EVOLVING, FOREVER RELEVANT

by Lieutenant-General Tom Lawson with Captain Michael Sawler



Introduction

Military planners are sometimes asked to apply a ‘blank sheet test’ to an organization’s structure. This test simply requires the organization’s purpose, expressed as a list of desired organizational outputs. From that list the planner develops, from scratch, the outline of an organization optimized for the outcomes of interest. Frequently, the optimized organization bears little resemblance to the one in existence, and highlights the fact that many organizations have reached their present state by simple



NORAD/USNORTHCOM photo

Lieutenant-General Thomas J. Lawson

momentum and happenstance. Such organizations likely require tailoring and amendment. By contrast, in the case of

Lieutenant-General Thomas J. Lawson, CMM, CD, MSc, is a very experienced fighter pilot who has commanded at all levels and has held a variety of senior staff positions, including Assistant Chief of the Air Staff from 2009 to 2011. He is currently the Deputy Commander, North American Aerospace Defence Command.

Captain Michael Sawler, MSc, is the Business Relationship Manager for the NORAD J3 (Operations) in Colorado Springs, Colorado.

the North American Aerospace Defence Command (NORAD), one might strongly contend that the blank sheet test would drive planners right back to the NORAD of today. Admittedly, the exercise might not today produce a binational organization, as the uniqueness of such an amalgamation of Canadian and U.S. authorities likely reflects NORAD's birth at a time of immense threat, a threat so great as to require the ease of operations that could only come with shared national command. Arguably, most other characteristics would remain very much as they are. This suggests that NORAD is, and was from the beginning, nicely structured for its purpose: aerospace warning and control, and, more recently, maritime warning. In this article we will have a look at where NORAD has been, and where we believe it will be heading.

Background

The NORAD agreement between Canada and the U.S. was forged in 1958 at a time when the Soviet Union was making rapid advancements in both Long Range bomber Aviation (LRA) and nuclear weaponry. At the height of the Cold War, this was a clear and present danger to the U.S., and, by geographical and political association, to Canada. The requirement for both Canada and the U.S. to defend against this threat resulted in the establishment of the binational North American Air Defence Command. At its stand-up, NORAD's air defence capabilities relied upon radar chains built in the mid-1950s that stretched from coast to coast, and provided for the detection of aircraft entering

North American airspace. The first radar chain was the Pinetree Line of 33 stations built across southern Canada, and completed in 1954. This line provided continuous warning and intercept control but low altitude gaps in the line, and its shallow coverage, necessitated the establishment of two more radar networks.



The trio of early warning radar lines erected on Canadian soil.

By 1957, a Mid-Canada Line, or 'McGill Fence,' was completed about 300 miles north of the Pinetree Line, generally along the 55th parallel of latitude. It consisted mainly of Doppler radars which created a microwave 'fence' for the detection, but not tracking, of low flying aircraft. The third and most challenging joint air defence undertaking of the 1950s was the construction of a transcontinental line across the 70th parallel, roughly 200 miles north of the Arctic Circle. This network of 57 stations, completed in July 1957, was called the Distant Early Warning (DEW) Line. In order to tie all these radar networks together and to provide a complete picture for NORAD decision-makers, a new technology called Semi-Automatic Ground Environment (SAGE) was developed. By the early-1960s, some 250,000 personnel were employed within NORAD operating a multi-layered and interlocking complex of sites, control centres,

Christopher Johnson



NORAD/USNORTHCOM photo

The early days and early interceptors... An RCAF Avro CF-100 *Canuck* and a USAF Convair F-102 *Delta Dagger* in close formation during a patrol.

manned interceptors, and surface-to-air missiles throughout North America, which constituted a formidable defence against a potential bomber attack. Among all the associated sites, the base at Goose Bay, Labrador, was arguably the busiest and most strategic, stocked with tankers, bombers, interceptors, aircrews, maintainers, and support personnel.

of her sovereign air space. As well, the “A” in NORAD’s moniker was changed from “Air” to “Aerospace” to better represent its expanded areas of operation and interest.

With the development of Air Launched Cruise Missile (ALCM) technology in the mid-1980s, NORAD again had to adjust to a new threat, this time by shifting some of its focus back to the manned bomber. This led to the signing of an MOU by Prime Minister Mulroney and President Reagan that formed the basis for the North American Aerospace Defence Modernization Program (NAADM). NAADM was implemented in the early-1990s, and it included wide-ranging upgrades and new systems. The DEW Line’s long range radars were modernized, and short range radars were commissioned. A digital information link between Airborne Warning and Control System (AWACS) aircraft and the Sector Operations Control Centre (SOCC) was designed and implemented for the transfer of track, command, and intelligence information.



DEW Line - Canada

With the emergence of Intercontinental Ballistic Missile technology (both land-based [ICBM] and submarine-launched [SLBM]), NORAD was faced with a new threat that could literally ‘jump’ over the air defence network. NORAD now had to adapt and expand its focus from simple air-breathing threats to include ICBM threats. In order to mitigate this new threat in a time of decreasing budgets, NORAD decommissioned radar chains and reduced alert forces, investing the resulting savings in a space surveillance and missile warning system which, in concert with SAGE, would now provide worldwide air and space detection, tracking, and identification. Additionally, hardened command centres were constructed inside Cheyenne Mountain just southwest of Colorado Springs, and 600 feet beneath the Canadian Shield in North Bay.

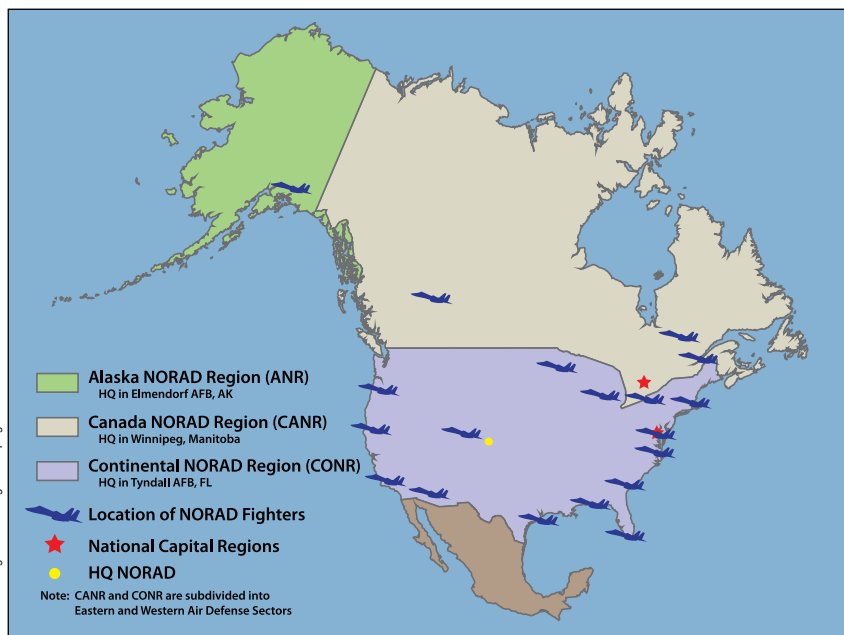
New forward operating locations (FOLs) and deployed operational bases (DOBs) across Canada were identified and developed for the northern deployment of fighters, and to increase aircraft mobility and survivability. Finally, the upgrade of several Pinetree Line radars provided a coastal extension of the North Warning System (NWS), and an overall communications upgrade was installed. These upgrades were complete by the early-1990s, and they provided a system which forms the basis of what NORAD uses today.

This refinement of focus from ‘LRA-centric,’ air-breathing threats, to aviation and space threats in the mid-1960s is illustrative of the adaptability that NORAD has demonstrated throughout its 54 years, in light of ever-changing threats to North American defences. As the SAGE system aged and computer technology improved, a new system called the Joint Surveillance System (JSS) replaced SAGE in the early-1980s. In the United States, implementation of the JSS meant that NORAD and the Federal Aviation Agency (FAA) would, for the first time, share radar data. In Canada, implementation of the JSS meant that Canada for the first time had full control



Cheyenne Mountain Command Center – 1984.

The end of the Cold War brought about more changes for NORAD. North American perimeter security now began to



NORAD Area of Responsibility

shift focus to include the growing importance of counter-drug operations in the North American psyche. NORAD's sensors and interceptors were envisioned to play a role in this new law enforcement mission, furnishing support to law enforcement agencies. This provided the impetus to the development of procedures to coordinate NORAD's efforts with those of Canadian and U.S. law enforcement agencies, a catalyst for the extensive interagency coordination that exists across NORAD today.

In the late-1990s, NORAD looked to modernize the aging JSS system, but, due to cost overruns, the project was cancelled. It was revived after the attacks of 11 September 2001, at which time the JSS modernization project replaced aging computers with today's Battle Control System - Fixed (BCS-F) at all the sectors. As well, the two Canadian SOCCs were amalgamated into the Canadian Air Defence Sector (CADS) in North Bay, and the four U.S. SOCCs were amalgamated into the Eastern Air Defence Sector (EADS), and the Western Air Defence Sector (WADS).

Responding to the attacks of 9/11, NORAD was again faced with refining its focus to include the identification and monitoring of, and reaction to, airborne threats originating within sovereign territory. NORAD was now not only responsible for its traditional military defence role for air-breathing threats and ballistic missiles, but it became a partner with other national agencies and departments in the security of Canada and the U.S. Interestingly, this also tied in with the new 'Whole of Government' approach being adopted by both nations. A plan, named Operation *Noble Eagle* (ONE), was devel-

oped for this new role, and it added several responsibilities to NORAD's mission. NORAD would now monitor and intercept flights of interest within continental U.S. and Canadian territory, and defend National Special Security Events (NSSEs) such as G8 Summits, North American Leadership Summits, political national conventions, the Olympics, and large sporting events, such as the Super Bowl. It also assumed responsibility for conducting city and critical infrastructure air patrols, and for the integrated air defence over National Capital Regions. NORAD would also provide interior continental radar and radio coverage through enhanced interagency cooperation with NAV Canada, Transport Canada, and the Royal Canadian Mounted Police in Canada. In the U.S., NORAD would partner with the Federal Aviation Administration, Transportation Security Agency, and the Department of Homeland Security. Of critical importance is the bina-

tional nature of NORAD, which has resulted in improved rules of engagement accepted by both nations in the interest of North American security.¹

The addition of Operation *Noble Eagle* represented a bellwether change to NORAD's *modus operandi*. Prior to 2001, its focus had always been outwards beyond the borders of North America. While it had been interested in civilian air traffic, its concern was primarily with aircraft entering North America. At that time, any aircraft originating within Canada or the United States had been assumed to be friendly. Post-9/11, tragically, threats were now also seen to potentially originate within North American borders, and subsequently, NORAD was required to look inwards as well. This *was*, and *remains*, a huge undertaking, and one to which NORAD continues to adapt. By comparison with the LRA threat, even if



A United States Coast Guard MH-65 *Dolphin* helicopter from Coast Guard Air Defense Facility Washington flies by the Lincoln Memorial during a training flight.

every peer nation's bombers were to fly into and out of North American Air Defence Identification Zones 'around the clock,' the numbers would be dwarfed by the sheer volume of civilian air traffic flying across, into, and out of North American airspace. As an example, in January 2012, Los Angeles International Airport (LAX) alone registered over 44,000 aircraft flight movements.² NORAD is now responsible for watching it all.

The 9/11 attacks also represented the catalyst behind the creation of new commands to focus upon the security of the Canadian and American homelands. U.S. Northern Command (USNORTHCOM) was established in Colorado Springs in 2002, and Canada Command (CANADACOM) in Ottawa in 2006. It was decided that the Commander of USNORTHCOM would be 'dual-hatted' as the Commander of NORAD, and that the command structures of the two commands would be amalgamated. Additionally, in 2008, the NORAD Command Centre at Cheyenne Mountain was joined with the USNORTHCOM Command Centre at Peterson AFB, Colorado Springs, and renamed the NORAD-NORTHCOM Command Centre, or N2C2 for short.

NORAD's mission, while it has evolved significantly since its inception 54 years ago, still has at its core the defence of North America. What has changed are the means that adversaries have developed to attack the continent. Today, NORAD's mission is defined in the following manner:

In close collaboration with homeland defence, security, and law enforcement partners, prevent air attacks against North America, safeguard the sovereign airspaces of the United States and Canada by responding to unknown, unwanted and unauthorized air activity approaching and operating within these airspaces, and provide aerospace and maritime warning for North America.³

NORAD Organization

The NORAD Agreement states that the NORAD Commander and Deputy Commander shall not be from the same country. Presently, NORAD is commanded by an American four-star general with a Canadian Deputy. These officers are responsible to national command authorities through the Chief of Defence Staff (CDS) of Canada, and the Secretary of Defense (SECDEF) of the United States. The Commander of NORAD has the N2C2 alongside him at NORAD Headquarters, monitoring all domains, Air, Space, Land, Maritime, and Cyber, for potential threats, and operating 24 hours a day, 7 days a week, 365 days a year.

Reporting to the NORAD HQ are the three regions into which North America has been divided to conduct the NORAD mission. These are the Alaska NORAD Region (ANR), the Canadian NORAD Region (CANR), and the Continental U.S. NORAD Region (CONR). The commanders of the individual NORAD Regions are 'dual-hatted' as follows:

- Commander ANR is also commander of the 11th Air Force;
- Commander CANR is also commander of 1 Canadian Air Division; and,
- Commander CONR is also Commander of the 1st Air Force.

Each region has an associated Air Defence Sector, or sectors (CONR has two sectors, EADS and WADS). Sectors function at the tactical level, providing surveillance, identification, tracking, and weapons control. The sectors require three things to successfully complete their mission: radar information, communications capabilities, and information services.

Air and Missile Warning Picture Development

Each sector receives raw radar data from the sensor systems in its Area of Operations (AO). This data, coupled with flight plan information and weather, is processed through the BCS-F system to provide track data. Tracks that trigger interest, due perhaps to flight plan deviation or communication difficulties are pushed to NORAD's common operating picture (COP) in the three NORAD Regions and the N2C2. The missile warning picture is developed from a world-wide network of radars, optical sensors, space-based sensors and ground stations. These various sensor systems allow NORAD the ability to detect a launch in more than one way, which is a key attribute in avoiding false indications.⁴ Usually, a launch is detected via the Space Based Infrared Satellite system (SBIRS), and a supporting detection by one of the radar systems is sought in order to



The Command Center Processing and Display System - Replacement (CCPDS-R) screen.

assist the battle commander in making an attack assessment – this supporting detection is called ‘dual-phenomenology.’

‘questionable’ targets, based upon information they have obtained from the FAA, Nav Canada, or intelligence sources.

For example, if it comes to the attention of any one of these agencies that a suspicious person is aboard an aircraft, the closest air defence sector is directed to keep an eye on the aircraft. Technicians track the aircraft on its flight plan, and watch for deviations. If the aircraft deviates from the flight plan, or if the agencies or the defence sector have reason to believe the aircraft is a threat, the defence sector notifies the NORAD Regional command Centre, which then decides if military aircraft should be scrambled to intercept the aircraft. Once on site, the intercepting crew can provide further information to the command centre, based upon their ‘eyes-on’ assessment of the aircraft. At this point, a decision is made as to what warning or control actions are to be taken by the NORAD Commander or his representative.



NORAD/USNORTHCOM photo

Alaskan NORAD Air Defense Sector Operations Center

The N2C2, Regions and Air Defence Sectors

Prior to 9/11, the battle commander’s task in an Air Defence Sector control room was to sort through the tracks on a computer-generated image of the North American continent. It was a *simpler*, if no less *critical* mission than that of today, and the potential adversary was a world power with relatively predictable motives. Post 9/11, with non-state actors and their proxy agents as potential aggressors, the battle commander and his team have the task of sorting hundreds of tracks on high-resolution screens to bring order to the picture, and to identify any that might represent a terrorist vector.

This identification process normally begins with the two organizations having primary responsibility for commercial air traffic over our nations; the FAA and Nav Canada. The events of 9/11 provided the catalyst for these and other Canadian and U.S. government agencies to lash together their capabilities in order to provide a credible air defence shield within our borders. Since 2001, FAA and Nav Canada representatives sit in the combined air operations centre in each sector. Since Operation *Noble Eagle* is considered a second front in the war on terrorism, these representatives are part of the commander’s battle staff, and they help identify aircraft that behave erratically.

Working attentively over the sea of tracks, technicians isolate possible

Potential actions depend upon what the aircraft does after being intercepted. For example, on 3 June 2005, a Virgin Atlantic Airbus A340 aircraft over the Atlantic was observed to be transmitting a transponder code meant to signify that a hijack was under way (i.e., Code 7500). Canadian CF-18 fighter jets were scrambled for intercept. The arrival of the fighters alerted the crew to its mistake and no further military intervention was required. Indeed, the response to this incident worked quite well. The CF-18s intercepted the jet in time to avert a more serious incident, and it was escorted to Halifax where a police response unit was prepared to meet the airliner.⁵



NORAD/USNORTHCOM photo

A pair of SU-27 fighters move into position to escort a simulated hijacked airliner during the second day of flying for Exercise *Vigilant Eagle* in Russia, August 2011, a joint exercise conducted between NORAD and Russia.

**NORAD's Threat Evolution:
Symmetric to Symmetric/Asymmetric**

At its inception, NORAD was conceived to deal with air threats originating from the USSR. In such a symmetric peer 'competition,' both sides have similar military capabilities, in this case, access to fighters, long-range bombers, radars, nuclear bombs, ballistic missiles, satellites, and cruise missiles. Another feature of a symmetric war is the presence of a defined front line, in this case, the boundaries of respective Air Defence Identification Zones (ADIZ). Unidentified or unauthorized aircraft entering these zones would be intercepted in short order, and their intention established. A third feature of symmetric warfare is being easily able to differentiate the combatants from the civilian population and each other, by uniforms and by equipment insignia.

Quite simply, symmetric warfare has 'rules.' Some of these are formalized in internationally accepted instruments, such as the Geneva and Hague Conventions. Others are implicit between the combatants, such as the concept of Mutually Assured Destruction (MAD) advanced during the Cold War; so long as the TU-95 Bears approaching the ADIZ did not do anything too provocative, the interceptors merely observed their actions. Until 2001, this was the type of threat NORAD dealt with, easy to identify, and demonstrating a rough idea of intent. Asymmetric warfare is completely different, and constitutes, in many respects, a more difficult problem.

In asymmetric warfare, if the weaker side fights according to symmetric 'rules,' they will lose. So they do not. They do not wear uniforms. They hide among civilians, they hit and run, and they attack whatever targets their enemy values but has left undefended. Often, those targets are non-combatants.⁶

"In asymmetric warfare, if the weaker side fights according to asymmetric 'rules,' they will lose."

Therefore, the spectrum of threats which NORAD now faces, and will for the foreseeable future, ranges from interstate threats from traditional actors, to asymmetric threats from transnational terrorist organizations which have both the ability and the willingness to cause a level of destruction once reserved solely for nation-states.⁷ Indeed, the latter presents a higher probability of threat than the former, but usually with greatly reduced consequence levels, and they are, in many ways, more difficult to defend against. Additionally, the nightmare scenario of a terrorist attack employing weapons of mass destruction has forced Western societies to view their national security in a new light, including the enhancement of law enforcement and other domestic security practices, and also the establishment of stronger links between the military and lead civil authorities.⁸ While NORAD interceptors certainly have the ability to down any threat aircraft, it is better for all concerned if hijackers are barred from boarding airliners in the first place. This is why NORAD has established strong ties with organizations such as the FAA, the Transportation and Security Administration (TSA), the Department of Homeland Security (DHS), the CIA, NAV Canada, Transport Canada, and the RCMP. These organizations have exchange representatives inside each other's operations centres.

Symmetry, Sovereignty and Canada's Next Fighter

As mentioned earlier, one of the characteristics of symmetric warfare is a clearly delineated front line. In peacetime, these are the borders between sovereign nations. A nation's claim to sovereignty over a region implies that nation's ability to exercise and enforce its national will, providing security and rule of law for its people within the region. NORAD's mission of aerospace control is how Canada and the U.S. largely perform this task within North American airspace. This is accomplished by tracking, identifying, and, if necessary, intercepting and potentially destroying aircraft that enter the airspace with malicious intent. It is this final option that brings us to the choice of the subject of Canada's next fighter.

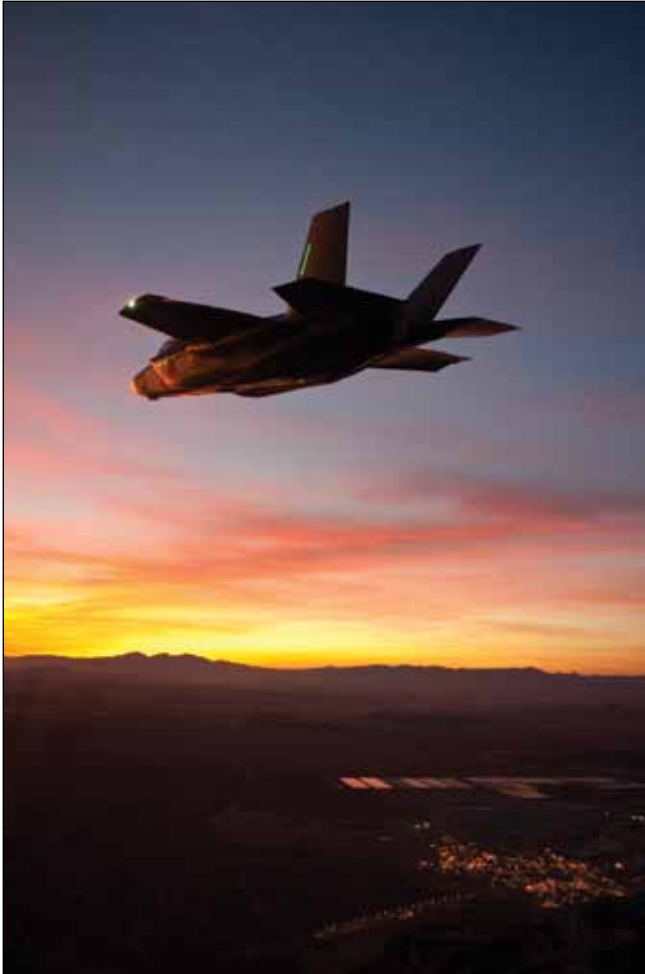
Fighter aircraft must possess a wide variety of capabilities, including extensive range, endurance, speed, survivability, the ability to perform air-to-air refueling, advanced reconnaissance capabilities, and interoperability with other military assets. While our current fighter aircraft, the CF-18 Hornet, is capable of performing its tasks at this time, it is reaching the end of its effective operational lifespan. It needs to



NORAD/USNORTHCOM photo

This F-16 Fighting Falcon continues to meet NORAD mission requirements for operations such as Operation Noble Eagle and other air sovereignty alert missions assigned to the command.

be replaced. Analysis of these capability requirements for a new fighter has "... made it clear that only a 5th generation fighter could satisfy our needs in the increasingly complex future security environment. We need a capability that helps us carry out our core missions of defending the sovereignty of Canadian and North American airspace through NORAD, providing Canada with an effective and modern capability for international operations, and effectively conducting joint operations with our Allies through NATO or a coalition."⁹



Lockheed Martin photo LM-6726150067

Currently, both Russia and China are in the process of developing 5th generation fighters of their own. If they have the capabilities provided by these advanced aircraft, and NORAD cannot match them, the current symmetry would end. As a simple example, a 5th generation fighter, due to its stealth properties and its more advanced sensor suite, will 'see' a 4th generation fighter well before it is spotted in return. Also, it must be noted that it is impossible to upgrade a 4th generation fighter into a 5th generation fighter. Stealth must be *expressly designed and built into* a fighter from the outset.

Maritime Warning: A new frontier for NORAD

Maritime security is critical to Canada and the United States. The reliance of both countries upon sea lanes of communication for trade and commerce is well established. Almost 90 percent of all world trade is conducted by sea. By comparison, only .25 percent is conducted by air.¹⁰ Canadian

Defence Scientist R.J. Sutherland assessed that the economic strength of Canada relies upon a community of interests that *was*, and *remains*, shared between the U.S. and Canada, uniquely presenting North America as a 'whole' comprised of two nations, as opposed to two singular disparate nations.¹¹ Hence, the binational nature of the NORAD agreement makes it an elegant tool through which to address the role of maritime warning.

Maritime Domain Awareness (MDA) is the *cornerstone of and enables all* maritime security activities. The Maritime Domain is defined as "... all areas and things of, on, under, relating to, adjacent to, or bordering on sea, ocean, or other navigable waterway, including the maritime related activities, infrastructure, people, cargo and vessels and other conveyances."¹² And yet, MDA represents a daunting challenge when one considers not only the vastness of the North American maritime areas, with 222,000 kilometres of coastline extending from the Arctic to the U.S. southern borders, but also the global reach of maritime entities, and the overlapping compendium of government departments and agencies with jurisdictional interests at stake.

In Canada, the 2004 creation of the Marine Security Operations Centres (MSOCS) on each coast demonstrated the development of cross-departmental efforts to develop MDA to assist in safeguarding this domain.¹³ The function of the MSOCs is to enable departments and agencies to work collaboratively to collect and analyze intelligence and other information in an effort to develop a solid awareness in their area of responsibility with regard to marine security.¹⁴ These centres continue to evolve, and they have



NORAD/USNORTHCOM photo

Lockheed Martin F-22A Raptors from the 94th Fighter Squadron – The 'other' American 5th generation fighter.

worked extensively to reduce roadblocks associated with sharing information across government departments, and across law enforcement agencies.

Interestingly, 2006 witnessed the addition of Maritime Warning to NORAD's mission. As retired Canadian colonel and NORAD academic Alan Stephenson notes: "In theory, (maritime warning) is similar to aerospace warning, but in practice, it is far more difficult and complex. Aircraft movements are generally of short duration, conducted on predetermined routes, and moderate in numbers compared to maritime traffic that is of longer duration, conducted on less regulated routes, and voluminous in numbers."¹⁵ With this new role, NORAD became the sole bi-nationally-mandated organization with the responsibility to warn the governments of Canada and the United States in the event of a maritime threat to North America. The NORAD agreement does not specifically assign any assets to this mission, but rather, it seeks to leverage established MDA efforts in both nations to build a consolidated maritime Common Operational Picture (COP). This COP enables the NORAD Commander to assess when a maritime warning should be issued.¹⁶

The assignment of the maritime warning mission to NORAD stirred controversy among many agencies and organizations that had long been employed in developing their own MDA, and, in some cases, in acting upon that awareness. However, maritime stakeholders had often observed that achieving MDA is exceptionally complex and too broad in scope to be the sole responsibility of any one department in either nation. Hence, the complex arrangement of departments and agencies with overlapping authorities and jurisdictions that have to deal with littoral and internal waters. Upon NORAD's arrival on the MDA scene in 2006, the question became: What value could NORAD add in this arena? This was particularly germane, given that NORAD's mission in this regard was to be only maritime warning, the success of which would rely upon MDA provided by many external sources.

But since 2006, maritime security stakeholders have converged upon the realization that NORAD could indeed add a very valuable element. NORAD's global area of operations, developed much earlier to fulfill its mandate of providing warning of ICBM launches worldwide, gave it a global perspective into which MDA could fit naturally. NORAD was therefore well positioned to become a strong binational advocate for MDA, since this is a primary requirement to successfully executing the maritime warning mission.

NORAD's efforts in this arena have therefore focused upon several tasks: advocating for MDA, and drawing together the products of dozens of MDA intelligence sources into a single COP; developing processes to assess that information and effectively identify threats; and identifying the organizations to be warned in order to affect a response. Unlike NORAD's aerospace warning and control missions, the maritime warning mission is 'information-based only.' Maritime threats are defended against by Canada and the United States under their own national maritime security and defence plans.

As an example of how the process can work effectively, in August 2011, the crew of the vessel *Sun Sea* attempted to smuggle 492 Tamil migrants into a western Canadian port. The development of this event provided a good example of binational information-sharing and collaboration months in advance of the vessel's arrival within 500 miles of the coast. When it became necessary, NORAD provided a consolidated warning, ensuring that both nations were aligned to this potential maritime threat. In response, the *Sun Sea* was intercepted by the Canadian Navy, the RCMP, and the Canada Border Services Agency (CBSA) off British Columbia's coast in a well-coordinated effort.

The development of effective maritime warning and response procedures require an assessment of a spectrum of threats. At the most serious end of such a spectrum would be a threat involving a rogue state-sponsored vessel arriving off the North American coastline with the ability of launching either a ballistic or a cruise missile. The 1998 Rumsfeld Commission report assessed such a threat as credible. In 2004, then-Secretary of Defense Rumsfeld emphasized that "... one of the nations in the Middle East had launched a ballistic missile from a cargo vessel. They had taken a short-range, probably Scud missile, put it on a transporter-erector launcher, lowered it in, taken it out into the water, erected it and fired it, and the ship that they used was using radar and electronic equipment



DND photo H52011-H003-008 by Corporal Rick Ayer

HMCS *Summerside* photographed during sovereignty exercise Operation *Nanook 11*, 10 August 2011.

that was no different than 50, 60, 100 other ships operating in the immediate area.”¹⁷ Although credible, the likelihood of such a threat is low, and it is even more unlikely that such a system could make it to within firing distance of North America without being identified and dealt with in international waters. Nevertheless, the proliferation of cruise missiles, and the possibility of disguising such a missile within a standard 20-foot shipping container, is debatably becoming more likely. The U.S. National Strategy for Maritime Security has made it clear that motivated terrorists would, most likely, use the maritime domain to transport weapons of mass destruction into attack range. Clearly, the importance of an effective MDA strategy cannot be overstated.

At the other end of the spectrum are events involving incursions into national Economic Exclusion Zones (EEZ), which may require simple awareness, or manifest themselves as other potential situations that could require months to develop into threats. Clearly, there was a need for another form of maritime communication less urgent than a warning. For this purpose, NORAD has introduced the NORAD Maritime Advisory message, which enables the Command to advise the two governments and binational mission partners, with much greater lead time, of an *emerging* potential threat. It is intended to ensure all players have full situational awareness long before it may become necessary to take action to defeat that maritime threat. It can be expected that the NORAD Maritime Advisory message may become much more commonplace in the future than NORAD Maritime Warnings.

As the NORAD Maritime Warning mission moves into its sixth year, NORAD has become recognized as one of the major players in MDA, and has embraced this role with equal priority to its aerospace warning and control missions.

Ballistic Missile Defence

In 2005, then-Prime Minister Paul Martin decided that Canada would maintain its established policy of not participating in Ballistic Missile Defence (BMD). This policy has lasted to this day. The U.S. has not asked Canada to change its mind, although Canadian participation would likely be welcomed.

“The current design of the U.S. system is not intended to alter the strategic balance.”

In order for Canada to reconsider its position on BMD, there would likely have to be a significant change in the threat level associated with ballistic missiles. Currently, the countries possessing these weapons have been governed implicitly by MAD, wherein if one nation launched, the resulting counterstrike would annihilate the attacking nation. However, in recent years, new nations have been working on

or have developed nuclear capabilities, specifically, Iran and North Korea. Each of these nations has ICBMs that *can, or will soon be able to be* armed with nuclear warheads. These states can best be described as ‘unpredictable,’ and their motivations are opaque at best. In addition, North Korea has proliferated these technologies, further increasing the threat.

The logic behind the U.S. decision to pursue BMD is simple: if even one missile impacts on North America or her allies, the consequences would be catastrophic. Potentially, there would be millions of deaths, cities rendered uninhabitable, large drifting clouds of radioactive dust, and an electromagnetic pulse that could devastate electronics in a large swath around the blast.

The current design of the U.S. system is not intended to alter the strategic balance. It would be overwhelmed if any of the major nuclear powers launched, even if every interceptor was successful. It is intended to stop a limited attack wherein only a few missiles are launched.

The problem is that Canada currently has no say in how the system would be postured or employed. Except for Canada, all other major U.S. allies (Australia, Japan, the U.K., and NATO) are involved in BMD to some degree. The primary factor in their decisions is the aforementioned proliferation. Whether Canada should join them in participating in BMD will remain an issue for the Canadian government. Should someday the answer be in the affirmative, the NORAD agreement will provide effective refuge for this role.



NORAD/USNORTHCOM photo

A CF-18 *Hornet* refuelling in support of Operation *Podium*, part of the airborne security provided to the 2010 Vancouver Winter Olympics.



NORAD/USNORTHCOM photo

An F-15E *Strike Eagle* witnesses the launch as Space Shuttle *Atlantis* heads into space for the last time, 8 July 2011.

The Way Ahead

In his book *From Good to Great*, author Jim Collins identifies a key common trait of highly successful organizations as being the ability to narrowly focus resources upon their field of competence.¹⁸ It may be argued that much of NORAD's successful longevity relates to just such a continuity of focus, and the command having 'kept its eye on the ball' throughout its adaptations. It has, since its inception, been focused upon aerospace warning and control, and has continued to adapt appropriately to outpace its threats. Certainly, while the number of serving NORAD personnel has dropped by an order of magnitude since peaking in the 1960s, NORAD now more heavily leverages technology to carry out its missions. With this in mind, it can be expected that NORAD will in the future continue to focus on getting better at what it does. To do so, it will *advocate for* and *aid in* the development of technologies and techniques that will ensure its ability to identify and track the movements of long range bombers, to better detect missile launches and track objects in space, to more quickly identify aircraft in North American airspace that could represent threats,

and to more effectively intercept such threats and others that may arise from among the large numbers of general aviation aircraft at hundreds of civilian airfields across Canada and the United States. For example, the North Warning System, last upgraded in the early-1990s, will require refurbishment or replacement beginning around 2020. The current radar infrastructure, tied to sites of the former DEW Line, does not provide coverage over the Canadian Arctic Archipelago. There are difficult cost-benefit questions to be answered regarding a NWS upgrade, and the eventual extent of its reach, and NORAD will certainly advocate for the development of systems that will push the air defence perimeter as far north as possible, exemplified by the project to modernize and upgrade ageing ground-based ballistic missile warning radar systems. This project will modernize the Phased Array Warning System (PAVE PAWS), the Ballistic Missile Early Warning System (BMEWS), and the Perimeter Acquisition Radar Attack Characterization System (PARCS).¹⁹ Similarly, for the maritime warning role, NORAD is highly interested in incorporating the surveillance capabilities of innovative equipment such as the High Frequency Surface Wave Radars under consideration by Defence Research and Development Canada (DRDC).²⁰

Although there has been little change to NORAD's fundamental role over the years, there has been a continuous evolution of its mission. As discussed earlier, NORAD's early mission of deterring, detecting, and intercepting Soviet bombers, soon expanded to missile detection and warning, with the later inclusion of internal air traffic, and, much later, the warning of threats from the seas. The uniqueness of the binational agreement encourages the use of NORAD to address threats of interest to Canada and the United States. One could therefore



17 Wing Publishing Winnipeg

The sheer mass of Canada's Arctic is dramatically reinforced by this overlay of it by Central and Southern Europe.



CSA image

RADARSAT 2-01

shore surveillance. However, even with such satellite coverage, there would remain a requirement for air surveillance and coastal maritime radars in the area to effectively provide real time MDA.

Conclusion

NORAD will soon celebrate its 54th birthday. Throughout its existence to date, it has experienced remarkable consistency with respect to its role, although its mission and operational techniques have been refined and augmented frequently. The numbers of servicemen and women wearing NORAD insignia has dropped from hundreds of thousands to around 7000, but government leaders nevertheless rely just as heavily upon the threat assessments and warnings provided by the NORAD Commander, and upon his aerospace control alert

broaden the discussion to speculate upon what else could fit into the NORAD mission. An area of interest that immediately comes to mind is the Arctic.

The Arctic region has always been of great interest to NORAD, as it represents the most direct route from Russia to North America. However, increasing numbers of parties wish to make use of international Arctic airspace and sea lanes in order to shorten itineraries, optimize trade routes, and seek new adventures. From a NORAD perspective, the Arctic region is of interest with respect to both the aerospace and maritime domains. But the Arctic region is huge, remote, and relatively uninhabited. The Yukon, Northwest Territories, and Nunavut alone have more surface area than the entire continent of Europe. NORAD's Arctic AO includes all of the aforementioned territory, plus the state of Alaska. There are few highways in the region. Therefore, transportation lines are by air, supplemented by sea during the summer months. In addition, the Arctic coastline makes up a vast portion of the 220,000 kilometres mentioned earlier. Each Arctic cove has the potential to act as a haven for smuggling goods or people. Developing an effective method of surveillance over this area of operations is a significant challenge.

It is clear that effective Arctic surveillance will require the bolstering of space assets of the type represented by Canada's Radarsat III. A constellation of such satellites would provide near-persistent Arctic off-

aircraft standing by at all times.

The NORAD brand often represents much more than NORAD's focused missions. As evidenced by its frequent citation in the speeches of national leaders, the NORAD Agreement represents the best of what can be produced when Canada and the United States seek similar goals. Lessons will certainly be drawn from the binational NORAD experience for application in other areas of common interest such as the Arctic, Cyber Warfare and Beyond the Border initiatives. Meanwhile, the men and women of NORAD will continue to maintain the watch.



Lockheed Martin photo LM-241028739

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US Army photo by Major Mike Humphries

A pair of F-22 Raptors operating over Alaska as part of Exercise Vigilant Eagle, 8 August 2010.



A group of Canadian Forces and Afghan National Army soldiers prepare to return fire during a dawn skirmish with the Taliban during Op Season, a company-level operation in the Panjwaii district of Afghanistan, 20 June 2007.

CULTURAL IRREGULAR WARFARE: THE CROSSROADS BETWEEN STRATEGIC CULTURE AND NON-KINETIC STRATEGIES EMPLOYED BY NON-STATE ACTORS

by Juan Castillo

Introduction

When entering the realm of violent non-state actors (VNSAs) and low-intensity conflicts, it becomes imperative to acknowledge the great diversity that exists underneath these headings. As noted by Dr. Ulrich Schneckener, Professor of International Relations at the University of Osnabrück, a variety of groups that differ in motivation, behaviour, organization, and membership form the general notion of VNSAs. Within this great diversity there is a great deal of confusion, as some of these actors tend to be categorized by the tactical tools they employ, such as terrorism or guerrilla warfare.¹ Thus, when labelling an actor as a terrorist or guerrilla organization there is a risk of neglecting salient features that define both the organizational behaviour and motivation behind these groups. Conversely, these violent groups do share two common qualities: their use of violence as the main vehicle to advance their interests (as the name implies) and some sort of social organization. The first and

most significant quality places the non-state actors in a recalcitrant position towards the state, as the latter's role has always been the legitimate use of violence.² Also, the use of force creates a political effect in which powerful violent actors manage to generate and run "para-states," where the state's monopoly on violence is broken.³

Nevertheless, the resources that VNSAs enjoy are limited in comparison to those of the state; thus, the toolbox of unconventional warfare becomes their core instrument for

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effecting political change. Even though there are instances in which, due to the hybridization of warfare, violent non-state actors have been able to minimize the capabilities gap (i.e. Tamil Tigers, Hezbollah, and the Mexican cartels), these groups will ultimately rely upon maximizing the advantages of asymmetric warfare.⁴ This strategic choice brings the local populace to the centre of the struggle between the state and the violent actors. The U.S. Army-Marine Corps Counterinsurgency Field Manual states that any irregular warfare campaign will rest its centre of gravity upon the civilian population.⁵ The VNSA's ability to infiltrate civil society thus becomes as significant as any military action. For the actor to effectively recruit, acquire logistical support, and, (most importantly), obtain some sort of legitimacy, it must be able to align the population with its own *raison d'être*. Consequently, the civilian's normative perceptions become a contested space where the violent actor's narrative seeks to usurp the state's natural position of authority.

This article aims to examine how different armed non-state actors employ non-kinetic doctrines and tactics to influence civilian populations as they seek to erode the normative power of the state. To accomplish this, it will look at the VNAs' choice of non-kinetic activities through the lenses of strategic culture, as this paradigm helps to elucidate the way in which these groups' organizational features and political perceptions influence their strategic choices.⁶ It is important to note that kinetic and non-kinetic actions are interlinked, and thus it should be considered how they complement each other. Accordingly, this article will be divided into two comprehensive sections that will discuss the theoretical framework behind the development of non-kinetic doctrines and its application in reference to the Taliban insurgency.

The Intrinsic Trinity: Strategic Culture, the Civilian Populace, and Non-Kinetic Action

As mentioned previously, 'VNAs' is a broad term incorporating different types of social organizations that use violence to advance their interests. Accordingly, the global presence of actors such as illicit armed groups, youth gangs, terrorists, militias, insurgents, and transnational criminal organizations have made the state's monopoly on violence nothing more than a "convenient fiction" in the 21st Century.⁷ The very existence of these actors sets them in opposition to the political, social, and economic order desired by the state. This does not, however, define the VNAs' desired interaction with the state. For instance, criminal gangs are interested in maintaining existing state structures because these facilitate the accumulation of wealth through a parasitic relationship.⁸ If anything, this type of actor normally seeks to stay undetected, since, under normal circumstances, the state can neutralize it through formal force mechanisms, such as law enforcement agencies.⁹ Other types of VNAs may have pro-state political interests, and thus, may be supported by agencies within the state structure.¹⁰ This article, however, will focus upon VNAs that not only pose an ontological challenge to the state, but also seek to usurp its power by advancing political outcomes through coercive means. Hence, this section seeks to elucidate the relationship between anti-state VNAs, their *modus operandi*, and the civilian population.

The anti-state VNAs (unlike the criminal or pro-government type) is able to organize, plan, and execute physical attacks that have "... strategic effects against the state."¹¹ Moreover, the armed non-state actor seeks to slowly acquire the state's characteristics by exercising power in a wide range of matters within a controlled geographical space.¹² Thus, the

VNAs is faced with the complex tasks of undermining the state's security apparatus while pilfering its legitimacy. The state normally has the upper hand in matters of coercive force, since institutions demand force mechanisms with which to back them up. Similarly, legitimacy is something that the armed non-state actor lacks, due to its inherent illegal character within the state's framework.¹³ Therefore, irregular warfare is a rational response to these challenges. According to US Air Force doctrine, irregular warfare is characterized by being a "violent struggle" in which non-state actors compete for legitimacy and "influence over the relevant populations."¹⁴ Accordingly, the use of physical violence accompanies a political struggle for popular support. The needs and expectations

"As mentioned previously, 'VNAs' is a broad term incorporating different types of social organizations that use violence to advance their interests."



A man holds a placard in Geneva during a demonstration in protest against Sri Lanka's military offensives in territories held by Tamil Tigers, 16 March 2009.

of the VNSA determine the relationship between the non-state actor and civilian populations.

play the same role among all VNSAs. As Smith points out, elements such as the relationship between the leadership and membership, the group's overall situational awareness and the actions it undertakes are all structured on the actor's strategic culture.¹⁹



Reuters RTR1HM7P

A Lebanese girl waves a Hezbollah flag in front of a poster of Hezbollah leader Sayyed Hassan Nasraliah during a rally in Beirut, 22 September 2006.

In this way, the content of a VNSA's internal narrative affects not only its normative structure, but also its operational activities. According to Sir Lawrence David Freedman, Professor of War Studies at King's College, London, narratives are in themselves "strategic" because they are "deliberately constructed" and reinforced with "current ideas that when not grounded on actual evidence seek to appeal to the human emotion."²⁰ That is, narratives seek to generate response from a target audience either within or outside a group. More importantly, however, the narrative allows any strategic actor to define its *position* in relation to others, and, consequently, its *actions* towards them.²¹ In some instances, the narrative itself is used to generate specific reaction among civilians. Al Qaida, for example, had tailored propaganda campaigns to sub-populations in the Muslim world that are under political stress.²²

Violent Non-State Actors and Strategic Culture

The paradigm of strategic culture explains the VNSA's interactions with civilian populations by elaborating its strategic preferences and choices. A study made by the US Defense Threat Reduction Agency (DTRA)/Advanced Systems and Concepts Office (ASCO) defines strategic culture as:

"Shared beliefs, assumptions, and modes of behaviour, derived from common experiences and common narratives that shape collective identity and relationships to other groups, and which determine appropriate ends and means for achieving security objectives."¹⁵

Traditionally, this notion has been assigned to the study of states' behaviour in the international system since it was introduced in the 1970s.¹⁶ However, many VNSAs are sufficiently complex in organization to be examined through this framework as well. According to Colin Grey, strategic culture is "contingently prescriptive" by providing "a guide to strategic action" in the battlefield.¹⁷ Moreover, strategic culture ought to translate an actor's interests and beliefs into operational reality.

Social and political scientist James M. Smith argues that political traditions, history/experience, beliefs/values, geospatial situation, classical texts/stories, economic resources, and security concepts all help determine an actor's strategic culture.¹⁸ As these determinants shape the VNSA's strategic culture, they provide the medium in which decision-making processes and information flows take place. Given the varied nature of armed non-state actors, these determinant variables will be heterogeneous as well. Regardless, these determinants

Even though their major political goal was to gather the entirety of Muslims behind their cause, the organization attempts to influence specific segments of the populace that they perceive as being more responsive.²³



DND photo IS2011-2005-07 by Master Corporal Angela Abbey

An Afghan villager halts for a Leopard C2 tank from the 1 R22eR Battle Group as it patrols the construction site on Route Hyena, 22 February 2011.

Finally, the VNSA's leadership's interaction with strategic culture is equally significant when examining the organization's behaviour. Traditionally, the leadership element within a VNSA is seen as the provider of "... strategic direction to break the ties between the population and the government and to establish and maintain "the credibility for the movement."²⁴ However, an actor's strategic culture can affect how the leadership makes choices and develops preferences when confronted with adversity. Distinguished professor and leadership theorist Edwin P. Hollander noted that leaderships reflect a

“... dialectical relationship between strategic culture and operational behaviour.”²⁵ Also, there can be some level of stress between ad hoc leadership decisions and the strategic culture shared by the collectivity. Nevertheless, the leadership elements within a VNSA are “strategic users of culture” that have the power to steer the direction of the cultural discourses within the organization, and thus, to set its general direction.²⁶ Hence, the VNSA’s strategy towards the civilian population and the state is defined by the leadership’s ushering of the actor’s culture.

The VNSA’s reliance upon the populace has led some distinguished scholars, such as Martin Van Creveld, to describe low-intensity conflicts as “non-Trinitarian” wars in which the roles of the “army” and the “people” become amalgamated.³¹ However, VNSAs are separate political entities in their own right, which, regardless of their motivation, emerge when there is “feasibility for conflict” within state structures.³² The interaction between the VNSA and the population is better described as a pathogenous relationship in which the armed actor seeks to infiltrate and influence the civilian communities

within its area of operations. The Australian scholar David Kilcullen, a leading theorist on counter-insurgency and counter-terrorism, argues that cases such as Al Qaida show how a VNSA seeks to ‘infect’ areas where the state is weak in order to start a ‘contagious’ operation that can penetrate similar areas, and thus influence a significant segment of the population.³³ Moreover, as Kilcullen points out, areas with weak state institutions resemble sick organisms that can be taken over by an invasive bacterium; i.e. the VNSA.³⁴ In addition, USAF officers and scholars Troy Thomas and William Casebeer have used the Applied Systems Theory to explicate “the energy flows” between VNSAs and the civilian populace.³⁵ According to this paradigm, an organization comprises different sub-systems that interact with the environment to meet its needs. Thomas and Casebeer observe that functions such as support, maintenance (internal entropy and culture), cognition (decision-making ability) and conversion (tactical actions) are carried out by sub-systems within the VNSA, which act in the same way as organs in a living organism.³⁶ Like a cardio-respiratory system, the support sub-system enables the VNSA macro-system to perform sustenance functions by acquiring recruits, stakeholders, and logistical assets that must come from the civilian population.³⁷



Protesters hold banners and flags, one showing an image of ‘Che’ Guevara, during a national strike in Lima, Peru, 9 July 2008.

The Human Battlespace: The Strategic Civilian Populace

The VNSA’s success in achieving political change depends upon the local population’s support. Therefore, it becomes imperative for the non-state actor to develop a doctrine through which it can produce the desired effects on the population, and in that way, satisfy its strategic needs. The US Air Force Irregular Warfare White Paper states that the “... support of the people determines which side prevails” in the VNSA’s struggle against the state: the people provide the necessary “moral or physical strength, freedom of action” and “the will to act.”²⁷ A belligerent entity survives only by acquiring and maintaining access to demographic resources, which provide “multidirectional” strategic and tactical goods such as “... logistical support; a recruiting base; intelligence; cover and concealment.”²⁸ For instance, Mao Tse-Tung, described the civilian populace as the “true bastion of iron” and the “richest source of power to wage war” against the state.²⁹ Ernesto “Che” Guevara noted that the VNSA engaged in guerrilla warfare must become one with the people in order to succeed, and not become “exterminated like criminal gangs.”³⁰



During Op *Crazy Flight 1* (one of the last operations for the Royal 22e Régiment, Charlie Company, before the Canadian Forces ends its mission in the Southern region of Afghanistan), Afghan National Police and Afghan National Army accompany Canadian Forces soldiers during an early morning operation in Panjwa'i District to clear several small villages and compounds.

A Model of Non-Kinetic Action

The civilian population's high strategic value in an asymmetrical conflict obliges the VNSA to obtain certain desired outcomes from it. The US Army-Marine Corps Counterinsurgency Manual notes that there are four methods through which armed actors seek to generate support: persuasion, coercion, encouraging over-reaction, and apolitical methods (economic incentives).³⁸ These methods are not mutually exclusive and can be combined according to the VNSA's choices. Most significantly, they involve both physical and non-kinetic actions, which can potentially complement each other. However, the non-kinetic element is most significant, as, without requiring "physical momentum," it can generate "effects" that will quickly translate into "support" from the civilian population.³⁹ Ultimately, it influences the population's collective normative values and aligns/morphs them towards the VNSA's strategic objectives.

Non-kinetic actions can include direct communication, indirect communication, and the so-called "voice of actions," all of which vary according to the VNSA's doctrine and expectations of the population.⁴⁰ Direct communication involves any sort of direct interaction with the populace. For example, Mao's *Three Rules and Eight Remarks* ensured that the Chinese communist insurgents behaved well towards civilians, and thus emphasized that the "People's Army" was the "Army of the People."⁴¹ Similarly, Mao's ideological cadres indoctrinated peasants in order to influence the population directly through non-kinetic means.⁴² Indirect communication refers to information or propaganda that the VNSA can supply without being physically present (i.e., websites, print media, or clandestine radio stations). The Iraqi insurgency, for instance, used the Internet as a "virtual sanctuary," not only to broadcast jihadist propaganda, but also to facilitate recruitment and receive economic support.⁴³ Finally, the "voice of actions" refers to the distribution of public goods, such as infrastructure or health care, to generate popular support.⁴⁴ For example, Hezbollah and Hamas have accomplished this by providing public goods that local governments have failed to or been unable to deliver.⁴⁵

Strategic culture plays an important role in shaping the choices and preferences that direct these operational activities. The actor's culture simultaneously defines its position towards the population and provides guidance on how to interact with it. Since cultural determinants such as narratives, myths, and ideologies provide a 'theory' with respect to how to achieve 'victory,' they will conceptualize strategies of non-kinetic action towards a populace.⁴⁶ The VNSA's leadership elements can also modify an established non-kinetic doctrine. Tribal, socio-

economic, religious, or ethnic divisions among the civilian populace can also influence the leadership's choices, since the actor is likely to focus upon sub-groups that are susceptible to its influence.⁴⁷ The dialectical relationship between the VNSA's strategic culture and its leadership will determine what non-kinetic strategy will effectively influence the population, while simultaneously adhering to the actor's political and cultural dogma. In addition, the non-kinetic doctrine must complement the VNSA's use of violence, and advance its overall strategic objectives.



Still image taken from a video shows Pakistani Taliban fighters holding weapons as they receive training in Ladda, South Waziristan tribal region, 15 December 2011.

Reuters/Reuters TV RTR2V9.1

The Taliban: Cultural Determinants as Cohesion in a Decentralized System

David Kilcullen argues that, in its present form, the Taliban is an "insurgent coalition" composed of a "fragmented series of tactical alliances of convenience."⁴⁸ Currently, the major factions within the "Greater Taliban" are the Taliban Quetta shura (council), which is mainly the leadership of the 1990s Taliban regime led by Mullah Omar, Tehrik e-Taliban Pakistan, and smaller movements, such as Lashkar e Tayyiba (LeT), Tehreek-e-Nafaz-e-Shariat-e-Mohammadi (TNSM), plus surviving elements of Al Qaida.⁴⁹ This section will examine how the current Taliban organization's over-arching strategic culture has helped shape its current non-kinetic strategy.

This general description of an insurgent federacy may give the impression that today's Taliban is somewhat chaotic and without effective central command structures. However, according to Antonio Giustozzi, a research fellow at the Crisis States Research Centre, London School of Economics, between 2002 and 2006, the Quetta shura successfully co-opted and re-absorbed the lesser insurgent groups, and now exercises a high degree of control over them.⁵⁰ The only exception has been HiG, which, since 2004, has violently clashed with the Taliban.⁵¹ Even so, the Taliban and its sub-

"Strategic culture plays an important role in shaping the choices and preferences that direct these operational activities."

17 Wing Publishing Winnipeg



Map of Afghan Tribal Distribution

sidiaries remain the major VNSA operating throughout Afghanistan. Shahid Afsar, Chris Samples and Thomas Wood argue that the Taliban is a “network of franchises” in which a “local Taliban” gains recognition from the organization’s main hierarchy (Quetta shura) in return for “support and cooperation.”⁵² Consequently, the local franchise will support the Taliban grand strategy, while retaining local freedom of action that allows it to exploit “tribal loyalties” or other socio-cultural structures within its area of operations.⁵³ To maintain the general direction of the organization’s grand strategy, the central shura appoints six regional commanders to oversee that the franchises act according to the leadership’s interests, while allowing them considerable flexibility in their organization and tactics.⁵⁴ These regional commanders are responsible for disseminating the central shura’s directives as fatwas (religious decrees), which the leaders of the local cells must follow in the context of their operational situation.⁵⁵

Given the extensive geographical area covered by each regional command, cultural determinants represent the Taliban leadership’s primary influence upon the organization’s strategic direction. For instance, since the Taliban’s shift from being a vertically integrated regime to a horizontally managed insurgency, Mullah M.

adhere to this rulebook, reflecting a functional command and control structure between the Quetta shura and the local Taliban cells.⁵⁹ Through such narratives, the central leadership is able to ensure that the local cells are part of the organization’s main effort without compromising their decentralization. Both Kilcullen and Giustozzi note that the ability of local Taliban to operate without central support has become one of their strengths, as any COIN operation must take into consideration the difference that exist in the *modus operandi* of each cell.⁶⁰



Reuters RTR2XRJU

Supporters of UCPN-Maoist carry portraits of former Chinese chairman Mao during a rally marking the 17th anniversary of the “People’s War” in Kathmandu, 13 February 2012.

By the same token, the Taliban's grand strategy is divided into four sequential stages. First, the Taliban seeks to mobilize the religious public in Afghanistan and neighbouring states; next it will rally the Pashtun tribes through ideological means against the Kabul government; thirdly, it will secure legitimacy for the movement while people lose confidence in the government; finally, it will re-establish an Islamic emirate comprising present-day Afghanistan and Pakistan.⁶¹ In principle, this strategic scheme follows a classical irregular warfare framework through which victory is achieved through gradual popular support. Moreover, Seth Jones argues that the general strategy being adopted by the Taliban allows each local cell to develop its own logistics and support networks, which are tailored to the local population's characteristics.⁶² Clearly, this approach has helped the Taliban regain strength in an extremely heterogeneous battle-space. By way of illustration, some observers initially suggested that the Taliban has traditionally favoured the Ghilzai Pashtun tribe based in Kandahar province (the group to which Mullah M. Omar belongs).⁶³ Nonetheless, as demonstrated by Guistozzi, the Taliban "did not want to present themselves as aligned with a particular tribe or community," as they yearn to expand and operate throughout the whole of Afghanistan.⁶⁴ Indeed, the Quetta shura currently contains primarily members of non-Ghilzai tribes (mainly Durrani and Karlanri), demonstrating that the Taliban's decentralized organization is inclusive through ideology rather than exclusive through ethnicity.⁶⁵ Simultaneously, the Taliban franchises have successfully gathered support from other ethnic groups, as in the case of pro-Taliban cells composed mainly of Hazaras and Tajiks in the northern part of the country.⁶⁶ Its decentralized system allows the Taliban to use local commanders that are native to their area of operations and thus exploit existing cultural dynamics regardless of the region's human geography.⁶⁷

Non-Kinetic Doctrine: Mullahs and the Shadow Emirate

Within the Taliban's decentralized system, non-kinetic doctrine directs local Taliban commanders in translating the main shura's guidance into operational action. While a cell's individual tactics must be tailored to the target population, the Taliban overall seems to use similar direct and indirect non-kinetic actions throughout its area of operations. For instance, David Kilcullen notes that the Taliban has launched a propaganda campaign throughout southern Afghanistan that focuses on five simple slogans: "Our party, the Taliban;" "our people and nation; the Pashtun;" "our economy; the poppy;" "our constitution, the Shari'a;" and "our form of government; the emirate."⁶⁸ In principle, the purpose of these "rallying calls" has been to create a unified front among competing groups (i.e. Tribal elders vs. Islamists vs. poppy growers).⁶⁹ This approach also permits local commanders to focus on non-kinetic tactics that target the interests of major regional stakeholders, such as poppy growers in Southern Helmand, Islamists in Kandahar or tribal patriarchs in Zabul.

Nonetheless, at the tactical-cell level, local Taliban commanders can employ a variety of tactics that shift from district to district. The Taliban has a wide-ranging psychological operations arsenal that can target specific audiences in diverse

operational theatres. In the case of indirect non-kinetic action, the Taliban has learnt that technology in the form of multimedia goods can "serve its cause" as it did for the insurgency in Iraq.⁷⁰ For example, the Taliban has distributed thousands of DVDs and VCDs in Kabul, Kandahar and other major cities containing footage of "successful" Taliban operations, speeches by mullahs regarding the "inherent clash" between Islam and the West, and other recordings showing jihadists from all over the Muslim world.⁷¹ Sympathizers of the Quetta shura are able to disseminate such propaganda even in areas controlled by the government or NATO. The Taliban also seeks to reach protected populations using clandestine radio stations and websites, which can reach audiences all over the region.⁷² Furthermore, the Taliban has also become quite skilful in using official media outlets, such as regional and international news agencies, to promote itself and gain new recruits or gather popular support.⁷³ According to (until recently) TIME Magazine's Kabul correspondent and multimedia journalist Jason Motlagh, the Taliban currently has the upper hand in this sphere, as the GOA has been sluggish in developing a propaganda strategy that could counteract the insurgents' multimedia approach.⁷⁴ However, the strength of the Taliban's non-kinetic doctrine really lies in its direct action tactics, as most Afghans do not own TVs, radios, or computers.⁷⁵



Hamas activists raise Islamic banners and flags in the air in front of a large poster draped over a building in the background at a rally at Al-Najah University, Palestine, 9 December 1995.

Reuters RTXLW/P

DND photo IS2011-1016-13 by Sergeant Matthew McGregor



During Op *Crazy Flight 1*, Afghan National Police, Afghan National Army and Canadian Forces soldiers question a villager in the Panjwa'i District.

The direct non-kinetic activities (both persuasive and coercive) employed by local Taliban cell commanders depend upon the cultural context of both the cell and the referent civilian populace. For example, Kilcullen notes how the elders of the Mashud tribe in the Afghan-Pakistan border encourage some of their youth to fight and support the Taliban as a result of tribal loyalties to Taliban commanders.⁷⁶ Also, the commanders may use economic means to encourage local civilians to join their lines or to support them, especially since the latter may not have any political preferences towards the Taliban. Instead, these individuals work as 'part-time' insurgents who are remunerated for specific combat tasks. As Kilcullen points out, some of them temporarily join the Taliban and become "accidental guerrillas," due to a lack of opportunities in their communities.⁷⁷ Also, the insurgents can offer the prospect of *badal* (revenge in the Pashtun honour code) to civilians who lost family members or property due to NATO's collateral damage or "hard knock operations."⁷⁸ Comparably, the local commander can win "hearts and minds" by informing about a future ambush or attack against NATO or GOA forces in order to avoid collateral damage and demonstrate good will to the local inhabitants.⁷⁹ Favourable socio-cultural conditions are not, however, always prevalent in many of the districts in which the Taliban operates, compelling local commanders to use coercive methods against the population.

One of the most prevalent types of coercive non-kinetic action currently employed by the Taliban is the posting of *shabnamah* (night letters) in local communities.⁸⁰ Historically, these letters have been literary instruments used by Afghan "religious figures, jihadists, and rebels to encourage people" to oppose "state authority and regulations," and were prevalent during the wars against the Afghan monarchy and the Soviet invasion.⁸¹ Today, the Taliban uses them as a method of popular "instruction and intimidation" to expose civilians to the organization's narrative, while dictating the behaviour the insurgency

expects of them.⁸² Failure to comply will likely result in public beatings or assassinations for the "collaborationists."⁸³ An additional cultural weapon are the pro-Taliban mullahs, who are quite influential in Afghan society. In the past, mullahs would be hired by maliks (tribe leaders) as spiritual guides to serve the community; however, after the introduction of Salafist madrassas, the mullahs have transformed into local leadership figures and politically compete against their former patrons.⁸⁴ More importantly, the Taliban (with most of the leading shuras being composed of mullahs) has used them to set up support networks, as a great majority of clerics in rural areas have links with the insurgency.⁸⁵ Therefore, local pro-Taliban mullahs can exercise influence on the populace by preaching against backing the "corrupt government in Kabul" or doing anything that would be detrimental to the Taliban's main effort.⁸⁶

Ultimately, the biggest success of the Taliban's non-kinetic strategy has been its ability to install shadow government institutions in 18 districts where the presence of NATO troops or the GOA is weak.⁸⁷ Mainly, these come in the form of Shari'a courts in which local commanders perform judge/conflict resolution duties for local communities.⁸⁸ These "shadow courts" present the threat that the civilian populace will come to see the Taliban as a moral and legal authority that is superior to the GOA and even traditional tribal structures. In some instances, the Taliban has sought to provide medical and education services (after destroying government-funded clinics and schools); however, it is difficult to distribute these public goods without government or foreign forces disruption.⁸⁹ Conclusively, the decentralized approach to non-kinetic action has allowed the Taliban to influence a great portion of Afghanistan's heterogeneous population. However, the strategic strength of this organizational structure may also become its prime weakness. The contradictions generated by



New recruits belonging to Somalia's Al Qaida-linked Al Shabaab rebel group march during a passing out parade at a military training base in Afgoye, 17 February 2011.

Reuters RTR21PX0

different local Taliban commanders may hinder any decisive action against the GoA or NATO. Furthermore, current COIN operations in Afghanistan can exploit the existing incoherence that may exist among Taliban cells within a regional command as a way to disrupt their influence on civilians.

sion of government presence in target civilian communities. Persuasion allows the VNSA to obtain popular support, while coercion leads the population to lose faith in the public authorities, and eventually regard the armed actor as the regulator of social order. In the case of the Taliban's decentralized system, local commanders seek to either persuade or coerce the populations at the district level depending on their disposition towards the insurgency, the GoA or NATO-ISAF forces.



Taliban militants hand over their weapons after joining the Afghan government's reconciliation and reintegration program in Herat, 30 January 2012.

Finally, it is worth mentioning how the VNSAs use these non-kinetic strategies to exploit social tensions within target populations. Grievances such as lack of economic opportunities, political oppression or even the state's inability to provide public goods create a niche for the VNSA's non-kinetic strategies, as these are moulded in response to these issues. Similarly, the VNSA may choose to employ cultural devices such as mythology, religion or local beliefs as access points to the population, which again can be used to gather support from the target audience. For COIN practitioners, this reflects the necessity to develop strategies against any type of political, economic or cultural exploitation available to VNSAs.

Furthermore, they must be ready to not only accurately detect possible features that may be exploited by non-state actors but to use a wide range of military, political and civilian tools to create a barrier between the VNSA and the civilian population.

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Conclusion

In summary, the precedence of the human battle space in irregular conflict environments makes it imperative for VNSAs to develop non-kinetic strategies that seek to sway civilian populations in their favour. However, their methods are defined by their strategic culture, which ultimately works as an operational guide. Certainly, internal cultural devices such as organizational history, ideology, narratives and beliefs provide the VNSA with a theory on how to achieve victory against the state or other competing actors. Also, it defines how the VNSAs see themselves in relation to the relevant civilian populations and the expectations they have of them. Therefore, the development and implementation of non-kinetic strategies is a process strictly derived from the approach through which an armed non-state actor seeks to achieve victory as it becomes necessary to provide legitimacy to its campaign of physical violence

Fundamentally, both physical violence and non-kinetic action are complementary and dependent of each other in irregular warfare. As discussed throughout this piece, the shape of these strategies is as diverse as the groups that utilize them, due to the heterogeneous nature of the human societies being targeted. For an armed non-state actor that seeks to displace the state from its area of operations, the use of both persuasive and coercive tactics facilitates the ero-



During Operation *Omid Atal 09*, Corporal Jean-Francois Belzil of A Company chats with an Afghan comrade during a patrol, 2 June 2011.

DND photo AR2011-0200-61 by Corporal Tina Gillies

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89. *Ibid.*



PHYSICAL OPERATING ENVIRONMENTS: HOW THE CYBER-ELECTROMAGNETIC ENVIRONMENT FITS

by Jim Gash

Introduction

There has been much recent discussion at the strategic level of the Canadian Forces (CF) with respect to the nature of operating environments. In addition to the traditional land, air, and maritime environments, many strategists are proposing the introduction of new environments for consideration by military force developers.¹ The CF *Integrated Capstone Concept* (ICC) published last year proposes three new environments, referred to as domains—space, cyber, and human—while declaring that even more operating domains will emerge in the future.² Specifically, nano and quantum domains are mentioned as possibilities.

The intent of this article is to discuss the cyber environment. It will be argued that the cyber environment is nothing new. Rather, it is simply a unique manifestation of the electro-magnetic (EM) operating environment—a familiar component of military operations with integral operating concepts and principles that lend themselves well to cyber.

The Land, Air, and Maritime Environments

The traditional environments of land, air, and maritime are distinct, and they will continue to be distinct in the future. This division exists because different technologies—and therefore unique supporting equipment, skill sets, and training—are required to physically operate within these distinct environments.³ Sometimes, the lines between operating environments can blur. The physical land environment, for example, may extend beyond mere geography, to include things such as water features (i.e., swamps, streams, rivers, and landlocked bodies of water). These features, however, differ significantly from ‘blue water’ oceans. Blue water requires distinct technologies—both surface and sub-surface—in which to operate. Land forces are ill-suited to navigating maritime shipping lanes, while naval ships are similarly unde-

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sirable for swamp or riverine operations. Thus, there is an enduring requirement to treat land and maritime as distinct physical operating environments.

Similarly, operations in the air environment require their own set of technologies. Dirigibles, fixed wing, and rotary wing aircraft are all technologies required to operate in the air environment, yet they are completely unsuited to maritime or land operations, not to say that they are not essential to *support* both land and maritime operations. Although army brigade groups or naval task groups may be structured to include helicopters in their respective orders of battle, this must be considered a manifestation of joint operations rather than an example of merging physical environments. The use of distinct technologies to delineate physical operating environments opens up other possibilities for environments beyond land, air, and maritime. As distinct physical components, only space and EM need to be added to round out an all-inclusive model of the physical plane.

“Cyber is physical in that it manifests only through the actual interaction between electrons and electromagnetic energy.”

Although space can be distinguished from the air environment, indeed, some argue that they are physically separated by the Karman Line itself—roughly where the speed required to maintain flight surpasses the speed required to maintain orbit, it becomes more difficult to conceptually differentiate cyber. In point of fact, there exists a fair degree of misunderstanding about what exactly is meant by cyber. Often, it is confused with virtual reality, or as something that exists on the information plane. The information plane, however, is not a physical environment. It is simply the link between activities that take place in the physical plane, and effects that are achieved on the psychological, cognitive, and moral plane, which together may be referred to as the human dimension. Cyber is physical in that it manifests only through the actual interaction between electrons and electromagnetic energy.

The ICC fails to mention the electromagnetic spectrum in its treatment of operating environments. It is understandable

that the document included no discussion of potential future environments such as nano and quantum, given that we do not yet operate in such environments, at least, not intentionally. Given that we have been exploiting the EM spectrum for military purposes for more than a century, it is surprising that it was not given consideration in the ICC. Considerable attention was paid, however, to the human domain—an area outside the traditional breakdown of the physical plane.



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Why Space is and Why Human is not ⁴

Should space be considered as a separate environment from air, or should it just be one aerospace environment? The answer essentially rests upon one’s definition of the term *operating environment*. Although several definitions exist, each with their own nuance, an operating environment may simply be thought of as the milieu in which military activities are conducted.⁵ Operating environments may be distinguished from one another, based upon the technology used by military personnel to operate therein. Using this definition, it is apparent that air and space are indeed separate. Aircraft and satellites, for example, tend to work best in one environment, and not in the other.

In the model proposed in the ICC at Figure 1, the human domain is represented in the same manner as land, maritime, air, space, and cyber. Although the model’s intent is understood to draw attention to the human dimension of military operations, delineating the human as an operating environment actually undermines the over-arching importance and omnipresence of the human dimension, thus defeating its objective of the elevation of the human dimension *above* the physical operating environments. It can certainly be argued that the human mind is an operating environment on the cognitive, psychological, or moral plane, each of which are underpinned by physical processes within the human brain, but such an argument overlooks the actual intent underlying the need to distinguish between operating environments.

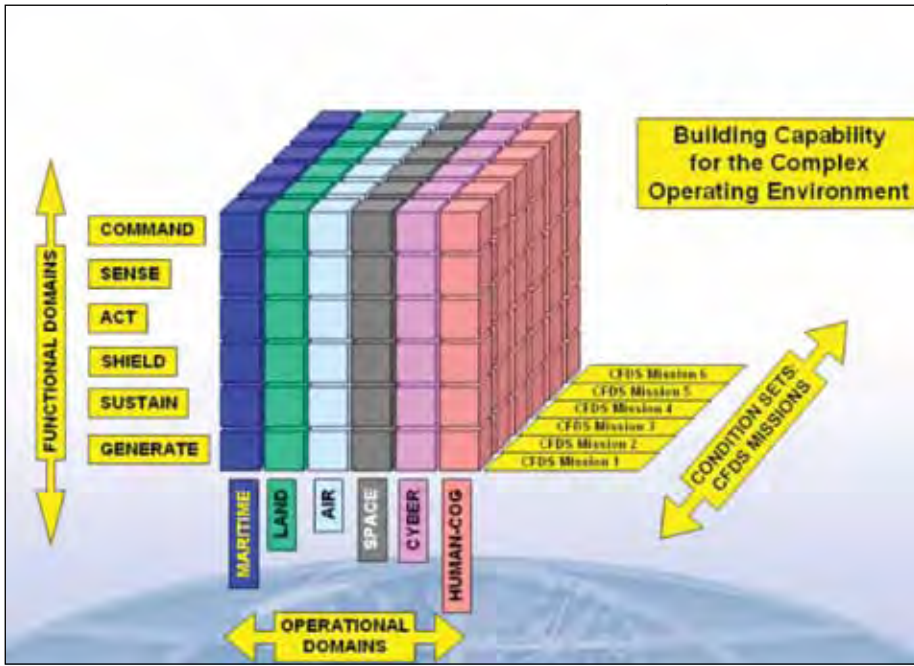


Figure 1

Figure 2 depicts the traditional depiction of the effects-based approach (EBA) to planning and operations. The EBA model may provide a better framework for situating the human dimension within an operational context. Figure 3 and the follow-on notes attempt to explain this approach.

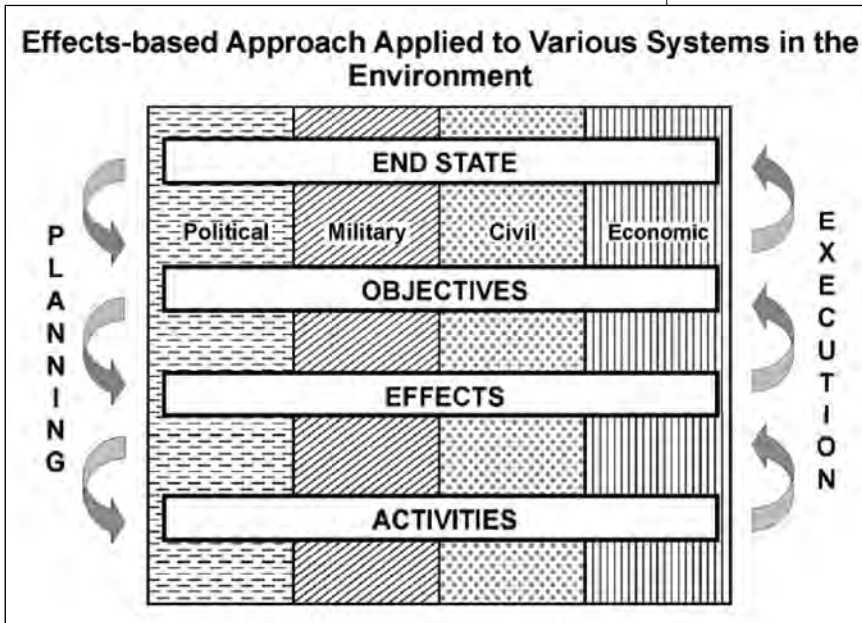


Figure 2

If *environment* is defined as the physical milieu within which activities are conducted, a comprehensive list of environments need only include land, maritime, air, space, and electromagnetic. These five environments are each valid in that they each require their own set of unique technological operating capabilities. Again, this is why space must be considered separate from air. Activities conducted within these environments occur in the physical plane, and effects are generated across the physical, information, and psychological

planes. However, when considering the EBA, the emphasis of effort is directed at analyzing effects on the psychological plane. It is in this plane where effects have the highest payoff, because it is herein that the human dimension (formerly called *human domain*) dominates.

Activities may have first-order effects upon the physical and information planes, but the milieu where effects matter most is upon the psychological plane, for this is where an adversary's understanding is shaped, his will is undermined, and his cohesion shattered; where domestic opinion and operational legitimacy lay; where trust within the comprehensive approach is built; and where so-called 'hearts and minds' of local populations are influenced. As such, Figure 3 may serve as a more comprehensive framework in which to

envision the all important human dimension. In this model, all activities conducted within the five physical environments are prosecuted with a view to achieving the desired effects in the human dimension, across all operational themes.

The human dimension is pervasive. The physical environments are merely the milieu within which activities are conducted to affect this human dimension.

The Electromagnetic Operating Environment – How Cyber Fits

Any given publication on the cyber domain will yield a unique definition as to what is meant by the term cyber. Within Canadian Forces doctrine, there is no definition prescribed for what is meant by cyber. It is therefore worthwhile to examine some of what has been said to date about cyber by the Canadian Forces.

The ICC describes the cyber environment as the cyberspace domain which includes the Internet, telecommunication networks, computer systems and software:

The cyberspace domain will be a mechanism for integrating all of the domains at the strategic level resulting in one common operational picture. This functionality will be complemented by the facility of the cyberspace domain to merge the strategic functions, producing integrated effects. Cyberspace may also be where the medium and the message are virtually inseparable.⁶

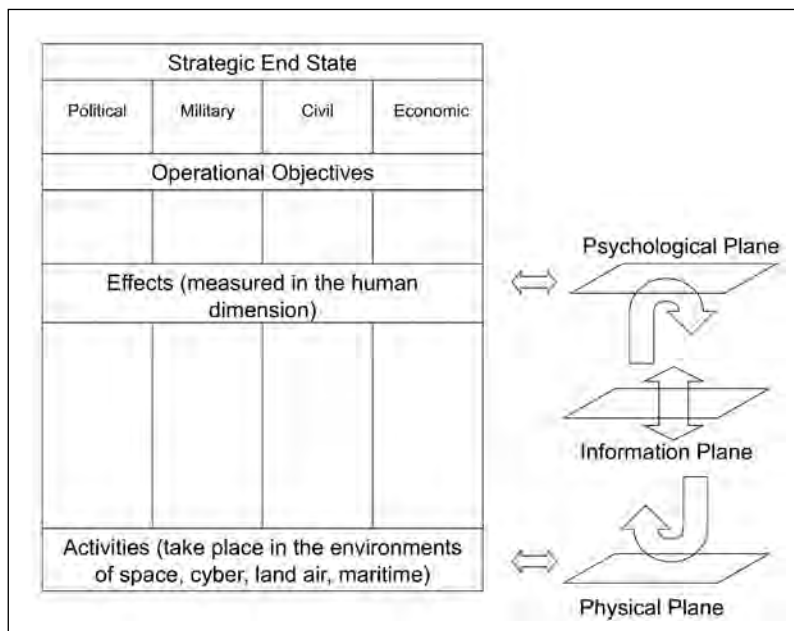


Figure 3

The ICC acknowledges that an official definition of cyber remains a work in progress. It also states that cyber ought not to be confused with the *information environment*. Cyber is merely one physical environment where information can be passed. To confuse the two would obscure the purpose of the information plane, and disregard the fact that all activities conducted in the physical plane are meant to generate information that will achieve an effect in the human dimension. Cyber is but one of several physical operating milieus exploited in the conduct of information operations, and the term cyber itself presently ignores other EM considerations.

software. Conceptually, software sits on computer systems which are connected via telecommunication networks creating a cyber world, most readily exemplified by the Internet. Moving this idea forward, we need to think of what is physically going on within this conceptualization; that is, the physical transmission of electromagnetic energy in order to physically manipulate electrons for the purposes of conveying information. It is the interaction of energy and electrons that wholly describes this environment. As this is the same thing that occurs in the greater electromagnetic battlespace, we may regard cyber as simply a subset of an all-encompassing EM environment.

Therefore, *five* physically distinct operating environments exist: land, air, maritime, space and electromagnetic (EM), where cyber is currently a subset of EM. The technologies required to operate in each are distinct, and each environment requires its own unique supporting equipment, skill sets, and training.

Components of the EM Environment

The Canadian Forces Communications and Electronics (C&E) Branch focuses upon EM as its operating environment. With the advent of more and more advanced computer networks, the main effort of the C&E Branch has shifted away from radio and telephony towards intense focus upon *network operations* that link together all so-called domains of the Branch.

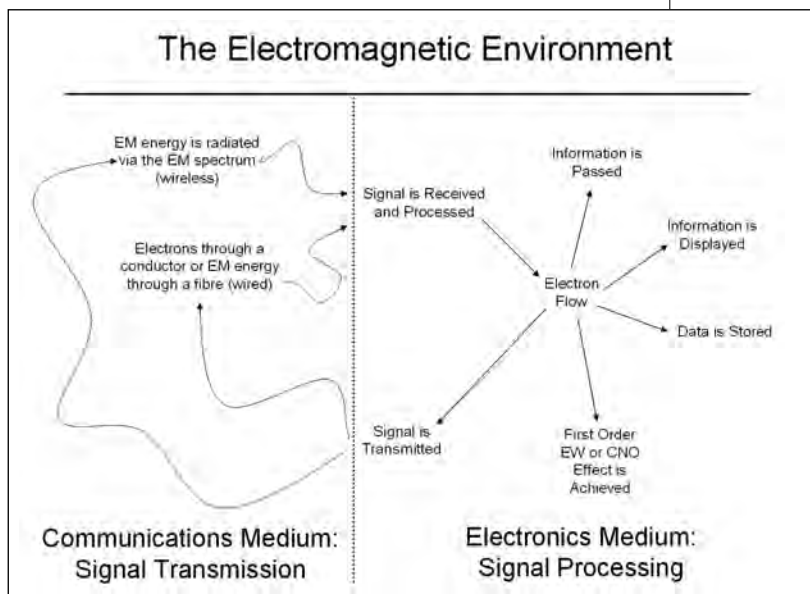


Figure 4

The ICC hits upon a key point that unfortunately was not expanded upon, specifically, that telecommunication networks are encompassed in the cyber environment. As already mentioned, the ICC describes cyberspace as consisting of the Internet, telecommunication networks, computer systems, and

As shown in Figure 5, the activities of the C&E Branch—described holistically as network operations—fit within the sphere of command and control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR).⁷ The three domains of network operations include electronic warfare and signals intelligence (EW/SIGINT), communications and information systems (CIS), and computer network operations (CNO). These three domains are linked together by the physical EM environment, as depicted earlier in Figure 4. They are, indeed, inseparable. A quick look at each of these domains will demonstrate this conclusion.

EW is defined as:

... military action to exploit the EM spectrum encompassing the interception and identification of EM emissions, the employment of EM energy, including directed energy, to reduce or prevent hostile use of the EM spectrum and actions to ensure its effective use by friendly forces.⁸ The EW component is further divided into three sub-components: Electronic Attack (the employment of electromagnetic energy, includ-

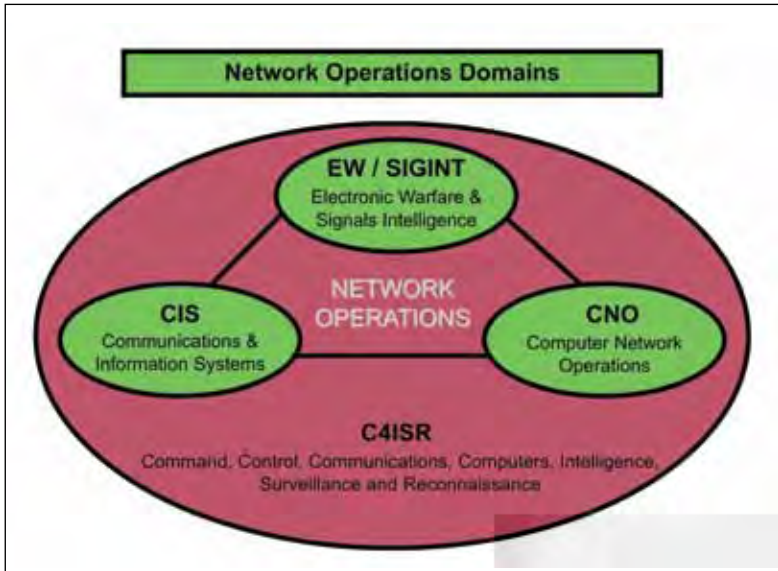


Figure 5

ing direct energy, to reduce or prevent hostile use of the electromagnetic spectrum and to ensure its effective use by friendly forces); Electronic Protection (action taken to ensure friendly effective use of the EM spectrum despite the adversary's use of EM energy); and Electronic Support (the search for, interception and identification of electromagnetic emissions in the EM battlespace). The products of electronic support include Electronic Intelligence and Communication Intelligence referred to collectively as SIGINT.⁹

CIS includes all of the resources that bind all of the other components of the command and control system:

To be more precise, it is an assembly of equipment, methods, and procedures, and, if necessary, personnel, organized to accomplish specific information conveyance and processing functions. CIS encompasses both communications and computer related resources including the associated low level software applications. Communication Systems (CS) provide communication between users and includes transmission systems and switching systems in support of information transfer. An Information System (IS) is used by individuals to store, retrieve, process and display information in support of job related tasks. It includes software, applications and processing devices such as computers, scanners, and printers; in other words the Local Area Network (LAN) itself.¹⁰

CNO is comprised of three components: attack, exploitation, and defence:

Computer Network Attack (CNA) includes the means to attack computer systems. Software and hardware vulnerabilities allow

computers, storage devices, and networking equipment to be attacked through insertion of malicious codes, such as viruses, or through more subtle manipulation of data, all in order to affect the understanding, and ultimately undermining the actions of, the adversary. Computer Network Exploitation (CNE) supports Information Operations by the ability to get information about computers and computer networks, and the adversary, by gaining access to hosted information and the ability to make use of the information and the computers and computer network itself. Finally, the purpose of Computer Network Defence (CND) is to protect against adversary CNA and CNE. CND is action taken to protect against disruption, denial, theft, degradation, or destruction of information resident in computers and computer networks, or of the computers and networks themselves.¹¹

Arguably therefore, CNO could be a sub-set of CIS, or even EW. However, it is important to describe CNO as its own domain within the EM environment, as this distinction allows us to define exactly what we mean by the term cyber. CNO consists of those operations conducted within the cyber portion, or cyber domain, of the electromagnetic environment. Alternatively, the cyber domain ends where computer network operations are unable to achieve an EM effect. As communications and electronics technologies continue to merge, it is clear that the line separating CNO from CIS, and, indeed, the line between CNO and EW/SIGINT, will cease to exist. In this sense, the EM operating environment will eventually become wholly synonymous with the cyber environment.

The three network operations domains are exhaustive in the sense that they include all military aspects associated with the manipulation of electrons and electromagnetic energy. In other words, these domains describe all military activities that take place within this particular component of the physical plane.

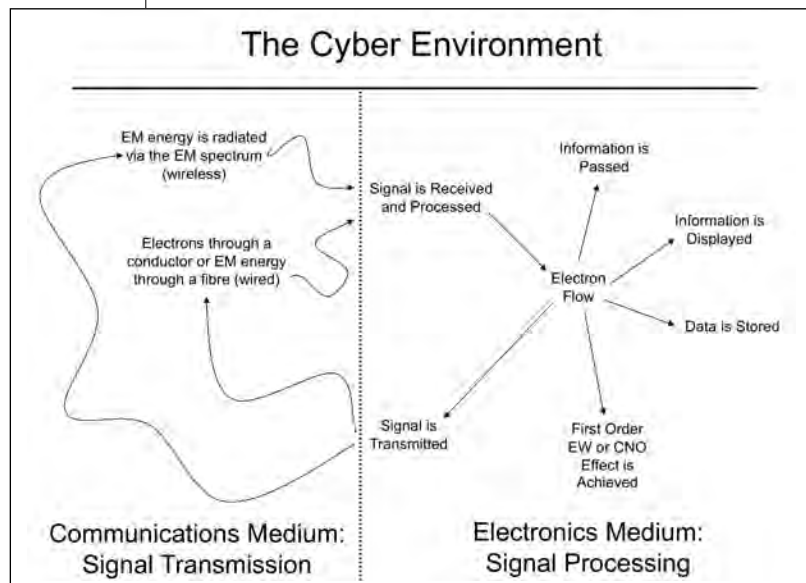


Figure 6

In summary, the EM environment includes electronic devices and their components (both hardware and software), the physical hardware and infrastructure connecting electronic devices, and the spectrum of electromagnetic energy itself, including all forms of radiation and EM particles—both elementary and atomic. Each specific domain within the over-arching EM environment may include some or all of these components. For example, the cyber domain includes all communications and information exchange enabled by computer-based networks. It is the domain where computer network operations are conducted. This ought not to be confused with the term *cyberspace*.¹² As CIS, EW/SIGINT, and CNO continue to merge, the cyber domain will expand to encompass all aspects of the EM environment. This process of expansion or envelopment, traditionally referred to as *convergence*, will eventually make the EM environment synonymous with the cyber environment.

Perhaps the best terminology to employ here, in order to account for the traditional use of the EM operating environment for military activities, recognition of the growing importance of cyber, and the issue of convergence, is the *cyber-electromagnetic environment*.

The Case for New Environments - Quantum

Given the definition of environment, is it reasonable to expect that new environments will emerge? The ICC mentions quantum and nano as potential candidates, while acknowledging that there may be even more domains that we have not yet considered.

Quantum refers to discrete packets of EM energy. To be sure, quantum theory is a different subset of physics than electromagnetic theory, although there is considerable overlap. However, this does not imply that a separate military physical environment is needed to describe activities and behaviour at the quantum level. It is the *macro* effect of quantum activities that is of interest on the physical plane. For example, futuristic quantum computing would be part of the cyber-electromagnetic environment.

Movement at the quantum level is not easily described. Physicists use probabilities and terms like quantum tunnelling to illustrate how particles move from point-to-point in traditional space time. It may well be that particles at this level actually move through undiscovered dimensions. To be sure, the discovery of new spatial dimensions beyond the traditional three (up-down, left-right, and in-out) will fundamentally change our perception of physical space. One could even imagine futuristic military applications involving the conduct of operations within these higher order dimensions—where we could, for example, manoeuvre across vast distances without ever being seen.¹³ No technological advance, however, will

allow us to pass formed three-dimensional structures in such a manner. Quantum will therefore not emerge as a future operating environment.



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A Nano Environment?

Another potential future operating environment put forward by the ICC is nano. Nano is a scaling factor that refers to a *relative size* rather than a *place*. Nano-science and nanotechnology therefore deal with behaviour and activities of physical entities at the nano scale. Generally speaking, we may think of this as the molecular level. There are, indeed, unique technologies required to operate at the nano scale, and therefore, at first glance, it appears to be a strong candidate for a future operating environment – although it begs the question of whether the ability to conduct military activities in ever-shrinking milieus requires the emergence of new environments. For example, we have atomic warfare at present, yet this has not driven the requirement for the recognition of a separate atomic operating environment.

Nanotechnology best fits into the pre-existing operating environments in much the same way as described earlier here for atomic weapons and quantum computers. Depending upon the technological advance, nano devices, including their activities and behaviours, will simply fit into other domains. For example, nano weapons will affect operations in particular environments much the same as CBRN weapons do today. As such, they will simply be a component of the physical environment that they affect. In a similar vein, nano robots (or nanobots) will be part of the environment in which they work, be that land, maritime, air, space, or even the cyber-electromagnetic environment.

Much the same as the maritime environment includes surface and sub-surface settings, the land environment logically expands to include the subterranean environment, as similar technologies and basing would be required in order to support both ground-surface and underground operations. The



aerospace milieu is unique in that different supporting technologies are required for the conduct of military operations. As such, the physical setting above the Earth's surface is logically split into two separate and distinct operating environments. The electromagnetic nature of the physical world completes a holistic model of the physical plane of military operating environments. They constitute the sum of physical milieus where military activities can be conducted in order to convey information that will achieve effects in terms of shaping and influencing the human dimension—the ultimate objective of military operations at all levels. To be sure, technological developers need to continue to look at the physical world at scales much smaller than can be seen by the human eye, but such research into enhancing the human ability to operate in

of only as the glue that links command with the other operational functions, we risk marginalizing the cyber component of the physical plane to a synonym for CIS—the so-called zeros and ones with which only ‘jimmies’ should be concerned. We would thus miss the full range of force enhancement capabilities that cyber offers. When examining the future security environment, and considering the trend towards full convergence of cyber, EW/SIGINT, and CIS, it becomes clear that an opportunity or vulnerability in one domain may be physically linked to exploits or threats in another. As such, a comprehensive understanding of what cyber is and how it fits into the traditional environments is essential.



NOTES

1. The terms *environment*, *domain*, and *environmental domain* are either used differently or synonymously, depending upon the source. The lack of common language is often what stirs debate on such conceptual issues.
2. This article will use the term domain to describe a sphere of influence. For example, the land domain may refer to those things which can be influenced by the land component commander. Not necessarily restricted to influence by one person, domains may be influenced by any number of different things (hence forming an infinite set of domains). The cyber domain, for example, may consist of the physical space influenced by actions in cyberspace—anything from blogging to computer network operations.
3. This technology-based conceptual distinction between operating environments was proffered by Mr. Regan Reshke, Chief of Staff Land Strategy Science Advisor, during Directorate of Land Concepts and Designs (DLCD) discussions concerning the nature of the human dimension in March 2010.
4. The discussion in this section is based upon DLCD discussions concerning the nature of the human dimension in March 2010.
5. For example, the ICC describes an operating environment as being “... where elements of power and influence are exercised.” It lists maritime, land, and air as some of the domains within this environment. This language is contrary to existing terminology employed by the land, air, and maritime environments.
6. Chief of Force Development, *Integrated Capstone Concept*, at http://cfd.mil.ca/CTF/resources/Core%20Documents/30557_ICC_PROOF.pdf, accessed 8 March 2011, p. 30.
7. This diagram was borrowed from the *Canadian Forces School of Communications and Electronics Campaign Plan* (draft second edition), p. 5.
8. Chief of Land Staff, *Electronic Warfare*, B-GL-358-001/FP-001, at <http://lfdts.kingston.mil.ca/DAD/ael/pubs/B-GL-358-001-FP-001.pdf>, accessed 8 March 2011, p. 31.
9. Signals Intelligence (SIGINT). The generic term used to describe COMINT and ELINT when there is no requirement to differentiate between these two types of intelligence, or to represent fusion of the two. Electronic Intelligence (ELINT) refers to technical material and intelligence information derived from EM non-communications transmission (i.e. radar, navigational aids, jamming transmissions) by other than intended recipients. Communication Intelligence (COMINT) refers to technical material and intelligence information derived from EM communications and communication systems (i.e. Morse code, voice, facsimile) by other than intended recipients. See *Electronic Warfare*, p. 18.
10. Chief of Land Staff, *Signals in Support of Land Operations, Volume 1*, B-GL-351-001/FP-001, at <http://lfdts.kingston.mil.ca/DAD/ael/pubs/B-GL-351-001-FP-001.pdf>; accessed 8 March 2011, pp. 1-3.
11. Chief of Land Staff, *Land Operations*, B-GL-300-001/FP-001, at <http://lfdts.kingston.mil.ca/DAD/ael/pubs/B-GL-300-001-FP-001.pdf>; accessed 8 March 2011; pp. 5-50.
12. Cyberspace is a colloquialism used to refer to the virtual or on-line world created by the physical global cyber infrastructure. It is usually used synonymously with the Internet itself. The cyber operating environment may include portions of cyberspace. For example, military operations may use cyberspace for intelligence activities, or they may simply exploit the physical public telecommunications infrastructure. It is worth noting, however, that the *cyber operating environment* is not the same as *cyberspace*.
13. See further discussion of extra dimensions on the interactive website: *12 Events That Will Change Everything*, at <http://www.scientificamerican.com/article.cfm?id=interactive-12-events>.

DND photo AR2011-0487-011 by Master Corporal Dan Shouinard



FROM SYSTEMIC OPERATIONAL DESIGN (SOD) TO A SYSTEMIC APPROACH TO DESIGN AND PLANNING: A CANADIAN EXPERIENCE

by John Anderson

*A good chess-player having lost a game is sincerely convinced that his loss resulted from a mistake he made, and looks for that mistake in the opening, but forgets that at each stage of the game there were similar mistakes and that none of his moves were perfect. He only notices the mistake to which he pays attention, because his opponent took advantage of it. How much more complex than this is the game of war, which occurs under certain limits of time, and where it is not one will that manipulates lifeless objects, but everything results from innumerable conflicts of various wills!*¹

Introduction

The international security environment has been characterized as uncertain, volatile, and fraught with risk. A literature review reveals that while large-scale, ‘force-on-force,’ nation state vs. nation state conflict is considered unlikely, it can never be entirely ruled out, necessitating the continued existence of conventional military force structures.² Therefore,

operational staffs will continue to use design and planning tools to best translate strategic direction into tactically executable actions that conform to the application of conventional force on force engagements. However, equally important to operational staffs is the changing character of modern conflict. Globalization and technological advances that have heralded the so-called information age have added a new measure of complexity to modern conflict. As Dr. Paul T. Mitchell, an Associate Professor of Defence Studies at the Canadian Force College demonstrates, geographical and state defined boundaries are less relevant as new communications methods permit people the means to “... direct their destinies in radical new

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ways by enabling them to bypass traditional sources of power – the state, the family, religion and corporations.”³ And it is by virtue of these technological advances that a networked approach has emerged.

This networking of state and non-state actors has prompted Western militaries to embrace the notion of a comprehensive approach to operations, marshalling all aspects of national power – economic, diplomatic, and military – to achieve a coherent national approach to dealing with national security issues. And as non-state confrontation over perceived grievances emerges, the likelihood of irregular war, resulting from disparity between the capabilities of the aggrieved, and the means to deal with it, demands that Canada explore “... new capabilities and new approaches to combat new adversarial means and weapons” because “increased complexity in future conflict will require increasingly complex responses from Canada.”⁴

The aim of this article is to demonstrate that these new approaches apply in the cognitive realm as well, in the way in which staffs design and plan military actions to deal with the complexity of modern conflict. It will use the findings of a three year experiment with an alternative approach to operational design to argue that when dealing with the operational problem of conflict that is complex, asymmetric, and irregular, tried and true methods, or the way in which these methods are typically employed, may not be the optimum approach to campaign designing and planning.

“From an operational level of war perspective, effects-based planning assigns missions and tasks to subordinate tactical level formations to achieve desired effects.”

approach offers the opportunity to take a broader and arguably more creative view of the application of combat power, and its integration into the whole of government comprehensive approach, to achieve desired effects.

The OPP Manual acknowledges that in order to command effectively, the commander must lead in conditions of risk, violence, and fear, and make decisions despite uncertainty, ambiguity, and rapid change. The staff is organized and focuses and synchronizes its efforts to assist the commander. It is by practicing the operational art, which is the employment of military forces to achieve strategic objectives, that they can collectively accomplish this. It is acknowledged that conflict is a human activity that occurs under conditions of imperfect knowledge by multiple participants acting and reacting, based upon perceptions. It is confusing and complex, and can appear chaotic and non-linear in that inputs and outputs are often disproportionate.⁶

The objectives of the OPP include standardizing the planning process and maximizing commander and staff creative thinking and associated thought processes.⁷ These two objectives, or the way in which they are approached, can be seen to be in conflict. In standardizing the process, the manual is presented as a series of steps, or a linear approach, that details what must be achieved at each step. Furthermore, the way in which this is accomplished is through the continental approach to staffing functions. Each sub-element of the design and planning team is focused upon a specific aspect of the overall problem. In effect, the process is compartmentalized, with each sub-element contrib-

uting their analysis of their component of the problem. In short, the problem is broken down into its constituent parts and analyzed. The aggregate of these analyses define the nature of the whole. The combination of describing the process in linear terms, and applying an analytical problem-solving approach, stifles the desired maximization of the staff’s creative thinking and associated thought processes.

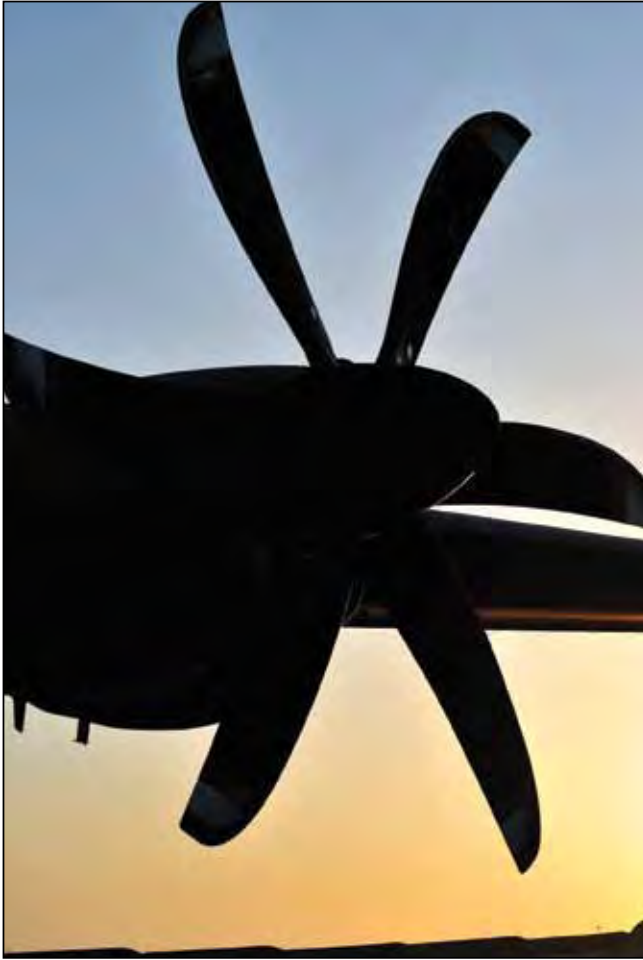


Armour Heights Officers' Mess, Canadian Forces College

The Planning Process – Setting the Conditions

The Canadian Forces College Joint Command and Staff Program (JCSP) focuses a large part of its curriculum upon operational design and planning and the Canadian Forces Operational Planning Process (OPP). The OPP was derived in response to the need for a common operational planning pro-

DND Photo by Sergeant Charles Barber



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In order to maximize creative thinking, it is important to consider the nature of the problem before determining the best method of dealing with it. It is suggested that as a starting point, there are two kinds of problems that the operational staff faces: complicated and complex. While these two words are often used interchangeably, there is a fundamental difference between them. A complicated problem is one for which there exist cause and effect relationships, there is proportionality between inputs and outputs, and the whole is equal to the sum of the parts. In contrast, a complex problem is one for which, as a result of the adaptive nature of the interdependent variables or components of the problem, there are no direct cause and effect relationships, inputs and outputs are not proportional, and the whole is different than the sum of the parts.⁸ Complex problems are human or social problems that are often referred to as 'wicked' problems.⁹ The confounding factor that wicked problems present to the operational staff tasked with deriving a plan based upon an analysis of the problem is that each attempt to solve the problem changes the problem *itself*; one wicked problem begets the next, or no plan survives first contact with the enemy. Another way of looking at this is that, if the perception of the problem does not 'see' the root cause, attempts to apply solutions will likely have unexpected effects that can facilitate the learning process towards a better understanding of the problem. Implicit in this is that perception and metacognition, or the ability to think about the thinking being used to form perceptions, are fundamental in understanding wicked, or complex operational problems.¹⁰

In setting out to standardize the operational planning process, the OPP and the way in which it is used is conducive to solving complicated problems; those problems where an understanding of the constituent elements yields an understanding of the whole. For a complex problem, an analytical approach will not yield an understanding of the whole. To illustrate this fundamental distinction, consider the following: The addition of hydrogen fuels a fire. The addition of oxygen fuels a fire. In both cases, the addition positively contributes to the fire. But when two parts hydrogen and one part oxygen combine and are added to fire, the fire extinguishes. In this case, understanding the properties of each element, hydrogen and oxygen as they relate to fire, cannot provide an understanding of the whole, H₂O, and its relationship to fire.¹¹

It is for this reason that when dealing with complex operational problems, it is important to consider the interrelationships of the constituent elements of the problem, as opposed to the characteristics of elements themselves, as separate entities, to understand the whole. Moreover, applying a solution in order to better understand a complex or wicked problem implies concurrent activity that is mutually supportive: the solution, or the plan, ameliorates the understanding of the problem, or the design that articulates that understanding.

If the evolution of conventional warfare, the application of force-on-force, to achieve military victory over an adversary is considered to have largely occurred as a means of dealing with a complicated problem - how to marshal large formations in a coordinated fashion under the constraint of limited ability to communicate dynamically with every element of the force - it is logical for the process of designing and planning to have followed a similar trajectory. As armies became larger and the ability of the commander to direct individual efforts became more unwieldy, formations were constructed, armed, and drilled to perform tasks in a predictable manner. This gave the commander the advantage of being able to 'stand atop the hill' and to direct subordinate element leads to execute broad actions to engage the adversary forces where it was most advantageous to do so. This mechanistic approach offered the commander the ability to predict the effects of the actions he directed. As the battle progressed, formations could be manoeuvred as large units in response to the ebb and flow of battle. This allowed the commander, constrained in his ability to reach out and touch individual soldiers, to manoeuvre his forces most efficiently, effectively, and, ultimately, predictably. Designing and planning operations and campaigns would have logically been done in a similar manner. Moving and provisioning, as well as preparing forces for large-scale coordinated manoeuvres would have necessitated it. The creativity the commander used would have been in *how* and *where* to apply actions he understood against those similarly constrained actions of his adversary. The structural and organizational construct of forces and their application was hierarchical, with an understanding of the range of functions and actions of each formation, element, and sub-element of his forces. It is akin to the game of chess. The roles, functions, and moves available to the pieces are prescribed by the nature of the game. Similarly, the roles, functions, and moves available to his forces are prepared for and practiced in advance. The ultimate aim is clear: to achieve the capitulation of the

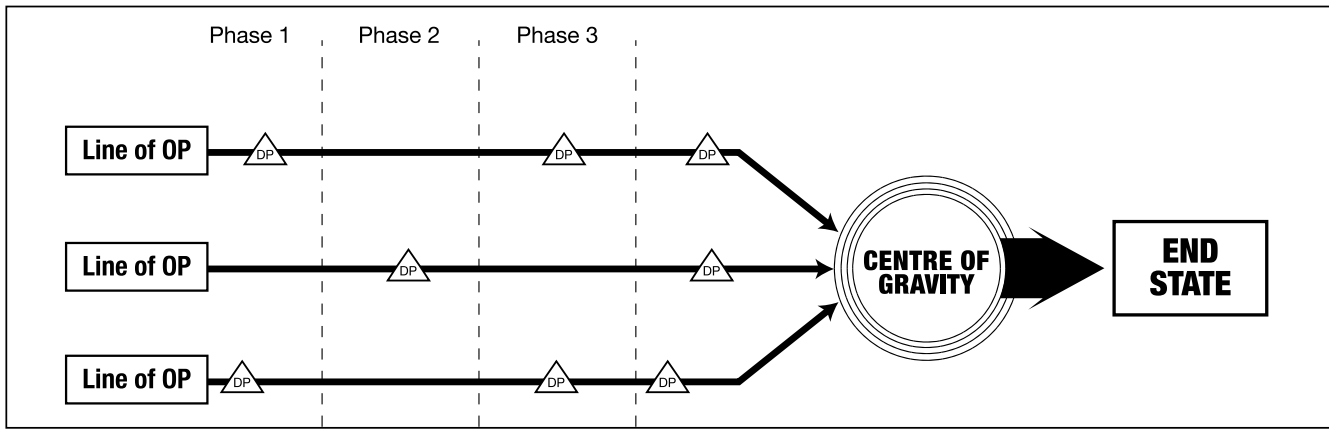


Figure 1: Sample Linear Campaign Plan

adversary through the defeat of his forces, who, in turn, function in accordance with the game, because the adversary is also constrained in the same way as the commander.

However, if the adversary is not engaging in conventional war, there are no discernable structured forces, or the forces themselves do not equate to the adversary's source of strength, defeat of which would lead to capitulation, then applied military actions would *change* the problem rather than *solve* it. John Arquilla of the US Navy's Postgraduate School and RAND Corporation analyst David Ronfeldt use the game analogy of chess versus Go. In Go, while the board may be similar – a grid of squares – the stones used to play are not constrained by the same rules that apply to the pieces used to play chess. In other words, if the commander is expecting chess and the adversary is playing Go, there is a mismatch in approaches, and therefore expectations, that will affect the outcome.¹²

As the technology of warfare has evolved, the ability to communicate has increased to the point where time and distance have become less significant. The information age has increased the interconnectedness of state and non-state actors. It is possible to reach out and touch individuals faster and more directly. This offers opportunity to the commander and the adversary alike.

In the Canadian context, this opportunity is exploited through mission command, or the inherent flexibility and freedom of action afforded to formations, elements, sub-elements, and even the individual soldier, to seek desired effects informed by an understanding of the commander's intent. The way in which the commander's intent is articulated using the OPP, is in a mission statement that the *staff propose* and the *commander approves*. It is a concise statement answering the basic questions: What is to be done? When, where, and why is it being done? It is developed during mission analysis, and it is a statement of task and purpose, intended to achieve the end state, or the set of conditions that describe the achievement of policy goals.¹³ It is acknowledged that at the strategic level, the end state can change over the course of the campaign as a result of changing situation or how the government decides to use its resources.¹⁴ The OPP answers four key questions: What conditions are required to achieve the objectives? What sequence of actions will likely produce these conditions? How

should military resources be applied to produce these objectives? What are the associated risks? In answering these questions an operational design emerges that depicts all the elements necessary to move from the current state to the desired end state. An example of an operational design is depicted in Figure 1.

Decisive Points are sequenced and synchronized along and across Lines of Operation. Achieving Decisive Points contributes to undermining the CoG which permits the attainment of the End State.

However, while the degree to which mission command can be manifested remains constrained by the institutional organizational hierarchical construct of modern nation state military forces, the degree of autonomy to act, at any level, is not absolute. The non-state adversary, in contrast, is not necessarily subject to the same constraint. How then can the operational art be used within the aforementioned constraints to better deal with the kind of complex problem modern militaries face in dealing with information aged non-state adversaries?

The current version of the OPP makes reference to Systemic Operational Design (SOD), Strange Analysis, and Operational Net Assessment as concepts whose aim is to develop a more complete understanding of the environment to aid in decision-making. As well, it is acknowledged that mission analysis is a cognitive activity, and may be conducted through a brainstorming process.¹⁵ Both these references are steps towards a more appropriate means of accomplishing operational design and planning for complex problems. They offer subtle adaptation to the way in which the staff can implement the OPP. They represent steps towards a more network-centric approach.

The Experiment

When CFC commenced its three-year experiment, the initial aim was to explore SOD as an alternative to the OPP. SOD is an attempt to operationalize complexity and systems theory into an intuitive approach to operational design and planning. It is comprised of a series of seven discourses whose aim is to understand the problem holistically and solve it based upon this understanding.

The Systems Frame comprises four discourses aimed at problem setting or understanding. They attempt to put boundaries on the system by identifying what has changed, and what is the cause for the intervention. The second bounds the rival, or those elements that oppose the desired system trend expressed in the strategic guidance. The third and fourth examines the tension that exists between the current command and logistics structures that are required by the emerging design, the rival, and the logic of the strategic directive. In other words what is the system; those elements relevant to the problem? Where is the problem itself, the rival? And what are the tensions between existing command and logistics constructs and that of the rival; are we postured appropriately to deal with the rival? This portion of the process is akin to an appreciation of the adversary and an analysis of the mission.¹⁶

The Operation Frame comprises three discourses that affect the transition from design to plan. The first conceptualizes the operation to exploit the tensions identified within the system during system framing. The aim is to influence or shape the system towards more favourable conditions through the positioning of forces in time and space, and it is akin to operational or campaign design. The second explores conditions within the system that, if achieved, may move the system towards the desired strategic direction. This is like the establishment of objectives and decisive points. The third builds upon the previous two discourses to add substance to the operational design: an emerging course of action (COA).¹⁷ The SOD process is depicted at Figure 2.

“The Operation Frame comprises three discourses that affect the transition from design to plan.”

The final exercise in the JCSP *Warrior Lance* series is a complex scenario involving the potential for the full gambit of military operations required to deal with modern conflict. The students exercise the OPP to determine a campaign design and recommend a COA, from several possible COAs, which requires collaboration with other government and non-governmental agencies represented by staff subject matter experts.

First Year

The challenge in the first year was to determine if it was possible to use a fixed methodology or process to deal with complex problems. The reference material used to guide the exercise was a draft document that put the seven discourses into a seven-step, sequential process: an analytical or linear approach to establishing an intuitive methodology.¹⁹ Although it was not known at the time, what has emerged over time is a growing well-founded skepticism for the claims of the suitability of analytical approaches to deal with complex problems. Two examples where attempts to modify intuitive thought processes into analytical tools have failed are Effects Based Operations (EBO), and Network Centric Warfare (NCW).

EBO acknowledges the vagaries of complexity, confounding attempts to identify with precision concrete effects as a direct result of specific actions; i.e., establishing a cause and effect relationship. Yet, its proponents make the assertion that a series of orders of effects can be predicted, and that the theory supports precision air strikes as the means of achieving desired effects with minimal collateral damage, citing the results of the air campaign during the first Gulf War as evidence.²⁰ This rationale for an effects-based approach to planning and the means to achieve desired ends – precision air strikes – was questioned and discarded as a replacement to the joint planning process by the Commander USJFCOM.²¹ Equally unsuccessful have been attempts to turn the concept of NCW into an analytical tool. System of Systems Analysis (SoSA) determines the nodes or constituent elements within a system, permitting identification of potential targets – disrupt the nodes, disrupt the system. Neither approach places the requisite emphasis on the nature of the relationship between the elements of the system as illustrated in the hydrogen and oxygen analogy. It is the *nature*, and therefore, the *ability* of the system to adapt that confounds attempts to achieve desired effects by focusing upon the physical elements of the system alone.²² In both EBO and NCW, effects-based *operations* were translated to effects-based *targeting*.

The parameters of the experiment used to compare and track the progress from year-to-year were the composition of the group, the approach to the process of dealing with the problem, the means of articulating the work being accomplished, and finally, how this experiment compares with the traditional approach to the OPP.

The normal composition of the Joint Operational Planning Group (JOPG) for CFC exercises is a mix of 25-or-more students from the three environments – land, sea, and air. It was decided to conduct the experimental JOPG using this standard

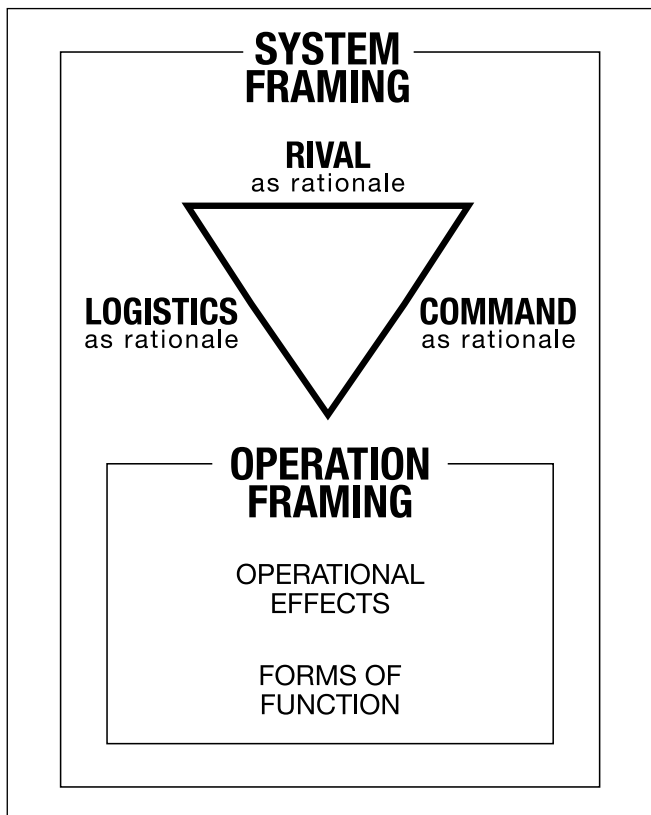


Figure 2: SOD Schematic¹⁸

Canadian Forces Aerospace Warfare Centre

composition. The SOD appointments included a student commander, chosen for his experience gained in researching SOD for his Master of Defence Studies (MDS) paper, and student leads for each of the four Systems Frame and three Operations Frame discourses. All the students participating in the experimental JOPG were asked to read an introductory paper on SOD.²³

Rather than sub-divide the group, parsing the activity in an analytical fashion to following the SOD process, the entire group worked through each of the discourses. It was found that this was less than optimum, as it was difficult to have such a large group effectively discourse. The process of using a step-by-step or linear approach, working on one discourse at a time, while effective in giving the whole group a better appreciation of the nature of the operational problem, inhibited the intuitive thought process.²⁴ Group intuition is based upon the collective sharing of mental models, or up having a common understanding.²⁵ This common understanding is accomplished through active listening, the ability to construct an argument, and representing personal views.²⁶ In a large group, this is difficult to achieve without imposing some constraints and order on the discourse, which, in turn, inhibits individual members of the group. And because intuition is holistic in nature, following a step-by-step process was also found to inhibit the group's intuition.²⁷ It was concluded that the optimum size for a SOD JOPG was considerably smaller than the one used in the first year.²⁸

The OPP Manual does not specify the type of products each of the steps should yield to facilitate communicating the group's work to the commander. However, there are commonly accepted tables and schematic representations of the various analytical activities undertaken. They have been compiled in a variety of iterations of the student guide to the OPP used at CFC as suggested formats. This guide is not an official publication, in that it is only meant to assist students in developing their understanding of the OPP, and how to communicate their work. However, presenting specific forms, rather than describing the desired aim of specific analytical activities, results in an expectation of the form or medium used to illustrate the analytical outcomes. In other words, standard templates emerge, offering not *a* means, but *the* means of capturing the analysis. The experimental group's understanding of outcomes or products generated through the various discourses essentially amounted to a series of relationship diagrams, each of which depicted the elements of the system and the nature of the interrelationships between them. They were free to depict these relationships in ways that suited the group. A representation of the type relationship diagrams each group derived is offered at Figure 3.

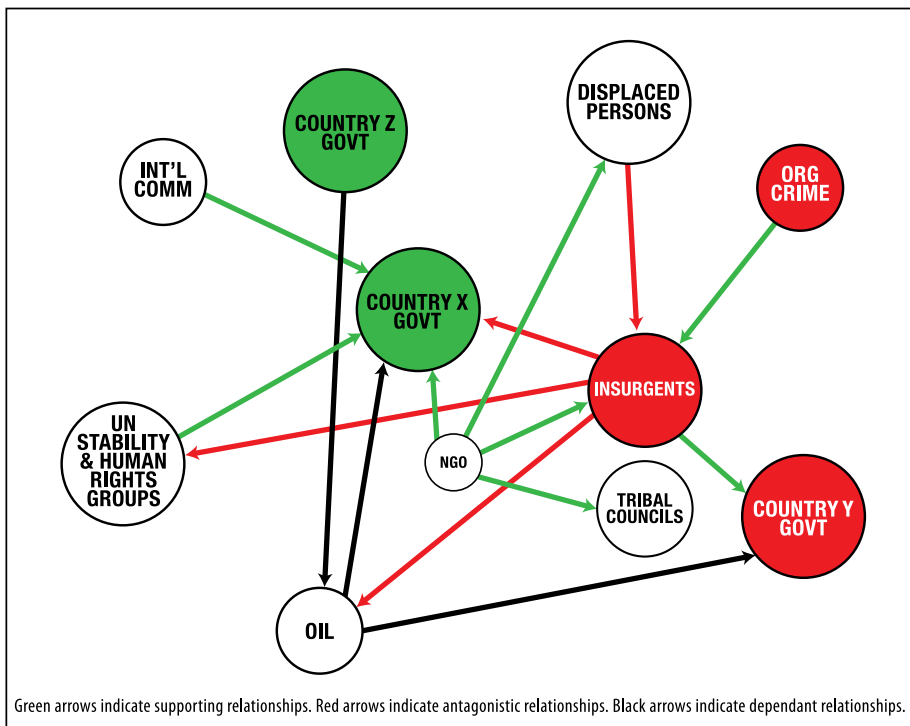


Figure 3: A simplified relationship diagram

The purpose of these diagrams is to capture the group's collective understanding of the problem. The other product the group generates is the narrative.

This product was not explained well enough in the reference material accessed by the group, and, as such, was not well understood nor employed effectively by the group. The result was that as the group progressed, it was difficult for an observer who was not present for the entire discourse to get a full appreciation of how well the group understood the problem, or equally, to give the observer the same understanding of the problem that the group shared.

Due to time constraints, it was difficult to accomplish all seven discourses. The decision was made at the outset to focus upon the systems frame, or their understanding of the problem. The group did make some progress on the operations frame, but found the transition from design to planning difficult. The systems frame outcomes did not naturally offer a clear or obvious segue to the operations frame. It was difficult to attribute a cause. Rather, there were a series of constraining factors: the documentation consulted did not offer sufficient guidance or explanation; the group's understanding of the theoretical underpinnings of SOD was insufficient to facilitate adaptation of the reference material; and insufficient time to complete the process as it was understood at the time.

Nevertheless, the consensus from the group regarding where and how SOD would best fit within the current approach to design and planning was that the complex nature of conflict made it a more appropriate tool for a whole of government, or comprehensive approach. It was also concluded that as a result of the greater collective depth of understanding of the problem the group felt they had acquired, SOD could be an addendum or replacement for OPP mission analysis.²⁹

Second Year

Encouraged by these positive results, the decision was made to continue to experiment with SOD during the same exercise in the next serial of the JCSP. As well, in order to develop a greater understanding of SOD and the underlying theoretical basis for this alternative approach to operational design and planning, an elective was developed and delivered to a group of 14 students during the academic year.

Armed with a greater depth of understanding of SOD and theoretical concepts, the JOPG was composed of the SOD elective students who volunteered, and four others who were interested in participating in an alternative approach. A student commander was appointed, and there were student leads for design and plans. And while the entire group participated in all discourses, the plans lead and a couple of other members of the larger team considered the implications of the discourses on understanding the problem (systems frame) to the transition to planning (operations frame) during system framing. The draft document that was considered as a framework for the conduct of the JCSP 33 group had been superseded by a more philosophical approach articulated by the US Army.³⁰ Thus, while the group retained the systems and operational frame discourses, they expanded the process, commencing with a discussion of what they referred to as the mess of conditions that existed prompting a military response. From that, they were better able to describe the system. In addition to the relationship diagrams, the group created other products that better illustrated their understanding of the problem. This was considered a major accomplishment in conveying the work of the group to anyone who had not been present during the group's discourses.

The initial presentation depicted the elements of the system on a graph of capability-versus-intent as it related to the desired state of a more stable region. To this graph they added the relative trends, should there be no intervention to ameliorate the current state. From this, they were able to discern where

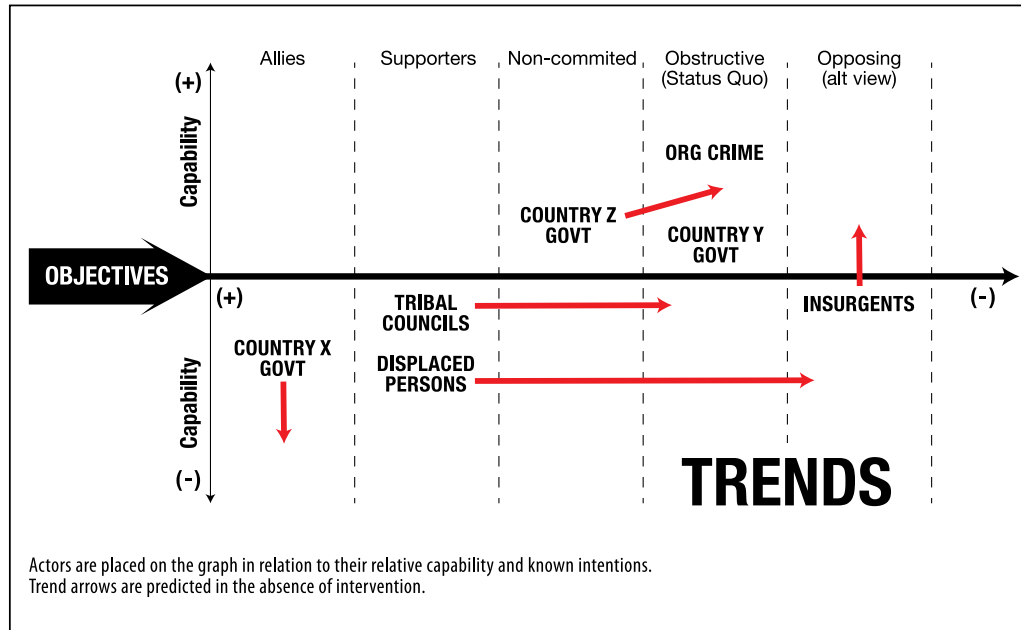


Figure 4: An Excerpt of the Trends Diagram

actions needed to be applied to reinforce positive trends, and to stop, or reverse, negative trends. From this and their determination of the system and the rival, they were able to identify what was lacking in the current environment that prompted the need to intervene. Figure 4 is an excerpt of the trends for illustrative purposes.

The group considered how best to illustrate the campaign design, and rejected the linear approach supported in the OPP that was illustrated in Figure 1. The group's campaign design, illustrated in part at Figure 5, is an overlay on the system and rival frame relationship diagram.

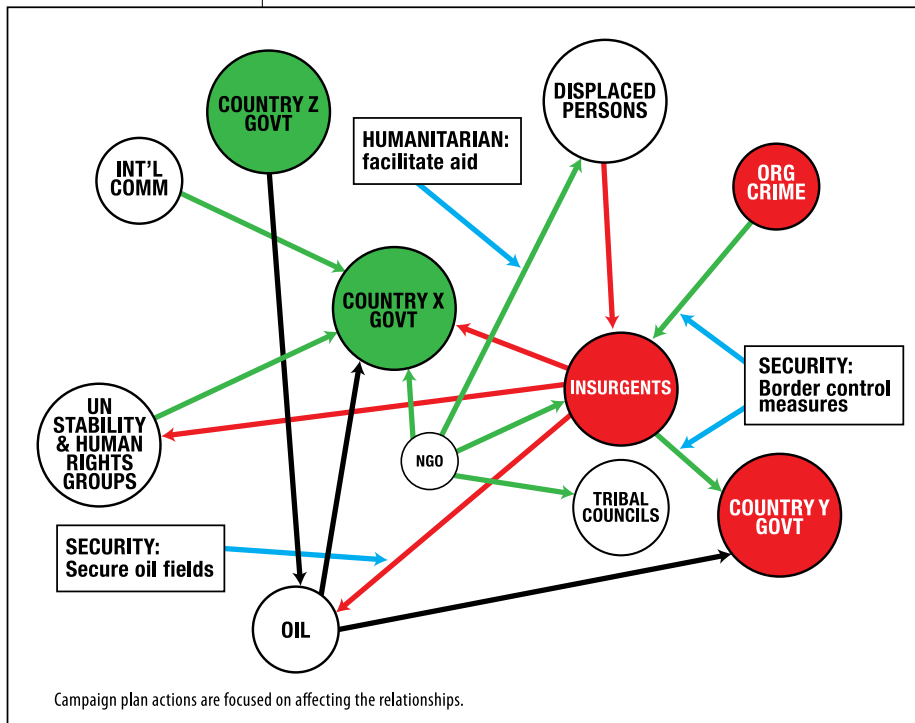


Figure 5: Campaign Plan Overlay

For complex or wicked problems, it is suggested that since each attempt to solve a wicked problem changes the problem itself, working backwards from an end-state to establish pre-conceived decisive points would be untenable. In other words, if effects cannot be attributed to specific causes or actions, pre-determined decisive points cannot be identified. For this reason, the group used a circular diagram with the centre being the strength that required bolstering to permit the region to effectively deal with the problem unaided as it persists and changes, as do wicked problems (Figure 6). It was considered that this centre would expand and contract as the actions taken positively or negatively affected this source of strength. Surrounding this were those elements of the system that had an impact upon the centre, and surrounding that were the types of actions intended to achieve a positive effect on the relative strength of the centre. The ultimate decision being recognition of when the current state becomes good enough.

cally, it was decided to use a systemic approach to operational design and planning that emphasized the contributing theories (complexity, chaos, and systems theory), rather than adhering to the SOD methodology, *per se*.³² This permitted greater latitude for each group to establish how they would define the system, and the means they would derive to communicate their understanding. They were free to use whatever means they decided were appropriate for the operational problem and themselves as a group.

Each group approached the problem using ways and means that suited their own group. The first group spent time developing a team building approach to the work of the group. They used simple means in capturing their findings, making notes and sketches on whiteboards and butcher paper. They spent a lot of time talking to ensure each member had a comprehensive collective understanding of the problem, and how they intended to deal with it. As they worked through the process they established and developed their COA applying new found knowledge and understanding to their appreciation of the problem, and how, as a wicked problem, their intended actions might alter the problem itself. Concurrent work on both the COA and the design ensured harmony between the two. Their final outcome, a briefing to their exercise senior commander, was delivered informally as a round table discussion, with the student commander leading the process and his design and plan leads explaining the group's understanding of the problem, and what they recommended be done about it.

The second group elected to make use of the technology available, and focused upon translating their whiteboard and butcher paper preliminary work into a variety of electronic products. While it was considered by the exercise senior commander that each group had a comparable understanding of the problem and had developed a sound COA, the advantage the second group's selected means offered was greater portability and easier archiving of their work. As well, the second group established a blog as a means of capturing the narrative. They found this provided a better means of sharing their evolving understanding of the problem and their COA. The more tangible and portable medium used by the second group would offer the means to communicate up and down the chain of command as necessary to link the strategic direction and the tactical actions. However, while the selection of an electronic record was consistent with the JCSP 34 approach, the actual products or means used to illustrate JCSP 35's work was unique to their group.

An interesting difference between the second JCSP 35 group and the JCSP 34 group was their understanding of the nature of the problem. For JCSP 34, the collective understanding that emerged was that the ability of the region to govern itself was the focus of their intervention actions. That is, in

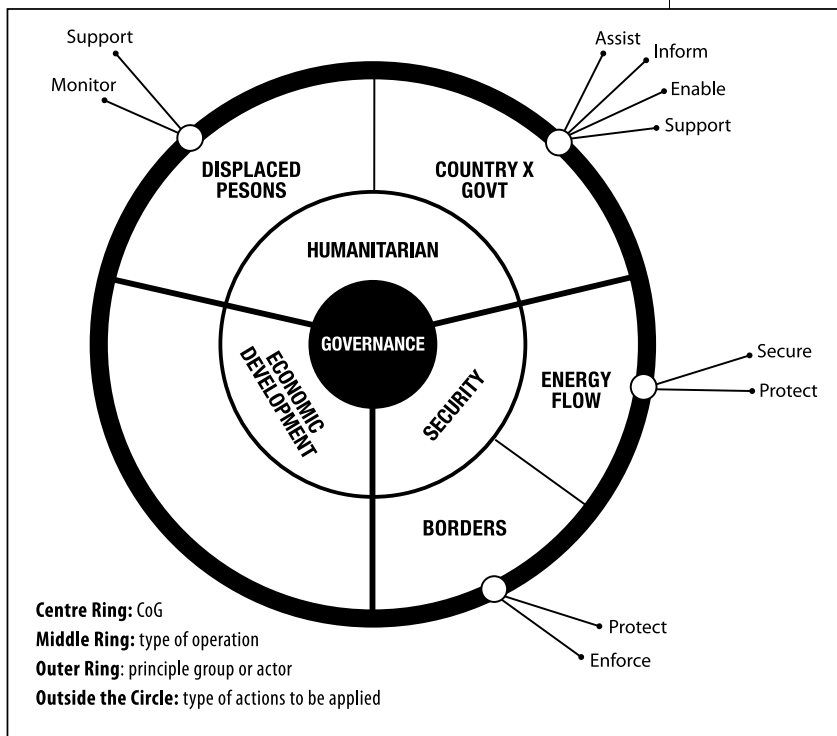


Figure 6: Circular Campaign Plan – Partial View

The group struggled with the idea of the narrative and elected to use it as an aide memoire for the commander to recapitulate and reset the discourses when they got side tracked or focused upon unproductive material. Rather than continue to consider merging SOD and OPP, the former was better considered as an alternative approach when dealing with complex problems.³¹

Third Year

For JCSP 35, the JOPG was divided into two groups with seven of the fourteen elective students in each. The other four members of each team were given the introduction to SOD to read, and all were given a briefing on the approach taken by

JCSP 34. As a result of difficulties encountered during JCSP 33 and 34 experiments, in trying to use SOD specifi-

portability and easier archiving of their work. As well, the second group established a blog as a means of capturing the narrative. They found this provided a better means of sharing their evolving understanding of the problem and their COA. The more tangible and portable medium used by the second group would offer the means to communicate up and down the chain of command as necessary to link the strategic direction and the tactical actions. However, while the selection of an electronic record was consistent with the JCSP 34 approach, the actual products or means used to illustrate JCSP 35's work was unique to their group.

An interesting difference between the second JCSP 35 group and the JCSP 34 group was their understanding of the nature of the problem. For JCSP 34, the collective understanding that emerged was that the ability of the region to govern itself was the focus of their intervention actions. That is, in

applying actions that increased or supported self-governance, or conversely, decreased or weakened those tensions that undermined self-governance, the current state would be ameliorated and the region would be more stable. For JCSP 35, the crux of the problem was the different perceptions of what constituted regional political stability. They saw the tensions being those things that perpetuated the different views of stability seen by the coalition and the rival.

Centre Ring = desired outcomes. Outer ring = focus of actions. Arrows indicate type of Whole of Government action. Central box the attractor.

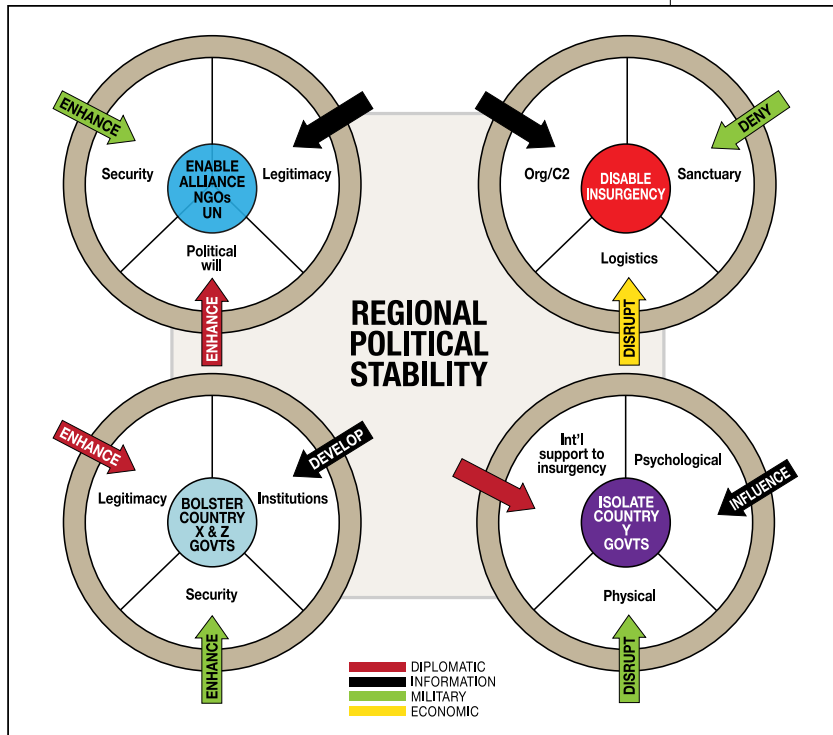


Figure 7: Whole of Government Campaign Plan

Consequently, their intended actions were designed to bring both sides to a new, mutually acceptable attractor,³³ a desired state that would result in a more stable region. While an effective outcome for JCSP 34 would have allowed the region to deal with its own problems, it would have fallen short of addressing the real problem: different views of regional stability or the ideal state. The JCSP 35 group placed significant focus upon what would be required across all aspects of national power in a comprehensive approach to influence the acceptance by both sides of the conflict of a new, mutually acceptable ideal state. Had they had the benefit of subject matter expertise from other government and non-government organizations within the JOPG, their COA would likely have been richer. This comprehensive approach would have been more appropriate, given that the fundamental consideration in wicked problems is that "... the information needed to define the problem depends upon one's idea for solving it,"³⁴ and problem solution is dependent upon one's perspective. Each element of any coalition would have its own thoughts on the problem solution / definition, and therefore, a collective effort to achieving a mutual understanding would likely lead to a better solution. Moreover, by focusing solu-

tions upon affecting the perceptions of political stability towards a mutually satisfactory attractor, there would emerge greater potential for long-term stability. The foregoing is not meant to assess the outcome of JCSP 35 as superior to that of JCSP 34. Rather, it is to illustrate the evolving understanding of how to deal with complex problems from an operational design and planning context.

Conclusions and Recommendations for Further Research

The OPP challenges Canada to explore new approaches that will offer more complex responses to deal with the increased complexity anticipated in future conflicts. A systemic approach to operational planning based upon an understanding of the underpinning theories of systemic operational design has offered one such approach.

The iterative evolution of the CFC experiment lead from attempts to use an intuitive approach in a sequential manner; first design, then plan, to a systemic approach that is more consistent with the theory of wicked problems; solve to define and understand the problem, then design and plan concurrently. This occurred as the experiment moved from an investigation of SOD as an addendum or alternative, to the adoption of a systemic approach informed, but not constrained, by the underpinning theories upon which SOD was developed. It was evident that the depth of understanding and appreciation for the implications of wicked problems to military planning staffs increased progressively. The means of illustrating each group's work became consistently

more comprehensive. Illustrative tools and media were selected and developed by each group to suit their understanding of the problem, and how to describe it. Successive iterations of the experiment lead to an increasingly fuller understanding and appreciation of the nature of the operational problem, and how to convey that understanding, most notably, when problem solution was done concurrently with problem definition or understanding.

A significant area that would offer an opportunity for further research is the narrative aspect of the process. If a picture paints a thousand words, which words does it paint? If the thousand words are those of the observer of the picture, would they be consistent with the artist's thousand words?

Dr. Michael Collender, a philosopher who has lectured at the National Defense University's Joint Forces Staff College, and USAF Lieutenant Colonel Matthew J. Deller, offer an interesting discussion of the role of language in representing understanding. The context of their work is the interpretation of mental relationships to objects, with language among other things as a significant aspect - as a consideration in opera-



NOTES

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3. Paul Mitchell, *Network Centric Warfare and Coalition Operations: The New Military Operating System* (London and New York: Routledge, 2009), p. 2.
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6. *Ibid*, pp. 1-3, 1-4.
7. *Ibid*, p. 3-1.
8. For a discussion of complicated and complex problems, see Edward Smith, *Complexity, Networking, & Effects-Based Approaches to Operations*, DOD Command and Control Research Program publication series, The Future of Command and Control, July 2006, Cp. 2.
9. For a detailed description of wicked problems, see Horst Rittel and M. Webber, "Dilemma in a General Theory of Planning," in *Policy Sciences* Vol. 4. (Amsterdam: Elsevier Scientific Publishing Company, 1973), pp. 155-169.
10. See the companion pieces by Colonel Stefan Branach, "Educating by Design: Preparing Leaders for a Complex World," and "The Art of Design: A Design Methodology," in *Military Review*, March-April 2009.
11. This analogy was used by Lieutenant-Colonel Dundon during the SOD Elective discussion on emergence as a property of wicked problems, JCSP 35, 2009.
12. John Arquilla and David Ronfeldt, "A New Epoch – and Spectrum – of Conflict," in Arquilla and Ronfeldt (Eds.), *Athena's Camp: Preparing for War in the Information Age*, (Santa Monica, CA: Rand, 1997), p. 11.
13. Canadian Forces Joint Publication 5.0 (CFJP5.0): The Canadian Forces Operational Planning Process (OPP), Change 2, April 2008, pp. 3-11, 4-5.
14. *Ibid*, p. 2-1.
15. *Ibid*, p. 3-10.
16. For a brief, concise explanation of the SOD process, see Matthew Lauder, "Systemic Operational Design: Freeing Operational Planning from the Shackles of Linearity," in *Canadian Military Journal*, Vol 9, No. 4.
17. A more detailed discussion of the SOD process can be found at Lieutenant Colonel William Sorrells, Major P. Blakesley, Lieutenant Colonel G. Downing, Major D. Pendall, Major J. Walk, Major R. Wallworth., *Systemic Operational Design: An Introduction* (Fort Leavenworth, KA: School of Advanced Military Studies, United States Army Command and General Staff College, 2004-2005).
18. *Ibid*.
19. It should be noted that this draft document was never intended, nor sanctioned, for use as a planning method. It was not put to the test during the CFC experiment as such, rather the framework of adapting an essentially intuitive approach into a step-by-step process was being explored. US Training and Doctrine Command. Concept Development & Experimentation Directorate, Futures Center. *Systemic Operational Design: Designing Campaigns and Operations to Disrupt Rival Systems, Version 3.0 4 April 2005 (draft)*. Fort Monroe, VA: Future Warfare Studies Division, 2005.
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23. Lieutenant Colonel William T. Sorrells, US Army, Lieutenant Colonel Glen R. Downing, USAF, Major Paul J. Blakesley, British Army, Major David W. Pendall, US Army, Major Jason K. Walk, Australian Army, Major Richard D. Wallwork, British Army, "Systemic Operational Design: An Introduction." A Monograph, School of Advanced Military Studies, United States Army Command and General Staff College, Fort Leavenworth, KS. Academic Year 2004-2005.
24. Lieutenant-Colonel John Anderson, *Report on the Suitability of SOD*, CFC 2007.
25. For a detailed discussion of mental models, establishing a collective understanding, see: Montgomery, Henry, Lipshitz, Raanan, Brehmer, and Berndt (Eds.), *How Professionals Make Decisions*, (Mahwah, NJ: Lawrence Erlbaum Associates, N/D).
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28. *Ibid*, p. 5.
29. *Ibid*, pp. 4, 5.
30. TRADOC Pamphlet 525-5-500, The United States Army Commander's Appreciation and Campaign Design, Version 1.0, 28 January 2008.
31. Lieutenant-Colonel John Anderson, *Report on SOD as a Design and Planning Methodology for the JCSP*, 4 June 2008, p. 5.
32. Lieutenant-Colonel John Anderson, *Report on a Systemic Approach to Operational Design and Planning for the JCSP*, 19 June 2009, p. 2.
33. In short, an attractor is a trajectory to which motion gravitates. The difference between an attractor and a strange attractor is that for the former the trajectory itself is predictable, for the latter, since it is non-repetitive, it is not predictable. The concept of a strange attractor is more consistent with the nature of complexity and its inherent unpredictability. But the end is the same, the attractor will attract the "object," or the object will always be drawn to the attractor. If the attractor is its understanding of political regional stability, it will always be drawn, regardless of its trajectory, to that attractor. For a discussion of attractors and strange attractors see Marion Russ, *The Edge of Organization*, (Thousand Oakes, CA: Sage Publications, 1999), pp. 15-22.
34. Rittel and Webber, p. 161.
35. Collender and Deller, pp. 37-81.

tional planning. Their construct applies to the analysis of both one's own and the adversary's resources, which is possible because of the notion of different models of victory for each, or the purpose of each force in the operational environment. They argue that this permits the interpretation of causes in a complex system.³⁵

It is recommended that further study be done in the area of the narrative as a means of communicating operational design and planning.





Michael C. Barton. USN. 100116-N-8678B-026

Lieutenant-Commander Amy Hunt and Canadian Captain Rory Macdonald tend to a Haitian woman and infant aboard the aircraft carrier USS *Carl Vinson*, 16 January 2010.

HUMANITARIAN RELIEF SURGERY: A ROLE FOR CANADIAN FORCES HEALTH SERVICES SURGICAL TEAMS POST-KANDAHAR?

by Andrew Beckett, Peter Chu, and Homer Tien

This article represents the views of the authors, and does not necessarily reflect the views of CFHS or DND.

Introduction

The Canadian Forces Health Services has provided highly capable combat surgical teams to Canada’s mission in Afghanistan from 2002 until the the present.¹ Our surgical teams at the NATO Role 3 hospital in Kandahar have provided expert-level care to coalition soldiers and allies, achieving an internationally enviable record in the process: 98 percent of all casualties treated at the Canadian-led hospital survived their injuries.² In the wake of our surgical experience in Afghanistan, the question becomes: “Where should these assets be used, and, most importantly, how should these assets be maintained?”

In the post-Second World War and Korean War era, CFHS did not optimally focus upon war surgery, focusing instead upon garrison health care for Canadian Forces (CF) members.³ This change in doctrine resulted in losing the lessons and experiences of emergency war surgery. When 1 Canadian Field Hospital arrived in Afghanistan, it was the first time

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since the Korean War that CF surgeons had been deployed into a combat theatre, except for the first Gulf War, Learning *new*, and relearning *old* lessons about war surgery was required by all CFHS members deployed to Task Force Kandahar.⁴

The international response to recent natural disasters, such as the 2010 Haitian earthquake, has demonstrated both the extremes of human suffering, as well as opportunities for the Canadian Forces to provide rapid humanitarian surgical relief. The intense media coverage of the Haitian earthquake and the DART (Disaster Assistance Response Team) deployment to the area provided a great amount of positive publicity for the CFHS and its role in conducting humanitarian operations.⁵

Canadian Defence policy has incorporated an increasingly more robust doctrine in the realm of humanitarian operations. In 2008, the Defence Leadership Team, in the publication *Strategy 2020*, noted that providing emergency humanitarian relief is one of the primary responsibilities of the CF to promote Canadian interests and values abroad, while contributing to international peace and security.⁶

More recently, the Canadian Expeditionary Forces Command (CEFCOM) Humanitarian Operations Contingency Plan (CONPLAN RENAISSANCE) has delegated to CFHS the responsibility to provide mission-specific medical and humanitarian services to those affected by a disaster. As part of the overall operational aim, CONPLAN RENAISSANCE is directed at saving lives and decreasing the suffering of those affected by disasters, while promoting a positive image of Canada, both abroad and at home.⁷

To achieve these goals, the CFHS needs to fully develop and operationalize its humanitarian relief surgery (HRS) doctrine. Not only would a CF HRS program fulfill the mission aims of CONPLAN RENAISSANCE and Defence 2020, but such a program would maintain the war surgery experience gained from prior conflicts for any future conflicts in which CFHS must provide support.

This article will review the literature dealing with the principles surrounding humanitarian relief surgery practices. It will then analyze the 1 Canadian Field Hospital surgical response to the Haitian earthquake, and compare these results to the contributions made in Haiti by other military forces and Non-Governmental Organizations (NGOs). Based upon this review, we will propose a humanitarian relief surgery doctrine for the CFHS that will achieve the mission objectives identified in CONPLAN RENAISSANCE and the Defence Leadership Team's Strategy 2020.



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Humanitarian Relief Surgery Concept

Canada has a long history of providing medical care in many humanitarian emergencies, including deployments to earthquakes in Turkey, Pakistan, and, most recently, in Haiti.

HRS is a high impact, high visibility health care practice that has achieved internationally recognized value for saving lives, relieving suffering, and promoting goodwill towards the country that provides the service. However, to be successful, an HRS doctrine must be understood within the context of what it *is*, what it is *not*, and, most importantly, what are its inherent limitations.

The focus of HRS is limited to providing surgical care in a war or disaster scenario for only a defined period of time, without attempting to develop or improve local surgical facilities. HRS provides basic life saving surgery, such as the treatment of fractures, the completion of traumatic amputations, and hemorrhage control. The primary mission of HRS is to provide the “greatest good for the greatest number of patients” through triage and the judicious use of surgical resources.⁸ The medical care provided by HRS in the circumstances of a disaster is different than the care one would expect to receive at a Canadian hospital. However, that care can still be provided ethically, efficiently, and with sound clinical benefit to the affected population.

A relatively current Canadian perspective on medical humanitarian operations can be summarized by the following statement:

“Medical solutions that come from individual, high-tech practices in the developed world are often inappropriate and even harmful at the site of an overseas disaster. Canadian involvement there is almost always of short duration and, when foreign troops withdraw, it is local resources that must take up the slack. It

follows that Canadians must learn how to live within the boundaries of local medical practice.”⁹

HRS, by its definition and own limitations, consists of care delivered to persons affected by a disaster or conflict, not the care delivered to combatants or care providers, who have become ill or injured within the area of operations. HRS does not aim to replace the local health care system over the long term.¹⁰ Rather, the HRS team provides definitive ‘life and limb-saving’ surgery to local patients; no further surgical interventions should be required after being discharged from HRS care. Combatants and care providers, in contrast, are often repatriated immediately to receive higher levels of care in their native countries.

passes the first seven days following a calamity. During this period, affected persons are recovered and brought to aid. Next is the *relief* phase (Days 8-50), where the bulk of HRS occurs. Finally, the *recovery* phase, which is implemented 50 days after the event, involves rebuilding the national health facilities, and this is when NGO health care services become more established. Because of the damage to local health care resources and infrastructure, the HRS must be self-sufficient for a limited time period until more permanent and higher-level care facilities can become operational again.

It has been well-described that deaths after trauma follow a trimodal distribution; a humanitarian disaster or emergency is not different. The first and largest peak, comprising 50 percent of the total number of deaths, is observed immediately upon or within seconds after injury. The second peak, which accounts for 30 percent of deaths, occurs up to four hours later, and the third phase, which accounts for 20 percent of patients who expire, occurs from four hours to days and weeks after the event. These latter patients often succumb to organ failure.¹¹ Therefore, to be of maximal benefit, the HRS team must intervene early to prevent the second and third peaks of post-traumatic deaths. In summary on this issue, to be effective in preventing deaths from a disaster, the HRS team must be self-sufficient and rapidly deployable, so that it can reach victims within hours or days after a disaster.

Non-Governmental Humanitarian Relief Surgery Response to the Haitian Earthquake

Medecins sans Frontiers (Doctors without Borders)

In the aftermath of the Haitian earthquake, Medicine Sans Frontiers (MSF) operations in Haiti provided 16 operating rooms and performed 1178 procedures between 12 January 2010 and 31 May 2010, at a cost of 11 million Euros (€936.32/case).¹² MSF now manages 16 operating theatres, and has more than 1200 hospital beds available at its various locations within Haiti. Overall, since the earthquake, MSF has assembled included a staff of 3228 members, has provided medical care to more than 92,000 patients, and had performed nearly 5000 surgeries between January and April 2010.¹³ A large-scale and prolonged operation of NGO medical facilities is paramount for the success of any relief and rebuilding operation after a disaster. However, this model, which necessitates a long deployment and the allocation of resources, requires a massive financial commitment and political ‘staying power.’ Prior to full mobilization of NGO resources, there remains a large gap in the number of organizations with the airlift capabilities to arrive shortly after a disaster occurs that can provide humanitarian relief surgery.

International Committee of the Red Cross

Data has yet to be published about Haiti from the International Committee of the Red Cross.



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The Humanitarian Emergency and Distribution of Trauma Deaths

An HRS team must arrive as soon as possible to a humanitarian emergency to exploit its full potential and to have the maximal impact. Arriving to an event too late can cost many lives because the opportunity to provide life saving care will have passed. A humanitarian emergency can be divided into three phases. The first is the *rescue* phase, which encom-

Military Humanitarian Relief Surgery Response to the Haitian Earthquake



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A DART team member takes a momentary rest pause, 15 January 2010.

DART and 1 Canadian Field Hospital in Haiti

The Canadian contribution to the Haiti relief effort consisted of a primary care medical platoon in the DART team comprising 40 personnel. The DART medical facility provided basic laboratory, blood bank, and radiology services. During its deployment, the Canadian DART medical facility logged 4922 medical and surgical encounters, only 3 percent of which were surgical consultations.¹⁴

- 1 Canadian Field Hospital provided 100-bed field hospital facility, and a four-bed Intensive Care Unit (ICU).
- 1 Canadian Field Hospital provided two surgical teams, each consisting of one general surgeon, one orthopedic surgeon, and one anesthesiologist. The 1 CFH surgical teams commenced surgical operations 17 days after the earthquake, and were operational for 39 days in total thereafter. During that period, the unit performed 167 operations (cases) on 155 patients. Most of the cases were not related to trauma from the earthquake (13 percent), but rather, were for chronic neglected surgical problems (Table 1).¹⁵

“The Canadian contribution to the Haiti relief effort consisted of a primary care medical platoon in the DART team comprising 40 personnel.”

Surgical Cases	Number of cases
Inguinal Hernia and Hydrocele Repair	69
Umbilical Hernia Repairs	6
Hysterectomy	12
Open Reduction Internal Fixation	12
External Fixation	7
Circumcision	6

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Table 1. Surgical Cases by type performed by 1 Canadian Field Hospital in Haiti during a 39 Day Operational Period

Talbot *et al.* noted “... that greater clinical benefit might have been achieved through a lighter and more rapidly mobile surgical/resuscitation team for future Canadian Forces humanitarian and disaster response operations”.¹⁶ With the development of a light HRS program, the CF can improve this response time and provide more emergency and trauma surgery, rather than providing care for chronic surgical problems.

US Military in Haiti

The US military provided ground, air, and naval medical care, including the US Navy's hospital ship, *Comfort*, which arrived on 20 January, eight days after the initial earthquake. At that time, USNHS *Comfort* began accepting transfers of injured persons by navy helicopter to its more than 300 medical personnel, 12 operating rooms, and 500 beds. Between 19 January and 28 February 2010, the ship treated 1000 Haitian patients, and performed 850 surgeries.¹⁷ The operational capacity and flexibility of a hospital ship that is completely self-sufficient, secure, and mobile is highly desirable. However, this type of service is also very expensive, both as an initial investment, and by virtue of the cost of maintaining its operational effectiveness.

Israeli Defence Force Field Hospital in Haiti

The Israeli Defence Force (IDF) provided a 121-person field hospital after the Haiti earthquake and was fully operational in just 89 hours. Its field hospital provided 60 in-patient beds, including four beds in an intensive care unit with one operating room with a single operating table. This capability was later expanded to 72 ward beds, and a second operating table was also added. In its ten days of operation, the IDF field hospital treated more than 1100 patients and hospitalized 737 patients. The IDF ICU beds were used for patients whom the Israelis anticipated would be able to be stabilized within 24 hours or less. The practical implication of this prioritization scheme was that hospitalized patients who were deemed to have a small chance of survival were not likely to be treated in the ICU.^{18,19}

With respect to its surgical efforts, the IDF performed 244 operations on 203 patients with their staff of five general surgeons and seven orthopedic surgeons. The majority of traumas treated by this unit

included fractures and open wounds (Table 2).²⁰ The IDF field hospital case-load (Figure 1) shows that by arriving early to a disaster scene, many injured persons received urgent surgical care. As the days passed, the number of urgent trauma cases *decreased*, while the number of routine surgical cases *increased*.

ICD-9-CM Diagnosis	Patients n (%)
Fractures	265 (38.74)
Open wounds	188 (27.49)
Superficial injuries	120 (17.54)
Crush injuries	107 (15.64)
Contusions with intact skin surface	89 (13.01)
Burns	16 (2.34)
Dislocations	12 (1.75)
Internal injuries of the chest, abdomen and pelvis	12 (1.75)
Sprains and strains of joints and adjacent muscles	11 (1.61)
Intracranial injury (including skull fracture)	8 (1.17)
* Many patients had > 1 diagnosis	

Table 2. Occurrence of the 10 most Frequent Trauma Diagnosis Groups in 1041 Patients treated by Israeli Defence Force Field Hospital* (Adapted from Kreiss Y, Merin O, Peleg K, et al. Early disaster response in Haiti: the Israeli field hospital experience. *Ann Intern Med* 2010;153:45-8.)

The IDF HRS response to the Haiti earthquake was very rapid; it was operational just 89 hours after the earthquake. This is particularly commendable, given the distance the IDF had to travel to establish the hospital. The IDF triage process also appears to have been adhered to scrupulously, because the four-bed ICU was not overburdened by providing prolonged advanced medical care to unsalvageable patients.

However, some criticism of the IDF response was generated, given that they initially only provided one operating table, and then increased to just two operating tables, despite having 12 available surgeons. The large number of surgeons provided, although useful, increased the logistical footprint of the unit because food and accommodations were required for the 12 surgeons, even when they were not being utilized in the operating room. The 1 Canadian Field Hospital team had only one-third the number of surgeons that the IDF provided, but managed to perform 167 operations in 39 days with only four surgeons working in the same austere conditions. Sending fewer surgeons may be a reasonable choice for the CFHS, as it has fewer active duty surgeons than the IDF. Furthermore, it will reduce the logistical footprint of the hospital without affecting its operational tempo.

Humanitarian Relief Surgery Response to other Earthquakes

The military HRS response to the Haitian earthquake was similar to the experience of other field hospitals that have deployed to earthquake disaster zones. Specifically, much of the care was obstetrical in nature, or due to neglected surgical conditions caused by the devastation to the health care infrastructure. This was also due to the establishment of full field hospitals, which take time to establish and become operational. For example, the US 212th Mobile Army Surgical Hospital reported that 90 percent of its workload during their four-month deployment consisted of primary care following the 2005 Kashmir earthquake. They also noted that the requirements for surgical care decreased quickly after the first month. However, the unit only became operational 13 days after the earthquake after many persons had already died from earthquake-related trauma.²¹ Similarly, an American civilian field hospital that deployed to the Bam, Iran earthquake in 2003 performed only six surgical procedures, while treating a total of 727 patients. The majority of care provided by that civilian field hospital was obstetrical in nature.²² The experience of these two US HRS hospitals reflects a trend in relief surgery, and mirrors the experience of the CFHS in Haiti, namely that the longer it takes for a relief surgical hospital to establish after a disaster, the fewer are the lives that will be saved.

NGO Humanitarian Relief Surgery Doctrine

Two well-known organizations, the International Committee of the Red Cross (ICRC), and the World Health Organization (WHO), have established international reputations for providing HRS. Much of the existing doctrine for HRS was developed by these two reputable providers, who both publish extensively on the subject (www.icrc.org, and www.who.int/publica-

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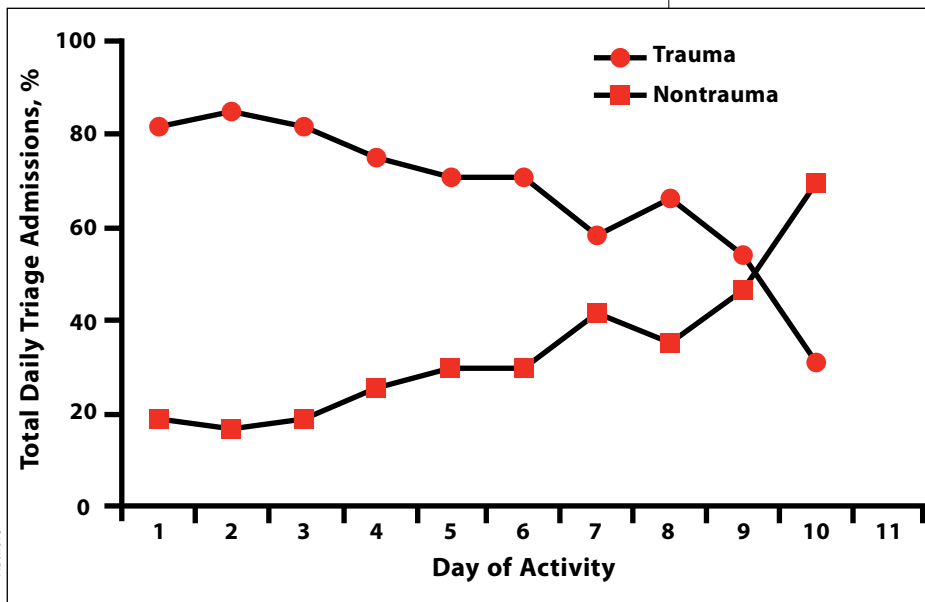


Figure 1. Israeli Defence Force Field Hospital Case Mix in Haiti. Adapted from Kreiss Y, Merin O, Peleg K, et al. Early disaster response in Haiti: the Israeli field hospital experience. *Ann Intern Med* 2010;153:45-8.

tions/en/). The ICRC has published several important documents that apply to the delivery of a HRS program. These include *Hospitals for the War Wounded*, *Surgery for the Victims of War*, *War Surgery*, *War Wounds with Fractures*, and several other useful documents available at the ICRC website.²³ In addition, the WHO has published on similar topics, including *Emergency and Essential Surgery: the Backbone of Primary Health Care*, and *Best Practice Guidelines on Emergency Surgical Care in Disaster Situations*, available at their website.²⁴



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The ICRC and WHO doctrines published in the above publications can be applied to the development of a light surgical Humanitarian Relief Surgical team for CFHS humanitarian operations. The ICRC and WHO stated principles on war surgery have important implications for the delivery of care in HRS operations.

- Triage is paramount. Allowing critically ill and medically complex patients to die with dignity is important for doing 'the most good for the greatest number of patients.' This allows resources to be utilized by more salvageable patients.
- The ICRC doctrine describes intensive *nursing* units, not intensive *care* units. In ICRC's *War Surgery*, it is stated that ventilators and monitors may not be appropriate in ICRC intensive nursing units. In most

cases, pulse oximetry is all that is required for the monitoring of post-operative patients. The WHO states that an ICU does not necessarily need ventilators or other expensive machines. It suggests that oxygen should be available, that intravenous lines should be capable of running overnight, and that vital signs should have the capability of being measured at least hourly. The minimum standard for monitoring is by a pulse oximeter. The key feature identified for the success of an ICU by the WHO is overnight monitoring of the patient.

- The ICRC doctrine states that high quality surgery can be performed with simple x-ray services only, and that no computed tomography or complex x-ray machines are required.
- Blood should only be given to patients in shock with a good chance of survival. In many cases when blood is transfused at ICRC facilities, the transfusion is of fresh whole blood donated by a relative. In some areas of the world with endemic blood-borne diseases, the ICRC recommends that blood transfusions be entirely avoided. Often, in affected areas, cultural taboos exist regarding the giving or receiving of blood. To support a blood bank, the ICRC has a basic cross match system, but cannot screen for blood-borne diseases. ICRC field hospitals do not store fractionated blood products, as the refrigeration required to store plasma, packed red blood cells, and platelets cannot be assured.
- The ICRC does not provide microbiology laboratory services.
- The ICRC doctrine advocates only for primary repair of vascular injuries. If a primary repair is not possible, prosthetic grafts should not be used, and an amputation should be considered for high-grade vascular injuries.
- Most open fractures can be managed with debridement, washout, Plaster of Paris casting, and skin grafting. External fixation systems may be used for open fractures. However, because of limited diagnostic imaging support, surgeons using external fixation devices must be comfortable using them with *minimal* or *no* diagnostic imaging. Internal fixation should be used sparingly, and avoided if possible. The ICRC uses the AO/ASIF tubular systems for internal fixation when necessary.
- Anesthetic agents should be given intravenously. Most ICRC hospitals use the agent Ketamine for induction and maintenance of anesthesia. Inhaled agents require bulky equipment and gas circuits that may require sterilization after use in patients with infectious respiratory diseases. Many procedures are also done under local anesthetic, such as amputations and chest tubes.²⁵



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Developing a CF Humanitarian Relief Surgery Program

A CF HRS team would provide a rapidly-deployable field surgical detachment that could be mobilized with DART in response to a disaster or conflict. This surgical capacity would be in support of CF humanitarian operations until more established and permanent health care facilities can be established, or until the CF HRS element can be augmented by other CFHS services.

Some key features that should be considered when developing a CF HRS program include:

1. The CF HRS component from 1 Canadian Field Hospital would deploy as an integral part of the DART with members of the surgical team on the initial deployment.
2. The duration of the HRS deployment would be same as that of the DART (40 days).
3. The CF HRS element of the DART would be self-sufficient with respect to re-supplying for at least seven days.
4. The CF HRS team would be light, rapidly deployable, and would have a small logistical footprint. The team should be modular and easily expanded, with more advanced

Role 3- type equipment as it becomes available.

5. Other DART health care providers would assist with peri-operative care of patients during the first week of deployment.
6. Injured or ill CF members would be treated in the same way as on previous DART missions.
7. A defined list of key clinical procedures would be established to enable planning for the required equipment, medical expendables, and the necessary training of surgical staff (Table 3).

Specialty	Types of Procedures	Comments
General Surgery Procedures	Neck exploration: repair of trachea, esophagus, vascular injuries Chest: chest tube insertion, decortication for empyema Abdomen: perforated viscera, vascular injury, splenectomy, hernias, appendectomy, gallbladder, intestinal volvulus and bowel obstruction operations	Patient must be extubatable postoperatively Surgical drains required, only staplers required for unstable patients, but otherwise all anastomoses are hand sewn to reduce kit weight
Urology Procedures	Suprapubic catheter insertion Bladder repair Open urethral realignment Urethral Dilation Ureteric repair Caesarian Section	J-Stents required
Obstetrics and Gynecology Procedures	Emergency Hysterectomy Dilation and Curettage Salpingectomy/Salpingotomy/Oophorectomy	For Ectopic pregnancy or Ovarian Torsion
Orthopedic Procedures	Casting for closed fractures External Fixation for open fractures Washout, debridement and casting of open fractures	(if available resources permit)
Plastic Surgery Procedures	Skin grafts Flap coverage of open fractures	All flaps should be fasciocutaneous or musculocutaneous or cross pedicle flaps. No free flaps.
Neurosurgery	None	

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Table 3. Suggested Types of Surgical Procedures to be offered by CF Humanitarian Relief Surgery Team, by Specialty.



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the CF HRS team would need enough OR instruments to perform up to 30 operations per day (15 cases per table) for the first seven days of a mission. This would provide enough time for a sterilizing machine to become fully operational. Additionally, the CF HRS team would need enough medical expendables for a projected 40-day mission.

How Would a CF HRS Team be received by the Affected Nation, NGOs, and the International Community?

Because the mandate for a CF HRS mission would be only 40 days, a great impact can be made on the care of survivors

without giving the perception of distracting from the NGO's long-term plans for the area. The Canadian Forces, with its new strategic air capability, could have surgical capabilities functional soon after a disaster or conflict, and even before NGOs arrive and become operational. This ability would set Canada apart from many other nations and NGOs. Once the NGO HRS care is functional, the CF HRS could re-deploy. A

Proposed Configuration of a CF Humanitarian Relief Surgery Team

To ensure a rapidly deployable and highly mobile HRS team, the logistical and personnel requirements must be small but sufficient to provide excellent HRS to affected persons. In keeping with what HRS providers have done in the past, the following organization would balance the competing interests of mobility and high-quality surgical relief care.

The composition of the CF HRS team would consist of as little as six highly-trained personnel added to the DART. The key members of this team would include a general surgeon, an orthopedic surgeon, two anesthetists, and two operating room nurses or technicians. This formula was shown to be effective during the 1 Canadian Field Hospital deployment to Haiti.

The equipment needed to provide care would be light, unlike that required for a Role 3 facility, as was utilized in Kandahar. The minimum required kit would be one-to-two operating tables, anesthesia machines/ventilators, and oxygen concentrators. Operating room lights, a generator, and an instrument sterilizing system would also be essential. No microbiology, biochemistry, or hematology laboratory equipment would be required. A patient's hematocrit could be determined with a centrifuge and a ruler. If available, the blood microanalyzers used by children's hospitals can run samples from a capillary tube of blood without the need for heavy equipment.²⁶

As suggested by the WHO guidelines, the CF HRS element should not run a blood bank. Blood should be donated by family members and transfused as whole blood that has been tested only for blood typing (ABO and Rh factor). Testing kits for Hepatitis B and C and HIV are very cheap, readily available, light, and quick to yield results.²⁷ However, depending upon the mission requirements, the storage of small amounts of fractionated blood products for CF members may be required for emergency use. To be completely self-sufficient,



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CF HRS team would be perceived as a significant contribution to those in desperate need by assisting overwhelmed local and NGO health care resources. However, an exit strategy must be well-planned with the NGO and national health services, so as to not abandon those institutions when the CF HRS mandate is complete.²⁸

by using our highly-trained CF surgical teams in HRS, we would help preserve part of the valuable war surgery experience that we gained in Afghanistan. This would allow the CFHS to maintain core surgical competence in austere environments, so that it will be prepared for the next challenge that the CF may meet.



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Ethical and appropriate care within the setting of a disaster or a humanitarian emergency can be provided within the guidelines established by internationally-recognized doctrines. The CFHS does not need to create or explore these complex ethical and clinical considerations in isolation.

In summary, the post-Afghanistan CFHS doctrine should implement an HRS team in the already-experienced DART formation. The addition of acute HRS care would add clinical strength and depth to the care that can already be delivered by the non-surgical health care services of DART. Because many people will be critically injured

after a disaster such as the Haiti earthquake, the surgical care offered by a CF HRS team may well be an individual's only chance for survival.



Conclusions

The addition of HRS to the DART and CFHS humanitarian operations would support the mission aims of CONPLAN RENAISSANCE and Strategy 2020. In addition,

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Two Canadian warships, HMCS *Toronto* and HMCS *Athabaskan*, restock their fuel supplies from the American tanker *Patoxtent*, 8 September 2005.

BY AIR, LAND, AND SEA: CANADA RESPONDS TO HURRICANE KATRINA

by Joseph Scanlon and Elizabeth Steele with Alex Hunsberger

Introduction

In September 2005, Canada sent a multi-service task force to help the United States recover from Hurricane *Katrina*. Operation *Unison*, as it was officially designated, included navy divers from CFB Shearwater (now CFB Halifax) and CFB Esquimalt, and army divers from CFB Gagetown, deployed initially to Pensacola, Florida. The force included supplies and equipment sent by road, as well as three Canadian warships and a Canadian Coast Guard light icebreaker. The entire operation was supported by formation logistics staff in Halifax, and an officer deployed to Pensacola to establish a Forward Logistics Site (FLS), and arrange for sustainment of the force, which was formally designated Canadian Forces Joint Task Group (CTJTG) 306.

The entire response was organized in a few days at the end of August through verbal orders and contracting arrangements at the same time as major organizational changes were being made at National Defence Headquarters (NDHQ) in Ottawa. In fact, Joint Task Force Atlantic (JTFA) was the only element then ‘up and running’ in what is now Canada Command. The formation was also assembled despite legal concerns with respect to having coast guard members placed under navy direction. Further, many decisions were not sup-

ported by advance paper work; this had to catch up later. These initiatives were all aligned with the views of General Rick Hillier, then-Chief of the Defence Staff, that there was too little reliance upon verbal orders, and too much upon paper work. Operation *Unison* fitted his goal of a command-focused, mission-centric Canadian Forces (CF), melding air force, army, and navy elements in joint operations.

This article will describe the CF response to Hurricane *Katrina*. It will cover the creation and operation of the task force under Commodore Dean McFadden and his successors.¹

Response to Disaster

Katrina was not the first time Canada and the US have assisted each other in the wake of a disaster. After a fire destroyed much of Saint John, New Brunswick, on 20 June 1877, the US Revenue Cutter *Gallatin* sortied twice from Boston with relief supplies.² And after the massive 6 December 1917 Halifax explosion, the first outside-Canada response was embodied in two US Navy (USN) ships, the USS *Tacoma* and the USS *Von Steuben*.

In 1992, after Hurricane *Andrew*, Canada sent a team of airfield engineers to Florida, where they rebuilt two severely damaged schools in Dade County. Their supplies were deliv-

DND photo HS2005-0686-05 by Corporal Halima Fofitas

ered by HMCS *Protecteur*, a CF supply ship. Generators supplied by *Protecteur* were used to assist in creating temporary power, and her medics provided assistance to persons from the area.

CF personnel have also, over the years, responded to domestic incidents – the 1996 Saguenay floods, the 1997 Red River flood, the 1998 Eastern Canadian ice storm, the 1998 crash of Swissair 111, and, in 2003, Hurricane *Juan*.

In the wake of the 9/11 terrorist attacks, legitimate Canada-US security concerns were raised with respect to air travel. The new security environment also demanded an examination of the threat to maritime security. In Canada in 2004, this resulted in new emphasis being placed upon maritime security in partnership with the United States, and the new policy broadened the definition of ‘security threats’ to include natural disasters.

Rear-Admiral Dan McNeil had worked on national security policy in the Privy Council Office before being sent to command Canada’s east coast naval forces in 2004. One concern was the split nature of Canada’s coastal capacity. Since search and rescue – which involves both the Canadian Coast Guard and the (Royal) Canadian Navy – was one of JTFA’s main missions, McNeil had coast guard staff deployed into his operations centre. He visited the US Naval Base at Norfolk, Virginia, and developed a close association with Admiral Mark Fitzgerald, Commander, USN 2nd Fleet. Fitzgerald strongly supported Commodore McFadden’s ongoing aim to ensure fleet interoperability with the USN. By way of example, during a US training exercise, McFadden and his staff on the US cruiser, USS *Cape St. George*, acted as if they were part of a multi-national operation. This assisted the Americans, and it also increased Canadian familiarity with the US approach to command and control. All this experience ultimately proved crucial to the success of Operation *Unison*.

When *Katrina* struck landfall, it appeared that it had missed New Orleans, but when it became known that the levees there had not held, discussion began with respect to a Canadian response. General Hillier called from Ottawa to say that military staffs should consider what they could contribute. The logical way to send supplies would be with *Preserver*, but she was just coming out of refit. The possibility of having the sister supply ship *Protecteur* deploy from Esquimalt via the Panama Canal was also discussed. Since planners could actually see the Canadian Coast Guard light icebreaker *Sir William Alexander* (SWA) docked across Halifax harbour, Commander Russell Stuart remarked that he wished that vessel could be employed to carry supplies.



The Canadian Coast Guard Ship *Sir William Alexander* sails out of Halifax harbour, 6 September 2005.

This raised legal questions: could a coast guard vessel – with its unionized civilian crew – operate as part of a navy task force, with its code of military discipline? Commodore McFadden discussed this issue with the District Commander of the Coast Guard and the question was settled when Larry Murray, a former admiral and then-Deputy Minister of Fisheries and Oceans, flew to Halifax. *SWA* could join the task force.

There were still concerns in Ottawa. Some argued that Canada had to place its commitments to the North Atlantic Treaty Organization (NATO) first and foremost. Acting Chief of Defence Staff Vice-Admiral Ron Buck then called Admiral McNeil, since Admiral Buck had been advised that no response was possible. Was that true? Admiral McNeil then told him he had been in contact with Admiral Fitzgerald. Canada had three navy ships – the destroyer *Athabaskan*, and the frigates *Ville de Quebec* and *Toronto* available – and *SWA* could carry supplies. His staff had also identified navy and army divers and construction personnel as resources. McNeil told Vice-Admiral Buck that he had, in fact, told the Americans that Canada would respond. By then, Public Safety and Emergency Preparedness Canada (PSEPC) was supportive, as was Prime Minister Paul Martin. Legal concerns were pushed aside – at least, for the moment.

There were still problems. Personnel at CFB Gagetown questioned the legitimacy of a verbal order to report to Halifax because they had been expecting a series of written orders. However, they were promptly told that they must follow the verbal order, as it was binding. Normally, army units ‘hit the ground running.’ They do not, like navy personnel, who have more transit time for such activities, benefit from being able to do substantial planning en route. It was also not yet clear that *Katrina* had been officially declared an emergency, as was the case during the Manitoba floods, the ice storm, and the crash of Swissair 111. Another legal issue was raised when it was considered to send in the medically-trained Disaster Assistance Response Team (DART) to the area. Planners were told that medical personnel could not operate in the USA without the

permission of state licensing agencies. Ultimately, although the DART did not participate in *Unison per se*, sixteen medical personnel did deploy to service the task force.

When *SWA*, *Athabaskan*, *Toronto*, and *Ville de Québec* were assigned to the task force, their captains were told that their responsibility was to get their ships ready to depart Halifax by Tuesday morning. Acquiring extra supplies was the Formation Logistics Officer's concern. Two ships (*Athabaskan* and *Ville de Québec*) would carry CH-124 *Sea King* helicopters and the 57 Air Command personnel required to maintain them. *SWA* also carried a helicopter, although as it transpired, it was used only once during the response. The task force commander, Commodore McFadden, and staff officers – his CSO (Operations) and the fleet technical officer – would embark in *Athabaskan*. The Commander JTFA, Rear-Admiral McNeil, was assigned overall operational level responsibility for *Unison*; the commander CTJTG.306, Commodore McFadden, for the deployed task group; and the captain of *Athabaskan*, Captain David Gardam, for the naval ships.

Acquiring Supplies

At 0900 hours on Friday 2 September, the order was given to JTFA to prepare three naval ships with supplies for homeless victims, to support the preparation of the *SWA*, and to be ready for departure within 72 hours. They did not have long to contact civilian suppliers because outlets were scheduled to be closed that Sunday and Monday (Sunday due to Nova Scotia's Sunday shopping ban, and Monday because of the national Labour Day holiday). The team then contacted a variety of suppliers in the Halifax area. All of them cooperated superbly by extending working hours over the holiday weekend to provide the necessary supplies. The ships ultimately packed thousands of tents, toiletry kits, water containers, and other items for victims, as well as crew supplies, including chain saws, leather work gloves, and first aid kits.

Athabaskan was conducting sea trials when *Katrina* struck, and arrived at Halifax Thursday in a state of high readiness. *Ville de Québec* was also ready: she was just about to embark on a training mission. However, *Toronto* had just finished a Great Lakes cruise in August, and most of her crew was on delayed leave. They were recalled, but as it happened, she possessed extra bunk space. That was filled by naval construction personnel and the engineers from CFB Gagetown – the Engineering Support Element. They assembled light gear – small chain saws, light generators, shovel, picks, and so on – in packs so they would be able to operate immediately upon arrival. The ships also carried 20 rigid inflatable boats (RIBs) and some *Zodiacs*, as well as fuel, in case crews were required to land personnel and supplies.

The navy made arrangements for secure communications between all the ships, including *SWA*. Six navy personnel travelled with *SWA* to facilitate communication between that vessel and the other ships, while Commodore McFadden established

secure communication lines to both the US Navy and the wing at Shearwater. The ships talked to each other every day to ensure all were well-informed as to what was transpiring.

While warship crews possess useful skills for humanitarian assistance, neither destroyers nor frigates have much surplus room for supplies. However, because *Toronto* was not carrying a helicopter, her crew was able to store some supplies in the hangar area. *Ville de Québec* could not use her hangar because she was carrying a helicopter, but crew members jammed what they could into her torpedo lockers. She also boarded some nurses. Although *SWA* was the smallest of the four ships, she possessed the largest cargo capacity.

On Tuesday morning, Prime Minister Martin, General Hillier, and the US ambassador to Canada, David Wilkins, spoke at the official send-off for Operation *Unison*. General Hillier said the deployment was intended to help those in need, and "...it just happens that those who desperately need our help are our friends and our allies and our neighbours."³ Due to the media interest, *Toronto* also carried a public affairs officer, a combat camera team, and five embedded journalists.

By the time *SWA* sailed, the navy personnel had established a navy communications system in a cabin, including a linkage to the navy's command and control network. This allowed encrypted secure communications between the ship and Shearwater, and between *SWA* and the other ships in the task force. It also allowed the naval officer on board to contact the meteorological and oceanographic centre (METOC), and ask them to download weather maps (used to track the path of other hurricanes) to their web site. As it transpired, the question of naval operational control over a coast guard vessel never became an issue. When Commodore McFadden wanted *SWA* to do something, he would simply ask her captain, "Can you do that?" If the captain responded in the affirmative, then McFadden would simply advise him as to what was required.



DND photo CX2005-0096-328a by Private Vaughn Lightowler

Divers Go First

By the time the ships departed Halifax, deployed divers were already doing clean-up operations in Mississippi. As soon as their participation was discussed, the Commander of 12 Wing Shearwater had made contact with the navy diving unit at Esquimalt and the combat divers at CFB Gagetown, who agreed to provide some three dozen divers altogether.

Due to prior testing and training, the navy diving teams knew how much equipment they could fit on the CC-130 *Hercules* air transports, and they had everything ready to load by the time the aircraft landed in Esquimalt and Halifax. As soon as these transports arrived and were loaded, both flights proceeded directly to Pensacola where the teams assembled. Upon arrival, the Canadians were met by Canadian forward logistics personnel, and by an officer from the US diving unit. Canadian divers do routine annual training at Norfolk with the US Mobile Diving and Salvage Unit (MDSU), and thus they were able to be employed immediately. “[I]t wasn’t just that the organization worked. They knew each other on a first name basis, they knew who to call when they needed things,” said Commander Moors.⁴ Because the Canadian divers had full facial masks (due to the fact that they often dive in the polluted Halifax harbour), as well as decontamination equipment and training, whereas the Americans did not, Canadians were actually the first to dive in some specific areas.



DND photo HS2005-G002-08 by Master Corporal Collin Kelley

Leading Seaman Timothy Topcliffe (right) checks on the status of diver Master Seaman Ghislain Pourier during a dive on a sunken sailboat on Bayou Caddy, Mississippi.

From Pascagoula Mississippi, the divers moved to a National Aeronautics and Space Administration (NASA) rocket assembly plant near New Orleans, where they slept on office floors. From there they did clearance work, helping to wire and raise overturned shrimp boats at several bayous. Some of the boats had been driven onto land: these the Canadians left for others. Once in New Orleans, they made do on existing supplies, as well as whatever they could find locally (such as food from a fast food outlet, which had already re-opened in spite of the recent devastation).

Planning en Route

As the four ships proceeded en route, Commodore McFadden and his staff had to decide specifically from where they were going to conduct operations, and what they were going to do upon arrival. The fact that those questions could be posed and answered en route is a strength of the naval response. They contacted Admiral Fitzgerald, who promised full cooperation: his staff provided contacts with the US Navy in Pensacola and to off-shore impacted areas. The US also sent a tanker to join the task force, so the ships could refuel at sea. McFadden and his chief of operations, Lieutenant-Commander Steve Paget, consulted with the various units involved, including the naval construction team and the army engineers. They asked them what tasks they could perform and reviewed what supplies were embarked on each particular ship. Crews then underwent training refreshers on key matters, such as first aid and critical incident stress.

While the ships were en route, Tropical Storm *Ophelia* developed into Hurricane *Ophelia*, and the ships had to monitor the storm’s progress every 30 minutes. Eventually, they decided the safest route was to remain close to the US coast, and thus passing the storm.⁵ That action generated a delay of about 24 hours. The SWA’s slower rate of travel relative to the navy ships (due to her design, combined with engine cooling problems in warm southern waters) meant that SWA was far enough behind to pass the hurricane without trouble.

Although the best port in terms of condition was located in Texas, Formation Logistics decided that this was too far away for the ships to steam for resupply. Further, it did not make sense to send them to devastated cities like Biloxi, Gulfport, or New Orleans. Pascagoula Mississippi was considered, but it was decided that the logical initial stopping place was Pensacola. It was estimated that this port would be sufficiently repaired by the time the CTG arrived to offload humanitarian assistance items. The decision to dock in Pensacola was made after the ships were en route, again, an example of the flexibility of an ocean-based response.

Pensacola possessed another advantage. It was where the US had established the Joint Force Maritime Component Command (JFMCC) under Rear Admiral Joseph Kilkenny. The JFMCC was tasked to oversee maritime coordination of rescue operations and delivery of relief supplies; operational support for the US Federal Emergency Management Agency (FEMA); coordination of all US and foreign vessels (eventually including the four Canadian ships); coordination of all naval aircraft (including Canadian helicopters); and restoration of naval facilities along the Gulf Coast.



HMCS *Athabaskan* sails through rough seas generated by Tropical Storm *Ophelia*, 8 September 2005.

Ville de Quebec, then *Athabaskan* docked first, took about four hours to unload, then sailed on to Biloxi, Mississippi. *Toronto* then docked when the first two had departed. When *SWA* docked, her crew was given two welcome gifts arranged by the Navy liaison officer – cold beer and baseball caps! While *Athabaskan* was in Pensacola, Commodore McFadden and his staff flew by helicopter to USS *Bataan*. When McFadden entered the room where the video-link was operating, Admiral Fitzgerald immediately greeted McFadden by his first name and said, “Dean, thanks for coming.” At the time the Canadians arrived, the US Navy was readying for departure. Admiral Fitzgerald told the officers on *Bataan* they, in fact, were not going anywhere. “You will stay,” he told Admiral Kilkenny. “Whatever these guys need, you will give them.” (The next day, President George Bush announced that those US forces were remaining in the area.) At that meeting arrangements were made to have the Canadians established on the same command channel that the Americans were using, just as was the case at Norfolk.

After that meeting, Commodore McFadden met with the head of the Seabees, the construction element of the US Navy, and decided that the Canadian combined navy-army construction team would team up with the Seabees and work with them. Both these units have received common training, and they perform similar roles. Although *SWA*'s crew was not trained to offer humanitarian assistance, when McFadden asked if the US Coast Guard could use them, he was told they could. As it materialized, the US Coast Guard could put *SWA* to work immediately, helping to deal with pollution problems from damaged oil rigs. When *SWA* was asked if the ship could assist with recovery and restoration of buoys, her captain replied, “We are very good at that.” That proved to be an understatement. McFadden then agreed to put *SWA* under operational control of the US Coast Guard. The legality of this was never questioned, and that arrangement was approved by General Hillier during his visit.

At Pensacola, *SWA* was met by staff from the National Oceanic and Atmospheric Administration (NOAA) concerned with respect to Oceanographic Data Acquisition (ODAS) buoys that had been damaged or forced out of position. They were astonished and impressed when the Canadians could not only tow the heavy buoys into position, but could deploy them on target. *SWA* had to drop a 10-ton buoy at the end of a cable extending down 600 metres. On the first try, they got it within less than ten metres of the target – an outstanding result.

Logistics in Florida

While the Canadians were deployed in the continental US and in American waters, there was a constant need for logistical support. One problem was getting

the supplies stored in a donated warehouse moved closer to New Orleans. Because no Canadian military vehicles were readily available, the forward logistics team had tried to contract commercial truckers to deliver the supplies to the U.S. Federal Emergency Management Agency (FEMA). However, when commercial truckers were unable to handle the job, the American military eventually assisted with transport vehicles.

Another issue centred around the needs of CF personnel in the area. *Athabaskan* and *Toronto* would return to Pensacola to pick up food and other supplies, and *SWA* required equipment to repair its bow thrusters. Personnel flying in and out of the area required accommodation. For example, the Canadians already present were joined by another 15 personnel flown in from 15 Wing at Greenwood, and that team included physicians' assistants (PAs), mental health workers, and a social worker.⁶

Some needs were requested from Formation Logistics in Shearwater and sent to Pensacola. For example, the parts for the bow thrusters were obtained in Canada and flown to Pensacola. They also acquired medical supplies to re-stock *SWA*. For some of those purchases, they needed cash. They also needed to supply petty cash as an advance on allowances to some outgoing personnel to ensure they had enough funds to cover incidental and emergency expenses on their way home. As it materialized, they eventually got a designated finance clerk to deploy to Pensacola to handle those transactions.

Although the forward logistics staff in Pensacola had established both Internet and secure communications with the four ships and with MSOC in Halifax, there were problems associated with keeping in touch with the divers and the construction engineers. However, both the engineers and the divers possessed Blackberries, and that was ultimately how the forward logistics personnel kept in touch with those personnel and arranged for needed supplies. By good fortune, Admiral

McNeil had previously equipped his people with Blackberries after finding them to be an excellent communication tool during his time working at the Privy Council Office in Ottawa.

Mississippi Coast Coliseum (a hockey rink) into a supply centre. At a particular FEMA supply centre, no-one from FEMA or a non-governmental organization (NGO) knew how to operate a forklift. The supply technicians from *Ville de Quebec* not only could do that, but they could also unload the tractor trailers and load supplies onto smaller vehicles faster than FEMA could move in supplies. An officer from *Athabaskan* described his arrival at Biloxi as follows: “As the craft (US troop transport unit) landed us on the beach, we were met, not only by our own ship’s crew but that of *HMCS Ville de Quebec* and US soldiers and marines from Mexico. Transportation was arranged to take us where we were most needed – clean-up and humanitarian shelters handing out food, water and much needed supplies.”⁷



USN photo 050911-N-0535P-089 by Photographer's Mate 3rd Class Jay C. Pugh

Canadian soldiers assigned to *HMCS Athabaskan* unload supplies destined for *Katrina* relief at Pensacola, Florida, 11 September 2005.

The forward logistics personnel also made arrangements for General Hillier during his visit. It was planned to move him and his staff around on a Canadian *Sea King*, as well as in staff cars, trucks, and jeeps. The Americans advance-checked every location General Hillier intended to visit, tasked a backup helicopter to shadow his *Sea King*, and had suitable ground transportation (usually a jeep) ready to move him when he landed. Commodore McFadden briefed the general on the arrangements he had made to date, including the creation of composite navy-army units of divers and engineers.

On to Biloxi

After leaving Pensacola, *Athabaskan* and *Ville de Quebec* moved towards Biloxi Mississippi, where *HMCS Toronto* joined them. Since the water in this port is very shallow, they had to anchor approximately 17 kilometres off-shore. After the meeting with Commodore McFadden, *Bataan* provided Landing Craft Air Cushion (LCAC), in effect, hovercraft, and some Landing Craft Utility (LCUs) so sailors could be ferried ashore. While the landing barges could accommodate as many as 200 persons, they could operate only in daylight. They would depart from *Bataan* at dawn, pick up crew members at the three Canadian ships, take them to shore, and then return them at dusk. The trip itself took close to two hours to complete. However, the RIBs and the *Zodiacs* would have been much slower, and they would have carried far fewer personnel.

Once on shore, the Canadians were directed by a US Navy beach master, and assigned to both hand out supplies and to assist in cleaning debris from a US military retirement centre: the entire first floor of the 34-storey building had been destroyed. The Canadians also helped clean up a church and a Vietnamese cultural centre; and also transformed the

do laundry, and hooked up the washers and dryers that someone had donated. Captain Gardam of *Athabaskan* used his ship’s helicopter to get a view of the area: “In all honesty I have never seen anything like it in my life. I flew by helo over New Orleans, then Biloxi and Gulfport. Biloxi in particular looked like a third world nation. There was nothing standing.”⁸

The Canadians worked on public buildings to avoid conflict with the private contractors now pouring in. However, in the words of Commander Moors: “Once we got ashore and started working and saw the civilian horsepower of the United States come rolling in, it became apparent that the manpower force of our ships wouldn’t be required as long as we thought.” Since the US Navy was finalizing its own plans, the Canadians coordinated their own departure with that of the Americans. The final decision was made when a US contractor, loaded with supplies and equipment, stopped to ask the Canadian when they were leaving. Moors said those civilian firms had heavy equipment and an expertise the Canadians could not match: “So our immediate assistance was timely and was much appreciated, but you could sense after five or six days it was time for us to pull out.”⁹

At that point, there were five separate operations under the overall control of the task force commander: the three navy ships – *Athabaskan*, *Toronto*, and *Ville de Quebec*, anchored off Biloxi, Mississippi, sending work parties ashore each day; the composite dive team in New Orleans; the forward logistics team in Pensacola, Florida; the composite construction engineering group at Bay St. Louis, Mississippi; and the SWA assisting the US Coast Guard. In addition, there was the support team in Halifax continually responding to requests for supplies – such as the parts for the bow thrusters for SWA – and for personnel.



HMCS *Ville de Québec*

The Return

When word came that Hurricane *Rita* might hit the same area as *Katrina*, Commodore McFadden, concerned for the welfare and safety of his personnel, decided *Ville de Québec* and *Toronto* would leave Biloxi on 18 September, with a stopover at the US naval base at Mayport, Florida, until it was known exactly where *Rita* would make landfall. *Athabaskan* would proceed to Norfolk where she was scheduled for degaussing, and then continue on to Halifax. To avoid *Rita*, the ships steamed south at 24 knots until they rounded Key West, the southern tip of the Florida Keys, then slowed to 18 to 20 knots as they headed north. They then stood by at Mayport until it was clear *Rita* would not impact the same area. Thereafter, the two frigates returned to Halifax. By that time, *SWA* had accepted a task far enough south in the area that she was not in danger from *Rita*.

Before leaving the Biloxi area, Admiral McFadden told his two senior staff officers that someone would have to remain in the area as task force commander. The divers would still be *in situ*, as would the navy and army engineers. Logistics personnel would also still be deployed at Pensacola,

“In addition to NOAA personnel, technicians from the National Data Buoy Center in Stennis, Mississippi joined SWA to do repair work.”

SWA, however, was still active. After a new captain and crew were flown in on September 22-23, she set out for Honduras to recover and tow a huge buoy – 30 metres wide – back to Pensacola. The trip took five-to-six days, and was by far the furthest south a Canadian Coast Guard ship had ever been operationally employed. On 28 September, with the agreement of the Department of Fisheries and Oceans, *SWA* was assigned to repair buoys damaged, not only by *Katrina* and *Ophelia*, but also by *Rita*. The ship was further authorized to remain deployed until late-October.

In addition to NOAA personnel, technicians from the National Data Buoy Center in Stennis, Mississippi joined *SWA* to do repair work.¹¹ Many buoys were too large to be taken on board, and had to be towed to their proper locations. Because *SWA* was the only element of the task force remaining, Commander Gravel turned command over to Lieutenant-Commander Anderson, who had been with *SWA* during the entire deployment, and would eventually return with her to Halifax. He thus became the third and last commander of the task force (CTJTG 306), and presumably, the first lieutenant-commander to ever command a task force! En route back to Halifax, *SWA* restored three more buoys off the Carolina coast,¹² and thereafter disembarked NOAA personnel and equipment at Portland, Maine.

and *SWA* would continue assisting the US Coast Guard in the region. Commander Gravel, who was the fleet technical officer, volunteered for the job, thus becoming the second task force commander. He therefore assumed overall responsibility for the divers, the engineers, logistics, communications, and the Coast Guard response, and operated primarily from Keesler Air Force Base near Biloxi, with occasional visits to Pensacola. Before the ships departed, some communications personnel on *SWA* were transferred to *Toronto*, which resulted in an earlier return for some personnel no longer required in the area. It also gave those transferred a chance to travel on a warship, and provided exposure to its communications systems.

As mentioned, the army and navy engineers – working with the Seabees – stayed on when the three warships departed. The construction team, which included skilled trades such as carpenters and electricians, constructed and repaired buildings.¹⁰ Due to practical experience garnered in dealing with the aftermath of Hurricane *Juan* in 2003, the Canadians were better equipped to deal with destruction than the Americans. They had, for example, pipes for construction, small generators, and a lot of plywood. When the Canadians finally left, the Seabees asked if they could have some of their equipment and small generators, which the Canadian engineers generously decided to donate to their US colleagues. As the Canadian operation wound down, the divers and the construction teams were bussed to Pensacola, and then flown back to Canada.



DND photo VL2010-0125-22

Summary and Conclusions

In a classic monograph, social scientists and behaviorists C.E. Fritz and J.H. Mathewson argue that over-response – they labelled it “convergence” – is normal behavior in the wake of a disaster. They say it is caused by unwanted, unofficial response to an incident. They argue that this behavior is stimulated by media reports, and might be stopped if a short-term media blackout was enforced.¹³ In *Convergence Revisited*, Joseph Scanlon, using data from a tire fire that occurred in Southern Ontario, during which 14 million used rubber tires burned for 18 days, opined that even *official* convergence can be overwhelming.¹⁴ What appears to have happened in the wake of *Katrina* was a mix of responses. There was the *official* response, for example, by the US military. And there was the *invited* response of critical personnel, such as the Canadian Red Cross volunteers who had acquired previous US disaster experience.

But there was also what might be termed “invited convergence” – consisting of supplies and personnel which the US was reluctant to refuse. It did, however, ultimately reject aid from two countries for political reasons - even though the situation in and around New Orleans was fluid, and it was hard to determine just what type of material was needed ‘when and where.’ While this article has examined the flow of Canadian supplies and personnel into the system, it does not document what happened to those latter contributions. Distribution was left to FEMA, and the CF did not request any accounting from FEMA.

If the only value of Operation *Unison* had been to send supplies, it would have made sense to send only *SWA*, or a merchant ship. However, the provision of supplies proved to be only one aspect of the success of Operation *Unison*. The Canadian divers who teamed up with their American colleagues helped clear away underwater debris faster than would have been possible otherwise. They also worked in areas where the Americans initially were reluctant to go, due to concerns about contamination. The sailors from *Toronto*, *Ville de*

Quebec, and *Athabaskan* helped restore veterans’ housing, cleaned up a church and a Vietnamese cultural centre, built shelters, cleaned up a hockey rink so it could be used as a supply depot, and helped FEMA organize, unload, and load supplies. The navy and army engineers integrated with the Seabees so well that they stayed on when the three Canadian warships departed the area. *SWA* restored most of the dislocated weather buoys in the Gulf and along the Atlantic Coast, and she was so productive in her efforts that the Americans kept asking for her stay to be extended.

The Canadians deployed on shore were welcomed everywhere. One member of the Naval Construction Team, Master Warrant Officer André Boudreau, said the local people were surprised but

very appreciative to see the small team from Canada. People driving by would stop, he said, get out of their cars, and come over to shake their hands.¹⁵ Captain David Gardam, *Athabaskan*’s captain, said: “One thing I find that the Canadian task force brings to the table that no other organization in the Government of Canada does, is that we can go anywhere in the world fast, and when we deploy, we are a city, we have everything on our back. We need no support and that’s exactly how it was. We arrived and we were working within about six hours after we arrived; and we had ‘boots on the ground’ working.”¹⁶

Operation *Unison* proved to be more than just the sum of its parts. It was a cooperative response involving all three services. It led to teamwork between the navy and the coast guard. It involved not only intra-service cooperation among the Canadian services, but extensive cooperation between Canada and the United States. It was, in fact, the first real test for what General Hillier saw as the need for joint operations, and a first and very successful test for the about-to-be-created Canada Command. Further, *Unison* was carried out when the only integrated command was Joint Task Force Atlantic. It was, in the words of one of those involved, “better than 100 exercises.”

The navy, for example, transported not only its own personnel, but also Air Command maintenance personnel and army engineers. The air force transported civilians, government officials, and its own personnel, some of whom headed to Florida to link up with the navy. The army provided supplies, personnel, and transportation for its own personnel, and supplies for the navy. Its divers and engineers worked seamlessly with navy personnel. There was cooperation between the military and the civilian communities both in terms of acquisition of supplies, and with respect to delivery of personnel. Finally, there was cooperation between the coast guard and the navy. Operation *Unison*, as the title of this article suggests was truly a joint air-land-sea operation. Most importantly, it was cobbled together very quickly, and yet it run smoothly, with good communications demonstrated throughout.

Canada-US cooperation included arrangements to fuel the task force at sea, to unload supplies at a US base, teamwork between Canadian and US divers, teamwork between Seabees and Canadian engineering units, the provision of US transportation for Canadians moving from ship-to-shore, and the US agreement to waive some normal requirements, such as passports for Canadian Coast Guard personnel. It also involved the Canadian Coast Guard taking over some functions of the US Coast Guard, as well as coming under operational control of the US Coast Guard. In one sense, all the Canadian activity was being directed by the Americans. However, at the same time, the Canadians were free to refuse any given task, and free to leave when they believed it was appropriate to do so. It aptly demonstrated how two allies can work together sharing common goals, and it was the first step toward US Northern Command and Canada Command working together.

Smooth cooperation among the elements of the Canadian navy, army, air force, and coast guard was a major achievement; although cooperation with the US Navy was somewhat less successful on occasion. However, the Canadian Navy is continually running joint exercises and operations with the US Navy. Captain Gardam commented: "For us, because the Navy has been integrating...our [needed] ability to communicate, to understand the operations planning process, to work with our US counterpart is second to none. There is no other Navy that can be as seamless as us...with the US, so [the experience] was outstanding."¹⁷

The Canadian response to *Katrina* took place shortly after Canada declined to join the US attack on Iraq. Canada's quick response after 9/11 had faded from memory, but the integrated response with American forces after *Katrina* warmed relationships that had cooled somewhat. Finally, as experience with *Juan* made the Canadian Forces better prepared for *Katrina*, experience with *Katrina* made the CF better prepared for future incidents. When an earthquake struck Haiti in January 2010, the CF again responded.

A reconnaissance team and the Disaster Assistance Response Team went in by air, and two warships – *Athabaskan* and *Halifax* – followed by sea. Some of the equipment carried by those ships consisted of the provisions that had been assembled and preserved because of the lessons learned from the response to *Katrina*. In Haiti, in contrast to *Katrina*, the Canadian ships had to use their helicopters and boats to ferry personnel and equipment to shore, but, just as had occurred in the wake of *Katrina*, the Canadians asked the Haitians what they needed – then did what was asked of them.

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HMCS *Athabaskan* heads out of Halifax harbour in support of Operation *Unison*, 6 September 2005.

DND photo HS2005-0686-02 by Corporal Halina Follas

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SCAR-C OVER LIBYA – TO WAR IN AN AURORA

by Alan Lockerby



DND photo GD2011-0887-09 by Corporal Laura Brophy

The return to CFB Greenwood from Op *Mobile*, 5 November 2011.

This past fall, I flew as a Strike and Armed Reconnaissance Coordinator (SCAR-C) aboard Long Range Patrol (LRP) aircraft in support of Operation *Mobile* and UN Security Council Resolution 1973. Our role was to employ CP140 *Aurora* sensors to acquire and verbally indicate targets for multi-role fighter aircraft, and to serve as spotters for offshore naval gunfire support (NGS) missions.

Operation *Mobile* was the first time the RCAF employed the *Aurora* as a SCAR-C support platform, resulting in many lessons learned. Among these, two stand out. First, the RCAF should equip the CP140 with the means to designate weapons and cue other platforms' sensors onto targets, allowing the *Aurora* to perform a wider range of air-to-ground tasks. Second, *and most importantly*, the RCAF must integrate the platform tactically and operationally with other air, land, and maritime elements in order to dovetail it into the all-arms battle, maximizing its full tactical capability. In essence, the LRP community must continue to think 'joint' when considering all future tasks.

The LRP community was new to the strike coordination and naval gunfire spotting role, and the task force leadership thought it prudent to place additional specialists onboard the *Aurora* to conduct SCAR-C and NGS missions. Eventually, I worked as part of a SCAR-C team that operated aboard the 405 and 407 (LRP) Squadron CP140s flying out of Naval Air Station Sigonella, located on the east coast of Sicily. We formed a modular part of the standard *Aurora* crew, and worked at available stations onboard each aircraft.

As mission specialists, we, our kit, and our procedures fit well with the organic crew and equipment already aboard the aircraft. Even before flying began, I was of the impression that doing the job asked of me from the CP140 would be a natural fit.

A wise Marine once told me, in a laconic display of intellectual prowess, that "words mean things." As members of the profession of arms, this rings most true when discussing doctrine and defining operational capabilities; particularly in the context of a joint and combined task force. For that reason, I

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state definitively that as a SCAR-C asset, we and the other strike aircraft over Libya did not, at any point, conduct close air support (CAS) missions.



DND photo courtesy of the author

The crew

While airborne, the CP140 lacked the ability to directly interact in real time with the forces that we supported as part of UN Security Council Resolution 1973. Furthermore, we could not assist in the supported force's operational planning, nor liaise for face-to-face coordination prior to our missions. Consequently, in doctrinal terms, our role aboard the *Aurora* was never that of a forward air controller (airborne), or FAC(A).

The primary difference between SCAR-C and FAC(A) lies in the proximity of their respective attacks to friendly ground elements and the necessity for detailed integration of each attack into that ground element's fire, manoeuvre, and, perhaps most importantly, its operational planning. In terms of safety and effectiveness, such integration is absolutely necessary to put air-to-ground ordnance near friendly ground forces. This is not just to ensure the safety of the soldiers on the ground, but also that of the supporting aircrews. The airspace over any battlefield is filled with both friendly and enemy artillery shells, ricocheting bullets, and fragmentation and blast effects, typically travelling in opposite directions! Should the means to coordinate between air and ground forces be lacking, cooperative air attacks must take place at a distance from friendly forces on the ground where detailed integration is not required.

With this in mind, whereas a FAC(A)'s primary job is ensuring safety of friendly troops and that air-to-ground attacks support the ground commander's intent, a SCAR-C's job is to maximize the effectiveness of air interdiction and armed reconnaissance assets. Although both coordinate air assets against enemy resources, the SCAR-C does so in areas where potential targets of opportunity are known, are suspected to exist, or where mobile enemy ground units have

relocated due to surface fighting. The SCAR-C's goal is to affect such targets before the enemy can bring his full potential to bear upon friendly forces. Although seemingly an issue of semantics, it is necessary to clearly outline what a CP-140 supporting overland operations can accomplish, (and, more importantly, *canis not* accomplish,) before investing time and resources into a capability that would prove unrecognizable to our allies.

I flew my first mission only hours after arriving in Sicily. A normal day began with a 3:45 A.M. wake-up for a 4:30 A.M. mission briefing, taking off shortly thereafter, and landing in the late afternoon. After transit, we would arrive over Libya, and, as the SCAR-C, would check in with air battle managers aboard the command and control (C2) aircraft in the

area. These assets provided routing and safety of flight information to all aircraft in area of operations (fighters, suppression of enemy air defence (SEAD) platforms, tankers, UAVs, and SCAR-C), and served as the communication link to the combined air operations centre on the Italian mainland. Controllers aboard the C2 assets then directed us to the area in which we were to search for targets. We would then talk with the fighters assigned to work with us in the same area, tracking targets and passing spot reports to each other and the operations centre for battle tracking.

In any operation in the air, on land, or at sea, the process by which tactical leaders at all levels ensure attacks achieve their commander's aim is very specific. The same is true for the SCAR-C. The methodology can best be summed up in the form of five questions the SCAR-Cs must ask themselves sequentially throughout a developing ground scenario. First, is the target positively identified? Second, based upon the weapon system available, could the attack cause collateral damage? If so, the third question is, can these effects be mitigated by any available means – such as weapon fuzing, or by assigning the employing aircraft specific attack headings? Fourth, based upon the pattern of life in the target area, could even the mitigated weapon effects cause civilian casualties? If so, and thus finally, is the potential military advantage gained from the attack worth the risk of civilian casualties it may incur? In accordance with the laws of armed conflict, each of these questions, or a variation thereof, is addressed every time the CF employs weapons operationally. Operations over Libya were no different.

During one particular mission, we observed a truck-mounted anti-aircraft gun firing from cover in an area con-

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trolled by Ghadaffi loyalists towards approaching opposition forces. Exercising tactical patience, we observed the gun crew ‘leapfrog’ the vehicle between different firing positions, converse with observers located on a nearby rooftop, and replenish their ammunition in a concealed assembly area. Based upon the collective experience within the SCAR-C team aboard the aircraft, where each member had previously served in Afghanistan as ground-based forward air controllers (FACs) or artillery observers, we were able to assess the gun crew’s activities and advise the air operations centre. We also coordinated with the C2 aircraft in the area to dispatch fighter aircraft armed to engage the target in a manner that minimally affected the surrounding buildings. In this case, a pair of RAF GR4 *Tornados* arrived, carrying guided anti-tank missiles.

Ghadaffi loyalists fleeing the area. The collateral damage assessment on this strike was zero percent. For this reason, among others, all involved with the engagement felt it had been a successful attack.

Since returning, I have had time to reflect upon and compare my time as a FAC in Afghanistan, attached to an infantry battle group, with the SCAR-C mission over Libya. Although ostensibly similar (both roles involved calling in air-to-ground attacks), I found each presented very different challenges. A FAC’s job is to plan, request, and control air effects in support of his commander’s intent, planning guidance, and manoeuvre. The decision to employ ordnance, and the responsibility for the results, rested with the supported commander. In the case

of operations over Libya, the responsibility for target identification and nomination rested with the SCAR-C during each engagement. Looking back on my role in Afghanistan, I would say, in hindsight, that finding a target and mounting an airstrike against it at the commander’s behest is, comparatively speaking, the easy part of the job. Making the decision to lay down some of the most powerful effects on the battlefield and assuming a greater portion of the responsibility for the outcome was not as easy as it appeared to me, immersed as I was in my duties as a FAC, when someone else had to make that call.



DND photo courtesy of the author

View of Libya from forward of the engines

Based upon our reporting, the recommended weapon-target match, the SCAR-C fuel state (we had extended our on station time to the maximum available), and deteriorating weather, the air operations centre authorized engagement on the truck-mounted gun itself. The *Tornados* arrived, and we guided the crews’ sensors to the target verbally, the ‘old-fashioned way;’ establishing a reference point and a unit of measure on the ground, and moving the pilots’ eyes forward, stating the direction, the distance, and a description of what to look for at each step, feature-by-feature, to the target. At that point, our target was nestled in defilade behind a building. Taking the target’s location into account, we assigned the *Tornado* crew attack headings to minimize the blast effects upon the building behind which the gun crew had concealed their vehicle between firing bursts. We observed the missile impact, and conducted a pattern-of-life scan for any persons interacting with the wreckage, later seeing the ammunition ‘cook off’ spectacularly as the vehicle burned, the remaining

As well, perhaps counter-intuitively, having now served in both capacities, I feel that, in many respects, it is easier, safer, and more effective to put air effects on the ground with friendly troops in close proximity to a given target. This means that, as a FAC in Kandahar, I knew exactly what my target was, who wanted it attacked, why it was to be engaged, and where friendly troops were positioned. Furthermore, with troops nearby, I could leverage friendly reporting, ground-based weapons (of particular value had there been localized air defence threats), and, most importantly, real time, on-scene visual assessment of the effects. Such was not always the case in Libya, for myself or any other individual involved in this line of work. A person staring at an object or event on a screen from thousands of feet for hours on end will never have the same awareness as someone who spent just minutes looking at the same thing from ground level through binoculars or other optics. Having now served in similar capacities in two operational theatres, this realization is what guides my impressions

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of further tactical development of the CP140 in support of overland operations: that the platform's usefulness as a low air threat SCAR-C asset would be most effective when integrated into the joint fight.

As one can readily surmise, a CP140 equipped as described and linked with existing air liaison elements organic to a land force's staff organization offers the supported commander an unparalleled ability to sense and affect his area of

operations. Not just a view to 'the other side of the hill,' but also the means to do something about what is there. Additionally, the same supported commander can account for the *Aurora's* protection from localized ground-based air defence threats with his own assets; namely, indirect fires and observers, as well as the fire and manoeuvre of his forces. While potent threats to aircraft, even modern self propelled anti-aircraft systems generally remain thinly armoured and highly dependent upon their echelon, and they present a force protection dilemma: the best ground from which to operate an anti-aircraft firing position may not be ideal for



DND photo courtesy of the author

Captain Alan Lockerby at his work station

To do so fully, the CP140 will require certain upgrades, to include the organic means to designate and mark targets. The current sensor on the CP140 could be upgraded to allow for the enhanced targeting capabilities. This inclusion would allow the *Aurora* to support the full range of offensive tasks in support of ground manoeuvre. A laser target designator would allow the aircraft to provide the means to guide the flight path of other strike platforms' precision weapons. The same designator could also be used to cue sensors of strike assets, permitting the visual hand off of targets for engagement. In practice during other operations, both capabilities have demonstrably increased the rate at which these air engagements take place. The designator would further provide the ability to generate high confidence target coordinates, sufficient, in certain instances, for employment of air-dropped inertially-aided weapons. Perhaps more importantly, particularly in support of ground forces and when air assets may not be readily available, the ability to generate highly accurate and precise coordinates with the CP140's sensor would eliminate much of the guesswork associated with indirect fires observation for assets such as artillery, mortars, or naval guns. While each of these assets has varying ranges, they are constrained by the location and availability of observers and the CP140, with the proper specialists aboard and under the direction of the appropriate ground agencies, could extend these assets' coverage to the fullest possible extent. An additional component would allow the sensor to visually indicate targets to any person or platform with night vision optics – this includes both aircrew members and the soldier on the ground.

the escorting infantry and armour to defend. When operating against air targets, most anti-aircraft systems are mobility-limited, and their crews are task saturated: comparatively 'easy pickings' for friendly armour, anti-tank weapons, and indirect fires. Beneficially, this ground-based protection would also serve as an additional layer of security for the CP140, complementing and increasing redundancy to the protection that friendly air combat air patrols, SEAD, and electronic warfare platforms provide.

Further adding to these capabilities is the *Aurora's* long loiter time and the fact that, unlike an unmanned aerial vehicle, the crew is physically located overhead the target area, allowing for a high level of situational awareness. On more than one occasion over Libya, I found myself, as a SCAR-C aboard a multi-million dollar aircraft with electro optical sensors, at a window looking through binoculars to better define a target area. As always, operations highlight problems that even the most modern technology cannot address.

With all this in mind, it is no stretch of the imagination to picture a CP140, in an area of localized air superiority and in communication with a manoeuvring ground unit's indirect fires and air control agencies, building situational awareness of the surface fight and maintaining a 'picture' of reported targets. Under such an arrangement, assigned strike aircraft would arrive in the area of operations, check in with FACs co-located with the ground unit for an operational update and targeting data before contacting the CP140 to be shown their

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DND photo courtesy of the author



An operational view from aft of the wing

targets, dropping their ordnance in minimum time and on the first pass. During the entire period, the ground force's manoeuvre and reporting would, at the very least, expose many enemy ground-based air defences and allow for their engagement by the most appropriate means; either indirect fires or air ordnance. An enemy faced with such capabilities would be presented, not with a *problem*, but with a *dilemma*: a 'no win scenario.' Most importantly, the ground unit would visually verify the results of all air-to-ground attacks, allowing the joint force's planners to more accurately assess the need for follow-on sorties, and the ability to shape follow-on operations, based upon solid information. Achieving this end state should be simple. Organizationally and doctrinally, all

the CF services are able to plan, request, and employ the capabilities that a CP140 with a 'full' sensor could provide. More importantly, our coalition partners plan and operate *similar platforms* along *similar lines*, and could also make use of such a capability.

By avoiding 'stove piping' with respect to training and tasks, the RCAF and LRP community can build credibility and interoperability within the CF, and with our allies. Otherwise, when a joint and combined task force deploys to the world's next hot spot, planners will not be able to *integrate* the CP140's capabilities into operations. Rather, they will have to *accommodate* its inclusion. It would undoubtedly take the CF time to gain experience operating at the level of air-land integration to which I have alluded.

There is nothing 'advanced' about what I have put forward, or the conduct of the CP140's SCAR-C mission over Libya. It was about the fundamentals of air-land integration, and, if I may paraphrase three-time Tour de France winner Greg LeMond's comments about racing, "... when you have the fundamentals, acquiring the experience is just a matter of time."

CMJ

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CP-140 Auroras on the flight line, Sigonella, Italy, 29 September 2011.

DND photo RE2011-M127-001 by Corporal Mathieu St-Amour

HIGHER EDUCATION AND THE PROFESSION OF ARMS: EXPLAINING THE LOGIC

by Bill Bentley and Bernd Horn



DND photo by Sergeant Charles Barber, J6 Imaging, Canadian Forces College

Canada's Chief of the Defence Staff, General Walter Natynczyk, addresses members of the JCSP course at CFC Toronto, 16 May 2012.

The question often arises among senior officers as to what is the requirement for higher, or more accurately, graduate education. Although few, if any, would deny the value of such an investment, the barrier is always time. For individuals who are exceptionally busy, the issue continues to be the trade-off between time *spent* on studies, and time *available* to clear the ever-present day-to-day workload. Many default to a position that time spent in an appointment or rank adequately prepares the individual for the challenges they encounter or will face in the future. So what exactly is the requirement for graduate education for senior officers?

There is no 'silver bullet' answer to the question; no quantifiable data that can categorically provide comprehensive proof. Rather, the response lies in the logic – the argument for the critical importance of education for senior officers in the profession of arms. The starting point stems from the great Prussian theorist Carl von Clausewitz. He clearly identified that: "If we pursue the demands that war makes on those who practice it we come to the realm of intellect."¹

Simply stated, all members of the profession of arms in Canada must possess a deep and comprehensive understanding of the necessity, if we profess to truly consider ourselves a

profession in Western society, to possess a deep understanding and comprehension of a relevant body of knowledge. More exactly, as Eliot Freidson, a leading scholar on the subject of professionalism identifies: "A profession has a formal program that produces the qualifying credentials, which is controlled by the profession and associated with higher education."²

And, there is good reason. The failure to abide by this tenet could have serious repercussions, as the institution discovered in the 1990s. By 1997, Doug Young, then- Minister of National Defence (MND), General Maurice Baril, the Chief of the Defence Staff (CDS), and the Louise Frechette, the Deputy Minister (DM), were all seriously concerned that the balance among the four pillars of professional development – training, education, experience, and self-development – had become distorted and very problematic. Missing was an emphasis upon education, particularly higher learning.³ The MND confirmed: "Without higher education you're not tuned into what's happening in the larger society." He concluded, "That's where we lost the ball."⁴

As a result, Young, supported by monographs written by four eminent Canadian scholars – Jack Granatstein, Desmond Morton, Albert Legault, and David Bercuson – oversaw the production of *The Defence Minister's Report to the Prime*

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*Minister on Leadership and Management in the Canadian Forces.*⁵ The center of gravity of this Report was the importance of higher education. Among the most important results were the stand-up of the Canadian Defence Academy, *Officership 2020*, *NCM Corps 2020*, the Canadian Military Journal, and the creation of the Applied Military Science Course and the National Security Studies Course at the Canadian Forces College (CFC). However, that was over a decade ago and these initiatives predate Canadian Forces (CF) involvement in Afghanistan, the Indian Ocean, and Libya. If anything, today's security environment is much more challenging, complex, and unpredictable than it was at the close of the 20th Century. Arguably, the need for higher education is even greater today.

But the logic or requirement for graduate education for senior officers goes beyond the failing of the past, due to a lack of higher education, or the more complex security environment. A second critical characteristic of any true profession is captured by scholar Andrew Abbott, another expert on the subject of professions. He observes: "In any profession practical skill grows out of an abstract system of knowledge, and control of the profession lies in control of the abstractions." Abbott further asserts: "This characteristic of abstraction is the one that best identifies the professions." He then explains: "Only a knowledge system governed by abstractions can redefine its problems and tasks, defend them against interlopers, and seize new problems."⁶ For the Canadian Profession of Arms, this abstract system of theory

based knowledge at the core of the profession is the General System of war and Conflict illustrated below:

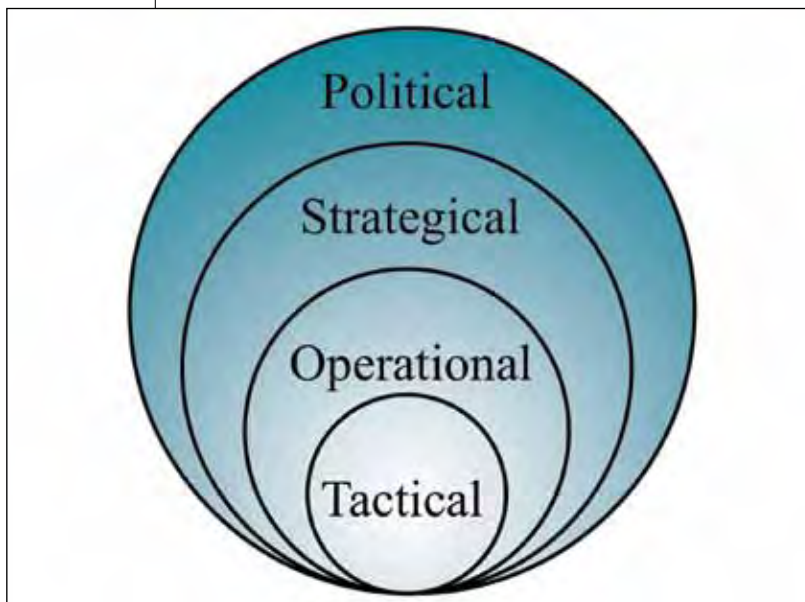


Figure 1. War as a Complex Adaptive System

This system must be understood as a complex adaptive system, as described in complexity science. The system becomes less linear and more complex as one ascends from the tactical to the politico-strategic level. Formal education becomes the mechanism that allows an individual to better comprehend and understand the integrated, multifaceted, intricate, and complex context of the military profession within the larger world in which it exists. It is critical to mastering the necessary body of knowledge.

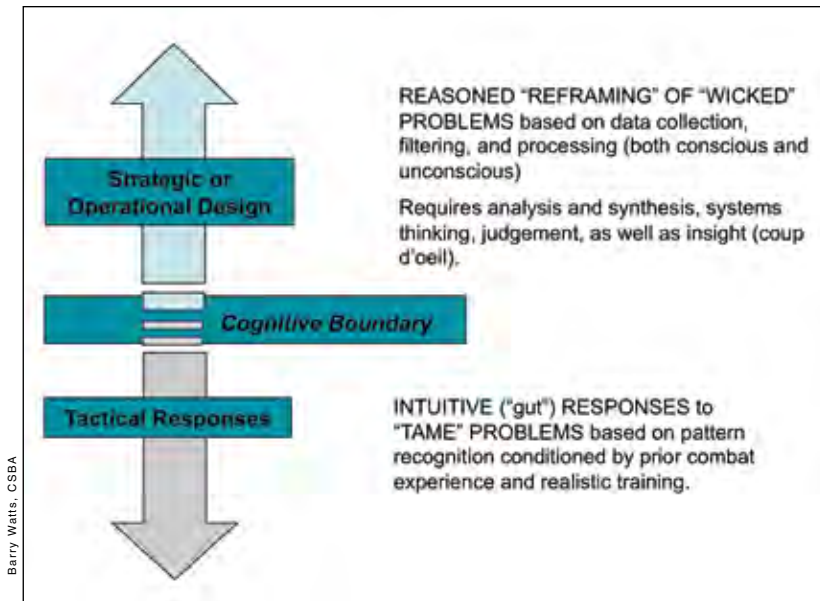
This requirement has long been understood by those studying the profession. Renowned strategist Colin S. Gray identifies a key abstraction within the realm wherein senior officers exist. He states: "Strategy is virtual behaviour, it has no material existence." Gray explains: "Strategy is an abstraction, though it is vastly more difficult to illustrate visually than are other vital abstractions like love and fear."⁷ Israeli strategist Shimon Naveh makes a similar, if more abstruse, point. He insists: "Military strategy evolves in a dynamic learning environment of praxis, which is a spatial reflection of the tensions between the ontological analysis of reality and the epistemological understanding of institutional knowledge, between conceptualization and application, theorizing and performance, institutionalization and change."⁸

Importantly, operational art, the playground of senior officers, is only slightly less abstract than strategy. Naveh asserts: "We can legitimately argue that the conceptualization of operational art transformed military science in a pattern resembling relativity and quantum mechanics."⁹ He notes: "The development of operational art as a neoteric field of knowledge provided for the first time in the history of modern military thought an intermediate environment for discourse, which bridges harmoniously over the traditional cognitive gap between the conventional fields of military knowledge."¹⁰



Deutsches Historisches Museum, Berlin

Carl von Clausewitz



Barry Watts, CSBA

Figure 2. Cognitive View of the Traditional Levels of War.

The central point is that officers, particularly general officers, require knowledge and understanding at a higher level once they leave the tactical level of operations and staff appointments. They need a wider and deeper understanding of human behaviour, politics, and the world around them, to mention just a few areas, in order to be able to operate effectively. Given this increasing complexity as one ascends the hierarchy in the General System of War and Conflict, higher education becomes a necessity. Military strategist Barry Watts underscores the requirement. He affirmed: “The cognitive skills exercised by combatants with tactical expertise differ fundamentally from those required of operational artists and competent strategists.”¹¹ In fact, Watts identified a cognitive boundary as illustrated:

In essence, the boundary is essentially between the tactical level and the operational level. Therefore, crossing this boundary and operating as operational artists and military strategists requires advanced education, specifically graduate level education. Gray drives this point home persuasively. He argues: “Because strategy is uniquely difficult among the levels of war and conflict few, indeed, are the people able to shine in the role of strategist.” He insists: “Their number can be increased by education though not by training, and not at all reliably by the experience of command and planning at warfare’s operational and tactical levels.”¹² Henry Yarger, yet another expert in the field, supports Gray’s thesis. He points out, “... [that] strategy remains the domain of the strong intellect, the life-long student and the dedicated professional.”¹³

In short, senior officers of all ranks can never stop studying and learning if they are to lead and act as stewards of the profession into the future. Moreover, the General System of War and Conflict discussed above always takes place in a real world, within a contemporary context that is ever changing and evolving. Importantly, this context is accessed, created, and understood through the study of conventional academic disciplines, such as Geo-Politics, International Relations, History,

Sociology, Anthropology, Economics, and Science and Technology. Given the nature of the abstract theory-based body of knowledge at the core of the profession of arms, the old paradigm that is based upon the concept that successful tactical command equals promotion must be rejected. The new paradigm for the 21st Century quite simply is – successful tactical command, plus higher education, equals promotion.

The respected American commander and war fighter, and the current Director of the US Central Intelligence Agency, General David Petraeus, confirmed the need of graduate level education for senior commanders. He believes: “Such experiences are critical to the development of the flexible, adaptable, creative thinkers who are so important to operations in places like Iraq and Afghanistan.” Moreover, he concluded that graduate studies “... provide a fair amount of general intellectual capital and often provides specific skills and knowledge on which an officer may draw during his or her career.” Importantly, General Petraeus insisted “... [that] graduate school inevitably helps U.S. military officers improve their critical thinking skills.”¹⁴ It is no different for Canadian officers.



Reuters/PTX85BW

General David Petraeus

And so, a summary of the logic for higher education for CF officers can be itemized as follows:

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- All officers need an undergraduate degree.¹⁵
- All lieutenant-colonels and colonels employed at the operational or strategic levels need a graduate degree(s) from as wide a selection of universities as possible.
- All general officers / flag officers (GO/FO) require a graduate degree.
- A PhD is desirable (but not mandatory) for a GO/FO, but it should be acquired prior to promotion to Flag rank.
- All GO/FOs should be involved in a comprehensive program of secondments, seminars, two week courses, three, six and twelve month programs, fellowships, and so on. This program could be administered by the Canadian Defence Academy, but it must be directed by the CDS as the Head of the Profession of Arms in Canada.

The investment in graduate and post-graduate education in both time and resource is undisputedly high. However, the responsibility of senior officers to navigate the institution through an often ambiguous, perpetually changing, and always complex and dangerous world imposes the obligation on its stewards. After all, those who claim the title of professional, and who society has entrusted with the safety of the nation and the lives of its sons and daughters, are obliged to ensure they are as prepared as possible to provide advice to the government, and to lead the nation in harm's way.

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Colonel Bernd Horn, OMM, MSM, CD, PhD, is the Chief of Staff Strategic Education and Training Programs at the Canadian Defence Academy. He is also an Adjunct Professor of History at the Royal Military College of Canada.



Syndicate discussions at CFC Toronto.

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6. Andrew Abbott, *The System of Professions* (Chicago: Chicago University Press, 1988), p. 9.
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THE FUTURE OF ALUMNI ORGANIZATIONS¹

by Michael Rostek



Photo by Steven McQuaid, CFB Kingston Imaging

Without a destination, any road will get you there.

Lewis Carroll

Introduction

The future cannot be predicted with any useful degree of accuracy. Indeed, uncertainty is a predominant characteristic of the 21st Century global environment and organizations around the world are struggling to understand and define how their policies fit within this paradigm. In this age of complexity, many organizations often get caught in the trap of attempting to diminish uncertainty, rather than learning how to function with it. As noted historian Colin Grey points out:

The challenge is to cope with uncertainty, not try and diminish it. That cannot be achieved readily. Such ill-fated attempts will place us on the road to ruin through the creation of unsound expectations.²

If the future cannot be predicted and uncertainty rules, how do organizations prepare for it? A great amount of information exists that can yield guidance for understanding the future; however, making sense of that information is difficult. Few, if any, foresaw the emergence of the dramatic Arab Spring in 2011, or the current financial crisis gripping the European Union. While it would be wrong to proclaim

that the future will resemble the present, it is equally incorrect to assert that the future will bear few hallmarks of the present as we know it. As such, a balanced yet proactive and rigorous method of future analysis is required to stave off reactionary planning which can be costly for organizations across all sectors - private, public, and non-profit - around the world. Alumni organizations, such as the Royal Military Colleges Club of Canada, are by no means immune to the effects of this environment, and it is argued they must proactively engage in future analysis in order to remain relevant to their membership.

Future of Non-Profits

Broadly speaking, most alumni organizations are non-profit organizations, and research reveals that non-profit organizations should be particularly concerned in this uncertain environment. The current financial crisis has forced many donors to scale back donations entirely, while others look for greater value for each dollar donated. This climate of seeking greater relevance to donors should not be scorned, but embraced. Indeed, this presents an opportunity to retrench and challenge conventional thinking about the future of the non-profit sector. Yet, this does not appear to be the case. In fact, critics contend that very little has been done collectively to look at the future of the 'third' sector proclaiming that "... they have chosen to bury their heads in the sand, avoiding some of the tough analyses and choices they invariably will

have to make to keep the sector healthy and worthy of the public trust.”³ Of particular note is that little attention is being paid to governance, excessive compensation to officers and executives, ‘sweet-heart deals’ that provide financial benefits to non-profit officials, and conflict of interest issues. While there is indeed hesitation to research what are considered ‘risky’ issues for the ‘third’ sector, it can be argued that challenging the status quo and taking on the more difficult issues would, most assuredly, provide greater insight into the steps needed to ensure a more prosperous and stable future. Indeed, challenging the status quo could well increase prospects for innovation and transformation within non-profits, and, by extension, alumni organizations.



Photo by Brad Lowe, CFB Kingston Imaging

Embracing Change

Much of the global uncertainty experienced today derives from three factors - economic recession, demographic shifts, and technology. In fact, these factors also drive change for membership in organizations.⁴

The exponential growth of science and technology, in particular, internet technologies, is connecting people, rather than simply information, at an increasing rate. And the convergence of media and technology is fueling social networks with global reach, where the focus is on everything from benign collective interests to anti-government activism.⁵ Leveraging and understanding these new technologies is hardly a new requirement for alumni organizations, and yet, inaction can be perilous. According to one source:

Now, college grads may use social networks like Facebook and LinkedIn to connect with each other – without being part of fee based alumni organizations. Connecting directly to each other using a few mouse clicks, they can fuse lifelong bonds, help each other personally and professionally in near real time.⁶

A steady decline in fertility rate, a decrease in the death rate, and an increase in life expectancy meanwhile is resulting in the overall aging of Canada’s population.⁷ The social and economic implications of this shift are far reaching - affecting both the ability to recruit members for our armed forces, and, by extension, The Royal Military College of Canada. And while Canada’s world ranking in the current economic recession has improved relative to other states, it has still deteriorated. This fallout extends well beyond corporate board rooms, reaching deep into the pockets of everyday consumers - and thus potential donors or fee paying members of alumni organizations.

Alumni Organizations

The future growth, quite possibly, the very survival of alumni organizations demands that a rigorous and methodological approach to forward planning be undertaken to mitigate the worst effects of such an environment. A logical first step is to understand future trends in alumni organizations. To this end, Professor Susan Clouse Dolbert has identified governance as one of several key framing issues.⁸ She argues that governance models are moving away from an “independent” model towards a more “interdependent” model. Under this model, alumni organizations are partially funded by their universities, although a majority of their funding derives from dues, affinity programs, and other areas, such as merchandise sales. Here, the alumni director reports to both the university and the volunteer board of directors. While some would argue that this apparent diarchy would be problematic, it could also be argued that this model brings the alumni organization - a vital constituency that provides a credible voice and contributes time, talent, and treasure to the university - closer to the institution, and not at arm’s length as with the “independent” model. As technology, demographics, and economic recession interact in a more complex and uncertain world, universities may very well wish to consider an interdependent model to further reinforce their institution’s viability, credibility, and branding.

The Napa Group⁹ has noted through their research that declining resources are forcing alumni organizations to think differently about how they engage alumni.¹⁰ Alumni organizations are using ‘high touch’ methods in dense market areas and employing ‘high tech’ methods in sparse markets.¹¹ In addition, both alumni and fundraising components are coordinating and focussing their activities and resources for maximum impact. Use of social media is indeed a significant part of an effective engagement strategy. Yet, “... social media requires staff and time – and clarity around the right market-

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ing mix for the alumni audience. Related Internet-facilitated technologies include blogs, podcasts, video, mobile communications/text messaging and alerts, interactive website features, Facebook, Twitter, LinkedIn, Flickr, and YouTube."¹² While much of this is not new to alumni organizations, moving forward within the new operating environment described above will require a careful balance between 'high touch' and 'high tech' applications.

Electronic communication is connecting alumni in ways never experienced before, and this will continue to increase. Indeed, as noted by Andrew Shailin, "... alumni are organizing without alumni organizations."¹³ Alumni organizations must leverage this trend to improve their information, as well as provide their alumni with better services especially for the X, Y, and Millennium generations. Research has suggested that new services for alumni organizations might include facilitating alumni with transitions in life (i.e. retirement planning, and so on), rather than describing new ways to give back to one's alma mater.¹⁴ Technology facilitates early engagement of young alumni, and studies have shown that this leads to consistent and lifelong philanthropy.¹⁵ However, electronic engagement is not considered a panacea, and it is fully expected that print documentation, such as alumni magazines, will remain an important component part of engagement, at least for another generation.¹⁶ Additionally, alumni organizations must continue to find ways to increase personal interaction – a staple for alumni associations that will not disappear. One notable trend in this area sees extending the engagement of the alumni organization through increased volunteer leadership and training. Indeed, scanning Canadian alumni organizations reveals the emergence of volunteer workshops designed to attract volunteer alumni and provide them with the necessary tools and methods to assist in the fulfillment their organization's mandate. Whatever the engagement strategy, it must contain components comprised of electronic and print media, as well as the staple of alumni engagement, face-to-face interaction.

Conclusion

We continue to live in times marked by uncertainty and complexity. No organization, whether private, public, or non-profit, is immune from the effects which attend the complex interaction of demographics, technology, and economics. The implications for alumni organizations must be researched, understood, and acted upon if alumni organisations are to sustain their operations into the future. The RMC Club of Canada, an alumni organization representing a national institu-

tion with a proud tradition of learning, sacrifice, and leadership, is not immune to the effects of this environment. From improved governance models and multi-layer engagement strategies, to widespread use of print and electronic media, alumni organization employees and volunteers are at the forefront of this change.

Along with an understanding of the trends noted above, an important step toward becoming more relevant to membership is research and engagement of current, potential, and lost alumni to determine their view of what their alumni organization should be in this complex and uncertain world. For example, the RMC Club has embarked upon a carefully structured and managed strategic review to study best practices in military and non-military alumni organizations, and to report on the Club's relevance, membership recruitment, services to members, and alumni engagement. This first step, as with any alumni organization, will indeed help define the 'destination' and the 'path' Lewis Carroll spoke of so many years ago; a path the RMC Club is following to sustain and improve upon its principle mandate - connecting its alumni across the generations with one of Canada's premiere learning and leadership institutions.

Colonel (ret'd) Michael A. Rostek, CD, PhD, is currently the Executive Director of the RMC Club of Canada.



Photo by Brad Lowe, CFB Kingston Imaging

NOTES

1. The author would like to thank Peter Gizewski, Strategic Analyst, Defence Research and Development Canada-Centre for Operational Research and Analysis, and Mr. Bruce McAlpine of Fulcrum Search Science Inc. for thoughtful comments on an earlier draft of this paper. The views expressed herein are those of the author and do not represent the official view of the Royal Military Colleges Club of Canada.
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Photo by Brad Lowe, CFB Kingston Imaging

Damned Nations: Guns, Greed, Armies and Aid

by **Samantha Nutt.**

Toronto: McClelland and Stewart, 2011

xii and 228 pages. \$29.99

Reviewed by **Peter Denton**

Writing is therapeutic. At some level, writers put words in a row to make sense of themselves, their world, or both together. Sam Nutt's *Damned Nations*, with its ironic volley subtitle of *Guns, Greed, Armies and Aid*, sharpens and deepens the critique with which she has persistently confronted audiences across Canada, in particular, for the last ten years.

In standard book 'review-ese,' she should be referred to as Samantha Nutt, M.D. (as her publisher notes on the book cover), Doctor Nutt for her varied honorary doctorates, then Order of Canada, Order of Ontario, and whatever else deservedly has been awarded out of her work with Warchild Canada and other agencies providing humanitarian aid. Yet meet her, talk to her, and the encounter quickly becomes a conversation with Sam.

It is that sense of personal engagement, that conversational encounter, which her book manages to convey. The dogged persistence that leads Raine Maida in the book notes to describe her as "a force of nature" has produced a first book whose tone is engagingly authentic. She could have written a sanitized, loftier and a more cerebral book with perhaps a wider commercial appeal, but thankfully she did not. In comparison to another famous Canadian's efforts to make sense of himself and his world, Lieutenant-General Romeo Dallaire, Sam's book resembles more *They Fight Like Soldiers, They Die Like Children* than *Shake Hands with the Devil*.

Everything in *Damned Nations* in some way has become personal. Read the memorial dedication to Margaret Hassan and Aquila al-Hashimi, whose stories figure prominently in Sam's oral presentations and now in the book, and you are left with the sense of a survivor's guilt. In the stories she recounts of her experiences in war zones, it is how she feels at the time, as much as what she has thought about it later on, that emerges most clearly. Even the writing of the book is personal, given the effusion of thanks and appreciation to her family, friends, and colleagues for their support.

Perhaps, in the midst of incisive commentary and candid observation, in the end, it is this stubborn refusal to separate

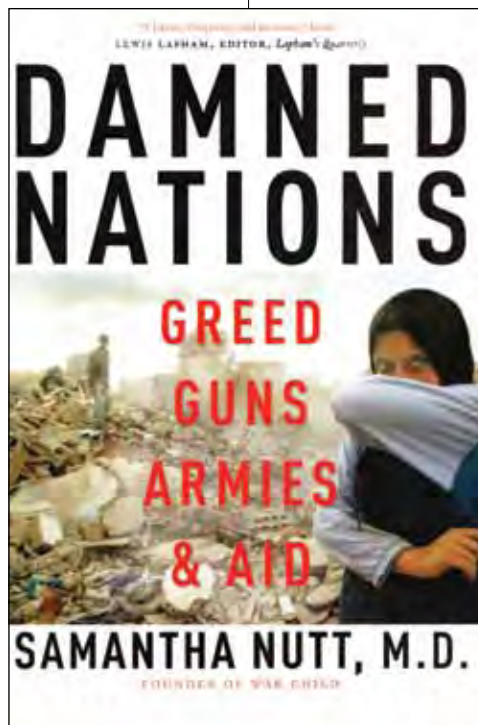
the personal from the social, to dissociate the events and feelings of one life from the mass of those many lives shattered by war, which makes *Damned Nations* a compelling book. Sam grieves the loss of her friends, the babies who die in their mothers' arms, the individual children whose lives are contorted or ruined by the cruelty of adults, and conveys this grief in a way that remains vivid once the book has been closed.

To call it personal, even *emotional*, is in no way to discount the unsettling character of the argument she presents. She knows how to wring pathos from the stories she tells, but takes the more difficult path of using the inevitable emotional response to challenge her readers to thought, rather than merely to reduce them to tears.

The world needs to be transformed from the ground up. Aid is one means by which local people and agencies can be empowered to make the changes and lay the foundations for long-term development and stability. And yet, Sam argues that the last thing we need is the bureaucracy of 'Big Aid' to match in both structure and inefficiency the problems inherent in the operations of 'Big Government' and 'Big Business.' This is where her book fits the form of an essay in the classical sense – it is an effort, an attempt, to articulate an answer to the problems of generating and delivering aid on the scale required to the myriad places where it is needed, without falling into the traps posed by large-scale endeavours.

She challenges the shrinking humanitarian space, as aid is increasingly delivered by foreign militaries in places where the interests of security outweigh any trust in local populations to support long-term development. Nor is this process working, as we might hope or intend. She challenges the moral bankruptcy reflected in military discussions of humanitarian aid as a weapon of war. Such an attitude reflects just how far we are from understanding the people and places we are attempting to help, whatever banalities are offered about "winning hearts and minds."

The book moves from analytical commentary, to philosophical reflection, to personal story and anecdotal conversation, then to numbers and facts, and back again, in another round. Magisterial in tone one minute, offering self-deprecating comments about her circumstances the next, Sam keeps your attention like a jungle cat pacing its cage with latent ferocity. Interspersed within the book are polished diamonds from her journals, no doubt worn to brilliance in the back of a Land Rover crossing rugged terrain, or in airport waiting rooms, or on long flights after what she has seen has made sleep uneasy. These short reflections cut to the heart of problems faced by people trying to deal with the heart-wrenching



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realities of delivering humanitarian aid today in the “damned nations,” or the failed states where need is the greatest.

The brief opening epigraph to *Damned Nations*, from the preface to George Bernard Shaw’s *Heartbreak House* (1919), needs its original context accurately to set the scene for what follows: “In truth, it is, as Byron said, ‘not difficult to die,’ and enormously difficult to live: that explains why, at bottom, peace is not only better than war, but infinitely more arduous.”

She provides examples of just how easy it is to die, in too many places. Such casual indifference to the value of life is then linked to the casual indifference with which Canadian teachers’ pension plans invest money in companies producing the armaments that use children to kill children elsewhere in the world. To live, even with guilt, is the more difficult path for any survivor. For us to find ourselves cast in the role of villain or perpetrator in these circumstances is perhaps even more difficult to accept. Sam drives this point home with a multiplicity of examples of how responsibility for war and violence in the 21st Century is reflected in the mirror of our daily lives, and how inadequate our responses to the needs of others, in reality, turns out to be.

If Sam’s own work becomes more arduous because of this book, she has only herself to blame. She has the moral courage to challenge the dimensions of aid agencies and their efforts that do not work on the ground, while at the same time arguing for the absolute necessity of such aid to create a more just and sustainable global society, one place, one person, at a time. It is a delicate balancing act.

For those who have experienced its horrors first-hand, no book is needed to explain the circumstances of war. For the rest of us, no number of books can do more than offer a glimmer of what remains unspeakable, even for the most eloquent of authors. Sam Nutt’s *Damned Nations*, however, makes her experience of “greed, guns, armies and aid” as personal for her readers as it is for her. It should be required reading for anyone involved in humanitarian operations, and its challenges should be considered by those involved in providing ‘whole of government’ foreign aid and development.

Peter H. Denton, PhD, is an Associate Professor of History at the Royal Military College of Canada.

Defence and Discovery: Canada’s Military Space Program, 1945-1974

by Andrew B. Godefroy

Vancouver: UBC Press, 2011

238 pages, \$32.95

ISBN: 978-0-7748-1960-2

Reviewed by Randall Wakelam

When Canadians think of the Canadian military experience, they are inclined to include such topics as the Canadian Corps at Vimy, the RCN in the Battle of the Atlantic, or the RCAF’s leadership in the British Commonwealth Air Training Plan. They are less likely, much less likely, to consider the role of defence scientists and policy makers in Canada’s contributions to space security and defence issues in the first 30 years of the Cold War. Andrew Godefroy’s *Defence and Discovery* provides a corrective to this circumstance. Godefroy has translated his lifelong fascination with space and his expertise, garnered from working in the Canadian Force’s Directorate of Space Development, into a fascinating story of Canada’s important contributions to defence on the ‘final frontier.’ As importantly, his research adds

another layer to Canada’s contributions to alliance defence during the first decades of the Cold War, a period during which space advancements were generally seen as a struggle between the two superpowers, with little-or-no involvement by, no pun intended, satellite nations. Finally, he gives us a sense of how defence in the modern era needs to be a collaborative effort between functionaries, scientists, and technologists, and those in uniform.

The book is organized, as the author explains, both by topic and chronologically, but most evident is the sequential flow that begins with a brief history of the mobilization of scientists during the Second World War, which then led in the first days of the post war reorganization to the creation of the Defence Research Board (DRB) under Dr. Omond Solandt. While the DRB would have several areas of interest, Godefroy’s purpose is to examine space, and he takes us from studies of the upper atmosphere, to rocketry and satellites, most notably, the *Allouette*, through Canada’s first and not insignificant efforts in missile defence, and finally, to the shift in focus of space efforts from defence to telecommunications, with the eventual formalization of a cabinet policy to that effect. One underlying theme, which will not be unfamiliar to those who have served in the Canadian Forces in past decades, is the drift of defence researchers away from defence needs to pure sci-



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entific research – science for the sake of science. A theme second is the general absence of a coherent national policy or plan on *military*, and even *civilian* needs and uses of space until the late-1960s. From that point on, and even today, Godefroy shows how military requirements have been generally downplayed, while attention has remained on communications and research.

The work is well-illustrated, allowing readers to see both the scientists and the various technologies that are the central characters in the book. All along, Godefroy gives us vignettes of the major participants, and ties their efforts back to both national and alliance concerns and programs. If there is one caution with this work, it is that the discussions of the actual sciences involved may exceed the knowledge and understanding of the average reader. The inclusion of a glossary, and perhaps a bit more explanation of the science would have been useful, but the author's message is certainly not lost, even upon the unscientific. There is also a comprehensive index and list of sources, as well as a chronology and a table of abbreviations.

Much of the work is based upon extensive use of primary sources, but Godefroy has also, of necessity, sought out materials from a range of atypical sources. In a short 'Short Note on Sources,' he provides his own caution, stating that there remains a lack of good history dealing with Canadian science and technology; he also informs readers that there is a large body of primary material which remains classified for reasons of national or alliance security.

For these very reasons, Godefroy says that he has only just scratched the surface of Canada's contributions to space security. Perhaps he is correct in this, but at the same time, it is clear that this is an important and illuminating 'first scratch,' one which opens our understanding of what in the 21st Century is likely to become an increasingly important area of defence activity.

Colonel (ret'd) Randall Wakelam, CD, PhD, *a former highly experienced tactical helicopter pilot, is an Assistant Professor in the War Studies Post Graduate Degree Program at the Royal Military College of Canada.*

From Victoria to Vladivostok: Canada's Siberian Expedition, 1917-1919

by Benjamin Isitt

Vancouver, Toronto: UBC Press, 2010, (hc)

352 pages, \$85.00

Vancouver, Toronto: UBC Press, 2011, (pb)

299 pages, \$29.95

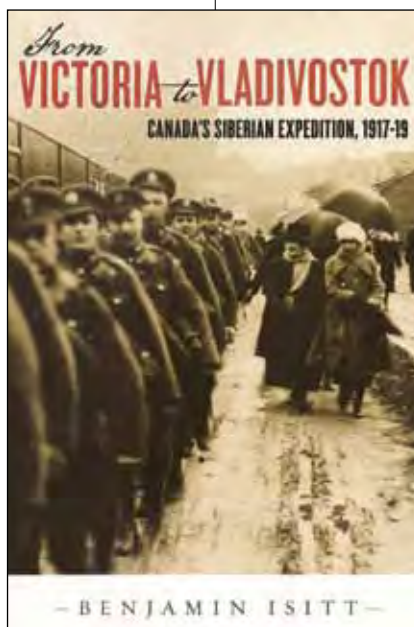
ISBN: 9780774818018 (hc)

9780774818025 (pb)

Reviewed by Ian C.D. Moffat

There is a large untapped subject area waiting to be investigated by contemporary historians in the field of social and military history in Canada. The connection of the social mores of the time and the effects on the members of Canada's professional and citizen military has only been scratched on the surface, and little has been done in the era of the Great War. A new book, *From Victoria to Vladivostok: Canada's Siberian Expedition, 1917-19*, by Benjamin Isitt, an historian specializing in labour and social movements in Canada, adds a new dimension to this intriguing field of study. Isitt has introduced an argument in his book that radical labour activity had a direct influence upon Canada's participation in and withdrawal from the little-known Siberian expedition against Bolshevik revolutionaries in 1918-1919. Herein, he has taken a first step in investigating this neglected area of historical

study – the social connections of the working class and the ordinary soldier/sailor/airman during war. His work is a welcome start to this field, and it is an in-depth expansion of his paper "Mutiny from Victoria to Vladivostok 1918," published in *The Canadian Historical Review Volume 87 No 2* (June 2006). His book, published in 2010, has delved into various archives and primary sources dealing with Canada's involvement in the Allied Intervention in Russia after the Great War, but it concentrates mostly upon Canadian social and labour history as it affected the Siberian portion of the Canadian involvement in this Russian adventure. Yet, overall, it is a very biased study that supports the labour and socialist side of the issue, and it fails to take into account other factors, such as high level political pressure from allies, and the decision-making process of the Canadian and other Allied governments in making policy. His main argument contends that radical labour activity, especially that which occurred on Canada's west coast, caused a small mutiny by Quebecois conscriptees preparing to embark for Russia, and that this, in turn, was the reason Canadian troops conducted no operational activity in Siberia and withdrew early. Around this theme, Isitt presents various radical labour events, mainly in British Columbia, and socialist pressure by labour leaders placed on soldiers assembling in Victoria before being sent to Siberia. This is interspersed with narratives of the events occurring in Russia that showed the evolution of the revolution towards the Bolshevik takeover of the Russian government. Isitt uses the events in Russia and in Canada as evidence of the solidarity of radical Canadian labour with the Russian revolu-



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tion, and, therefore, the rationale for radical influence on the political decisions in Ottawa.

Although Isitt's writing is clean and very readable, the book is disjointed and repetitive. In addition, it is riddled with rudimentary errors, such as the inaccurate-identifying of Winston Churchill as Lord of the Admiralty (the actual position is First Lord of the Admiralty), when he was actually the Secretary of War in charge of the army. In addition, Isitt gives Churchill a knighthood long before he actually attained that status. He also implies that Canada took an independent decision not to recognize the Bolshevik Government at the time of the revolution, when Canada had no power to do so, being then part of the British Empire, and, at the time, foreign policy being the sole purview of the Westminster Government in London. These errors of historical fact could have been avoided by virtue of basic research and knowledge with respect to the Great War era and Canada's place in the British Empire.

This book is a paean to old-school class warfare, pitting working class labour against the monolithic establishment. Isitt does highlight the tentative connection between militant labour on Canada's west coast and the dissatisfaction of the Canadian conscript troops preparing to embark for Vladivostok in late 1918. However, his observations that solidarity of Canadian radical labour with the Russian revolutionaries was evidence of pending revolution in Canada is 'stretching the facts,' and it places too much reliance upon the reading of Canadian radical labour press. More balance with official reports and mainline media stories would have demonstrated a more in-depth analysis, as well as more evidence for his theory, if such evidence exists. Isitt appears to have selected only some of Borden's correspondence of the time to support his argument, and has relied more upon radical labour newspapers for his hypothesis.

In this reviewer's opinion, Isitt places too much emphasis upon economic self-interest on Canada's part for its participation in the expedition, when that was only one of the arguments Borden used to sell it to his Cabinet. Participation

stemmed primarily from Borden's belief that Canada had a duty to support Britain when asked to do so, and Lloyd George had appealed to Canada in August 1918 for military aid for Siberia to help re-establish the Eastern Front. Isitt then asserts that Canadian labour unrest and agitation promoting the return of Canadian troops' from Siberia, while certainly a factor and a worry of the Canadian Cabinet, was instrumental in their repatriation. These arguments are not backed up with any official documentation. In fact, radical labour agitation was a minor factor, when it was Sir Robert Borden's pressure on the British government that was instrumental in the withdrawal of Canadians from Siberia. Borden's disillusionment with the intervention stemmed from the absence of an official agreed-upon Allied Russian policy. These facts are easily found in Borden's papers, and in various monographs dealing with Canada's role in the Great War. Yet, none of this is addressed by Isitt. Rather, he paints a picture of socialist pressure and labour solidarity as the reason for the Canadian withdrawal from Vladivostok.

Notwithstanding these shortcomings, Isitt's work is a good addition to the literature on this long-forgotten subject. His description of the mutiny and the effect of the radical labour rallies on the ordinary soldiers assembling in Victoria for deployment provides a new dimension to a little-known event in Canadian Great War historiography. While hardly the definitive word on Canada's Siberian foray, Isitt's book opens the debate for modern historians, and it is an important contribution to the discussion. For that reason, this book should be read by anyone interested in Canadian participation in the Allied intervention in Russia at the end of the First World War, as well as for an introduction to the study of social pressures on ordinary soldiers in time of war.

Commander (ret'd) Ian Moffat, CD, a naval officer and an operational sailor for over 35 years, is currently working on his PhD thesis in War Studies at the Royal Military College of Canada on the Canadians in Siberia experience.

La Grenade Verte: Valcartier 1974 : les oubliés de la compagnie D

by Hugo Fontaine

Montréal, Les Édition La Presse, 2011

199 pages

ISBN 978-2-923681-81-8

Reviewed by Michael Boire

This is a well-written and deeply-researched account of a terrible event in Canada's military history. On 30 July 1974, during a routine lesson on explosive and pyrotechnic safety, an M-61 grenade exploded in an improvised classroom crammed with over a hundred teen-age boys at the Valcartier Summer Cadet Camp. When the smoke cleared, six youngsters lay dead or dying; over 50 boys had been wounded, many seriously.

The author, Hugo Fontaine, is a well-known business reporter with Montreal's *La Presse*. He is a skilled writer, with a flair for painstaking research, and an obvious passion for military history. He has written a praiseworthy work of narration and analysis, based upon rigorous primary source research, including interviews with survivors, military police reports, the board of inquiry, and the coroner's report. The author takes us back nearly 40 years to investigate that long-forgotten moment. His purpose is two-fold: to recount in frightening detail how and why a deadly powerful live grenade made its way into box of dummy explosive devices which was passed around in a crowded room filled with adolescents naively unaware of the imminent danger. More to the point, Fontaine shows us how the explosion changed forever the lives its victims. For many survivors, their wounds remain physically and mentally debilitating. In this, his first book, Fontaine's agenda is refreshingly unblemished by ulterior motive.

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In his research, Fontaine's draws tough conclusions. First, it is clear that there was "a climate of negligence and carelessness" in the handling of explosives in Valcartier at the time. His description tells us how officers and NCOs responsible for the safe handling and detailed accounting of explosives failed the moral test of leadership. Had the men in the chain of responsibility applied the regulations and procedures in place at the time, this grenade would have exploded harmlessly on one of Valcartier's ranges. During its journey from the base ammunition depot, via a grenade range, and finally, into the crowded classroom, there is a trail of shocking disregard for safety. Fontaine's second conclusion is that the victims did not receive the follow-up support or care to which they had a right. In contemporary interviews, many survivors tell a story of neglect - being sent home after camp with no follow-up. Months and years later, victims continue to suffer.



The last and best conclusion is that despite the horror of the moment there was valour as well. For the survivors, there is a hero in this tragic tale. His name is Charles Gutta. As the NCO responsible for the cadets in that classroom, he was one of first on the scene, directing first aid and evacuation. In the days and weeks that followed, he dedicated himself to the welfare of each victim. Decades later, he is still seeing to his flock, keeping track of survivors, and continuing the fight for compensation.

This is a great book artfully written and thoroughly researched – a splendid example of good military history.

Major (ret'd) Michael Boire, CD, MA, a former Armoured Corps officer, is an academic counsellor and PhD candidate at the Royal Military College of Canada, and is the Editorial Advisor of the Canadian Military Journal.

Demolishing the Myth: The Tank Battle of Prokhorovka, Kursk, July 1943: An Operational Narrative

by **Valeriy Zamulin**

Solihull, UK: Helion and Company Ltd., 2011

ISBN: 978 1 906033 89 7

630 pages, \$69.96 (hc)

Reviewed by **Chris Buckham**

With the fall of the Soviet Union in 1989, many documents and unit records of Soviet operations during the Second World War became available to scholars. Valeriy Zamulin has taken advantage of this opportunity to draft an outstanding operational history of the Battle of Prokhorovka. Fought on the Southern Front of the Kursk conflict between 2 and 17 July, 1943, this battle represented the zenith of German offensive capability on the Eastern Front. From this point on, German efforts were defensive in nature, while Russian operations transitioned onto the offensive full-time.

Of note in Zamulin's book is that it is written from the perspective of the Soviet forces. He has taken advantage of numerous first-hand accounts, ranging in perspective from junior soldiers to Front Commanders, and they provide context and depth to the narrative. While the scope of his study is relatively narrow (the Battle of Prokhorovka within the larger Kursk conflict); the breadth of his operational narrative is such that it provides a clear sense of the challenges faced by the Russian commanders controlling the fast-moving and fluid conflict.

Zamulin's approach to the Russian command performance during the battle is balanced and objective. His use of daily logs, orders, situational reports, and first-hand recollections highlight some of the strengths and weaknesses of Russian command and control. Specifically, the tendency of the Russians to be extremely stratified in their decision making is repeatedly identified. Interestingly, the pressure exerted upon senior commanders to perform effectively was compounded by the implied (and real) threat of consequences, should they fail. This expectation resulted in 'micro-management,' and a fear of error that permeated throughout the command structure. Zamulin, by example, refers to a scenario wherein Stalin himself directed that, just prior to the initiation of the Soviet counterattack on 12 July 1943, the senior Front Commanders and their senior staffs spread themselves between each of their individual regional headquarters. Thus, the Front Commander, his Chief of Staff, and other key commanders were physically separated while trying to coordinate a multi-army, combined arms battle.

One of the real strengths of this book is the ability of the author to expose the reader to both the interdependent role under which the various arms operated, and the individual challenges and success that each combat arm faced. This battle revealed a growing confidence in the Russian military leadership in their abilities and equipment. Many errors were committed and these are discussed within the larger narrative of the battle, and weaknesses were highlighted in the senior leadership's ability/experience level to coordinate effective counterattacks using combined arms assaults. Nevertheless, it is evident from the overall performance of the Russian command and soldiers that morale and competency had improved dramatically.

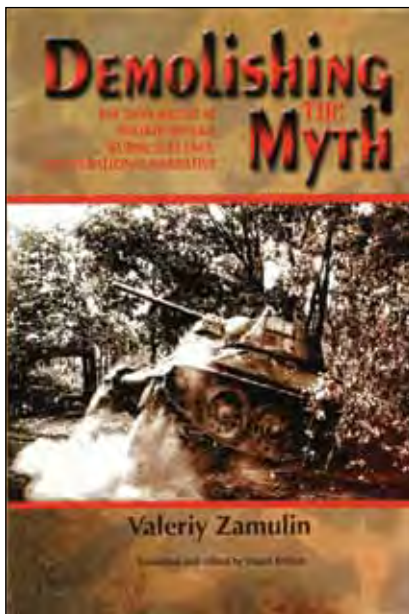
What I particularly enjoyed about Zamulin's book is the way that he presents his evaluation of the battle. Thus, while

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he sets his third-person narrative at the operational level, in order to provide context and depth, he seamlessly transitions to the tactical level and first-person dialogue. This provides the reader with a much greater appreciation of what was going on within the 'heads' of the individual commanders and soldiers. Additionally, while this book is primarily a narrative dealing with the Russian experience, he does make a concerted effort to include the German perspective, which adds further context and flavour.

Another strength is Zamulin's chronological presentation of Prokhorovka. Therefore, despite the complexity of the battle, the reader is easily able to follow as the battle unfolds from the German offensive conducted from 2 to 12 July, to the transition to the Russian counter-offensive running from 12 to 17 July. Zamulin has obviously researched the units involved in great depth. Included within the narratives (in chart format) are breakdowns of unit strengths by vehicle type and personnel, unit replacement rates, and overall loss rates for both the German and Russian combatants.

Zamulin concludes his narrative by addressing the commonly-held beliefs of historians surrounding the Battle of Prokhorovka. Using primary source documentation only recently made available to historians, he refutes, for example, the idea that Prokhorovka involved the largest concentration of armour involved in a single combat operation on the Eastern



Front. Additionally, he summarizes very succinctly the strengths and weaknesses of the Russian commanders, from an experience viewpoint, as well as from a doctrinal and quality of equipment perspective.

Rounding off his book is a comprehensive listing of all of the units from both sides involved in the battle. He also provides an in-depth bibliography of his primary and secondary sources. One observation that I would make involves the concentration of the maps into one section of the book. While this is a very small point that in no way takes away from the narrative, strategic placement elsewhere would have made tracking the battle easier for the casual reader.

This is an outstanding historical analysis of a 'battle within a battle.' Valeriy Zamulin's work represents, for both the military professional and the casual military historian, a work of profound depth and scope. There is something here for any branch of the combat arms professions and for operators in a joint environment. The cost in lives and materiel was horrific, but the Russians learned many lessons from their experiences during the Battle of Prokhorovka, and they did not waste time in applying those lessons downstream.

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The Longest Winter: The Battle of the Bulge and the Epic Story of World War II's Most Decorated Platoon

by Alex Kershaw

Cambridge, MA: Da Capo Press

330 pages, \$11.31

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Reviewed by Andrew Legge

Alex Kershaw's account of the 18 Intelligence professionals who became America's most decorated platoon is a must-read for history and Intelligence enthusiasts. The story begins with a crystalline account of Colonel von Stauffenberg's attempt on Hitler's life in July 1944, and how the unintended consequence of the Führer's surviving the attack was a desire for a bold offensive, reinforced by a misguided sense of Divine protection. The latter is a key detail, and an important extension of the story that readers will not have gleaned from Bryan Singer's 2008 film, *Valkyrie*. Seeking

to mimic Fredrick the Great's victory in the Seven Years' War by defeating a numerically-superior enemy through swift, massed attacks, Hitler ordered the full weight of the German military to mass on the Rhine River, where they would launch an all-out assault into Belgium to break the Allies' cohesion and their will to fight.

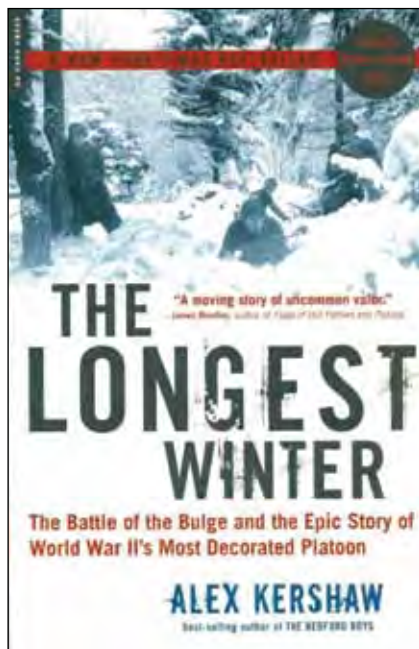
Positioned at the forward edge of the battle area, between two divisional boundaries, the U.S. Army's 394 Regiment's Intelligence and Reconnaissance (I&R) Platoon had only light weapons, no artillery support, and barely a month's experience in the European Theater of Operations (ETO). It was from this precarious start that this small group of untested soldiers began one of the most determined and effective defenses that became a critical part of the largest battle ever fought by American forces – the Battle of the Bulge. Unknown to the I&R platoon members until decades later, their actions changed the course of Hitler's plan to reach Antwerp by delaying his best soldiers – the vaunted SS Panzer Division led by Lieutenant-Colonel 'Blow-torch' Peiper and its supporting *Fallschirmjäger* (Airborne) division. After a full day of close-range fighting, and only after expending all their ammunition, were the platoon members captured and taken to several pris-

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oner of war (POW) camps as the Allies pushed deeper into Germany.

Miraculously, all the I&R troops survived captivity, yet none spoke of their role in that battle. It was several decades before historians pieced together what Lieutenant Bouck and his men did at the Belgian village of Lanzerath, and uncovered a story that sparked national interest and led to the platoon's belated official recognition. For extraordinary heroism and gallantry, the members of the I&R platoon were eventually awarded a Presidential Unit Citation; four Distinguished Service Crosses; five Silver Stars, and nine Bronze Stars with the "V" device for valour.

Kershaw's narrative instantly hooks the reader, while his detailed primary source research gives an exquisite account of what events unfolded and what actually occurred as the soldiers – both Allied and German – experienced them, including the exact amount of daylight that was available to the 394th's I&R platoon on the day of their capture. The author also draws out a number of lesser-known details to bolster the storyline. This includes the once-top secret raid ordered by General Patton to free his son-in-law from a nearby POW camp, where the officer chosen to lead this dar-



ing feat was the 10th Armoured Division's Intelligence Officer with the equivalent of a combat team under command.

In chronicling the book's shortcomings, the author does not explore two larger, intelligence-related details. First, why had Allied Intelligence staffs not anticipated the build-up on the Rhine? Second, the author also fails to discuss how General Patton's Intelligence staffs foresaw this break-out, thereby allowing his army to rapidly counter-attack the Germans at the Bulge, which constitutes a diametric stance from Patton's higher headquarters. Discussing these aspects would provide greater clarity and context to the reader with respect to the role Allied Intelligence played in the Battle of the Bulge.

However, in sum, this book is an important contribution to the field of military intelligence and Second World War history, while highlighting new areas for research, such as the actions which occurred at Elsenborn Ridge.

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DND photo IS2002-2010a by Master Corporal Frank Hudec