INTRODUCTION

In ancient Babylon, man sought to reach the heavens and touch the face of God. Committed and united, man set about building a tower which would serve to realise this quest. Bewildered and annoyed at man's impudence, God's response was: "let us go down, and there confound their language, that they may not understand one another's speech".[1] Unable to communicate intelligibly, unable to cultivate and share knowledge, comprehension and experience, unable to collaborate in planning and unable to synchronise efforts, man's individual, group and collective cognitive, decisional and execution abilities were debilitated. So compartmentalised, man's quest to reach the heavens proved unachievable, the Tower of Babel fell to ruins and God was never touched.

How does the story of the tower of Babel relate to Information Operations (IO)? Quite simply, Babylonians shared an operational architecture[2], organisational culture and institutional/group cognition[3] until God intervened. Similarly, in an age of complex operational environments where the moral plane of warfare is so critical, IO are all about using a variety of national enablers[4], technological and human, to wage war on the moral plane of warfare, also

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[1] Holy Bible, Book of Genesis, Genesis 11:7

[2] R Adm (Retd) Gary Wheatley, Dr David Noble " A Command and Control Operational Architecture for Future War fighters" RTO SAS Symposium 12-14 January 1999. Available at http://ftp.rta.nato.int/public//PubFullText/RTO/MP/RTO-MP-038///$MP-038-17.PDF; Internet Accessed 20 March 2009. Operational Architecture is defined as : The operational concept and connectivities that determine how a system will be used.

[3] Roderick Wallace, Deborah Wallace, "Public Policy, Institutional Cognition, and the Geographic Diffusion of Multiple Drug Resistant HIV in theUnited States" Abstract, Available at http://cogprints.org/4854/ ; internet accessed 21 May 2009. Here, "public policy and economic practice, both quintessential expressions of institutional cognition". By extension, national strategy, defense and security policies are likewise expressions of institutional cognition.

[4] Enablers include the human (cognitive – including individual, educational institutions, specialists, ingenuity, will), technological (information systems) and organizational (CIMIC, PSYOPS, Computer network operators, HUMINT, Intelligence).

known as the psychological plane[5]. Information Operations are meant to shape individual and societal cognition[6]. To achieve this, IO seek to manipulate individual and societal perceptions[7]. For this to be successful in the current complex operational environment, IO depend on inter-departmental unity of effort in the delivery of multidisciplinary synchronised, harmonised strategic, operational, tactical and individual actions. These are achievable only in a system where there exists a shared organisation culture, shared operational architecture and institutional cognition.[8]

In the end, shared organisation culture/language[9] within the war fighting community, inter-departmental operational architecture are key to achieving institutional cognition which itself is the pillar on which successful IO are based.

However, Canada has not achieved the required level of integration and synchronicity to wage war on the moral plane. As will be described later in this paper, shaped by a national

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[5] Ryan Clow, "Psychological Operations:The Need to Understand the Psychological Plane of Warfare", *Canadian Military Jjournal*, Vol 9, No 1 Available at http://www.journal.dnd.ca/vo9/no1/index-eng.asp#messages ; Internet accessed 20 May 2009

[6] Department of Defense, "Joint Publications 3-13", *Information Operations*, (United States, 13 Feb 2006), I-2, Available at http://www.dtic.mil/doctrine/jel/new_pubs/jp3_13.pdf; Internet accessed 20 May 2009. This is also based on the authors training (Joint IO planning course US Joint Warfare College Norfolk) and experience on Op Recuperation (Ice storm), OP QUADRILLE (Summit of Americas 2001), and JTF Afghan Roto 4 2007-2008.

[7] The study of perception in philosophy is an ongoing and widely published topic. Generally, perception involves a cognitive and emotive dimension. It is generally understood to include cognizance by the senses and mind. Perception is a process by which people translate sensory impressions into a coherent and unified view of the world around them. Though necessarily based on incomplete and unverified (or unreliable) information, perception is 'the reality' and guides human behavior in general. See http://knowledgerush.com/kr/encyclopedia/Perception/ for more on the issue of perception. Internet accessed 20 May 2009

[8] Institutional cognition is the shared comprehension of a collectivity; governmental, departmental or unit level. For more detailed work on this, see Roderick Wallace Deborah Wallace, "Institutional Cognition" Available at http://cogprints.org/4960/ ; Internet accessed 21 May 2009.

[9] Yvonne Du Plessis, Crystal Houde, "An Operational Project Management Culture Framework" South African Journal of Human Resource Management, (Pretoria 2006), 37, Available at http://74.125.95.132/search?q=cache:CyJ6P_4W0LsJ:www.sajhrm.co.za/index.php/sajhrm/article/viewPDFInterstitial/79/79+operational+culture&cd=46&hl=en&ct=clnk Internet Accessed 18 May 2009. Organisational culture in its most basic form refers to a system of shared norms, beliefs, values and assumptions that bind people together

culture, which for over 60 years has been anchored in military-centric peacekeeping[10] and contradictory policies on warfare and evolving in an environment marked by inter-departmental mistrust and a defence architecture shaped by business imperatives and a technocrat-driven revolution in military affairs, Canada's war fighting apparatus[11] became culturally, operationally and organisationally compartmentalised.[12]

Cognisant of shortfalls in its ability to wage war on the moral plane, the CF and its environments have sought procedural and organisational solutions. However, all these have been internal to the CF and therefore have never addressed the true malaise; strategic incoherence resulting from divergent operational architectures and culture[13] and inter-departmental compartmentalisation.[14]

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[10] Ibid Relating to the Kosovo operations, Dewitt states, "there appears to have been little in depth discussion or coordination between officials from DEA and DND and that consequently there was no clear policy as to how Canada would handle the "new world order." Military centric here refers to the fact that peacekeeping/Canadian expeditionary endeavours have been almost entirely a military venture with little to no political/economic involvement of government. The political realm committed to peacekeeping missions, but detached itself from its execution, leaving this task almost exclusively to the CF. The result has been a lost strategic culture of defence, security and warfare in general.

[11] War is a human, societal endeavour which is conducted by the whole of society if it is to be waged successfully. War fighting agents must, from the Clausewitzian definition of warfare itself, extend beyond the military to include all elements of National Power, including social, economic/industrial, political and military elements of the nation. The military's role must remain the delivery of authorised, managed violence, acting on behalf of, and in accordance, to Canadian identity, values and interests.

[12] David Dewitt, "National Defense Versus Foreign Affairs: Culture Clash in Canadian Security Policy" *45th Annual ISA Convention* Montreal Quebec 17-20 May 2004, 4, Available http://www.allacademic.com//meta/p_mla_apa_research_citation/0/7/3/8/1/pages73815/p73815-1.php ; internet accessed 20 May 2009.

[13] David Dewitt, "National Defense Versus Foreign Affairs: Culture Clash in Canadian Security Policy" *45th Annual ISA Convention* Montreal Quebec 17-20 May 2004, 4, Available http://www.allacademic.com//meta/p_mla_apa_research_citation/0/7/3/8/1/pages73815/p73815-1.php ; internet accessed 20 May 2009. Here, fundamental cultural barriers between foreign affairs and DND are exposed.

[14] This is based on the authors experience in working with other government departments and agencies from the Ice storm of 1997 (Op RECUPERATION), to Op ABACUS (year 2000), Op QUADRILLE, Op SUPPORT (sept 2001), Op ATHENA roto 4, Op SABOT (1996-2006) Op RUISSEAU (Surete du Quebec led Op concerning native issues 1997) and in the Joint Task Force East Inter-agency integration efforts between 2005-2007.

This paper's thesis proposes that realising a shared inter-departmental operational architecture is key to overcoming Canada's current inability to effectively wage war on the moral plane. To achieve this, Canada must leverage on two elements; information technology (IT) enablers and measures to enhance acculturation.[15] Information technology reform aimed at enhancing inter-departmental connectivity and measures which will enhance acculturation[16] to implement shared concepts and visions will allow Canada to transcend cultural, organisational and operational divides and effectively wage war on the moral plane.

In order to proceed, this paper is divided into three portions. The first deals with the complexities of warfare today and in the future and from this, the requirements-capability gap. The second portion will elaborate on the current state of affairs within Canada's war fighting community. The third portion will define remediation measures focussed predominantly on acculturation and IT, both critical to cognition and architecture. In the end, I will have demonstrated that, through the creation of shared culture and through the successful integration of IT enablers, Canada will enhance its potential for success. The following portions therefore deal with the requirements-capability gap emerging from the complexities of warfare.

[15] Throughout this paper, culture refers to operational culture. It involves shared language, doctrine and understanding/comprehension. As concerns acculturation, See http://www.rice.edu/projects/HispanicHealth/Acculturation.html. Internat Accessed 10 March 2009. Acculturation is a process in which members of one cultural group adopt the beliefs and behaviors of another group. Assimilation of one cultural group into another may be evidenced by changes in language preference, adoption of common attitudes and values, members in common social groups and institutions, and loss of separate political or ethnic identification.

COMPLEXITIES OF WARFARE

As posited in the thesis, operational architecture (shared operational concept and connectivity) is critical to meeting current operational complexities. In the next portion, the requirement-capability gap relating to operational architecture is exposed. In the end, I will demonstrate that future warfare will invariably require a continued emphasis on whole of government approach. More importantly, in an increasingly complex and operational context, cognitive and intellectual demands on war fighters increase substantively in such a way that multidisciplinary support to war fighters is critical.

In order to accomplish this, I will briefly outline the operational context of future warfare as well as detail the general requirements. This will establish the baseline gap between requirements, current capabilities and serve as a backdrop to the following portion dealing with remediation. What follows is the operational environment of present and future warfare.

Future Warfare

Strategy is the science of making use of space and time. I am more jealous of the latter than the former. We can always recover lost ground, but never lost time.
August Graf von Gneisenau[17]

There is much debate among the services, departments and academia as concerns future warfare. Notwithstanding the debates, the fact remains that "irregular and unconventional conflicts, rather than confrontations with standing armies … will dominate U.S. (and western)

[17] Field Marshal August Graf von Gneisenau, in Peter G. Tsouras, *Warrior's Words*, (London: Arms and Armour Press 1994), 405

military operations for the foreseeable future."[18] From a Canadian perspective, Canada's foreign policy focuses on a few target countries in an effort to add pertinence and effect to our actions abroad[19] and each of these failed or failing states is or will involve operations conducted against irregular combatants operating in a low technology and non-contiguously environment and enabled by criminal activity, corruption and a lack of institutional and individual security.

The consequences of this are significant in how warfare is likely to be waged in the future. Considering the Afghanistan experience which reflects with fidelity operations in a failing state, Canadian expeditionary ventures can no longer be relegated solely to the military and forgotten by society and other government departments as has been the case in the past.[20] Warfare is no longer an issue of force on force, attrition, national exhaustion and territorial conquest. In the end, future warfare will be predominantly focused on the human dimension and will require a synchronous involvement of multiple departments and agencies.

The challenges of this form of warfare exist across many dimensions, but fundamentally the most difficult ones seem to be related to human factors and the socio-cognitive domains",[21] that is, understanding the target audiences and synchronising actions in order to delivering, in a timely manner, efficient, effective effects. As identified by Lieutenant General Leahy, Chief of

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[18] See both Donna Miles, "Army Experts: Unconventional Conflicts to Dominate Future Operations", *American Forces Information Service News* Articles, (Oct. 12, 2006) and John Doyle, "Counterinsurgency Forces Need to Control Cyberspace", *Aviation Week and Space Technology*, (Oct. 23, 2006), 64

[19] See CIDA for a complete list of partner countries. Available at http://www.acdi-cida.gc.ca/CIDAWEB/acdicida.nsf/En/JUD-51895926-JEP Internet accessed 10 March 2009

[20] See David Dewitt, "National Defense Versus Foreign Affairs: Culture Clash in Canadian Security Policy" *45th Annual ISA Convention* Montreal Quebec 17-20 May 2004 , p4, Available http://www.allacademic.com//meta/p_mla_apa_research_citation/0/7/3/8/1/pages73815/p73815-1.php ; internet accessed 20 May 2009.

[21] Orrick White, "Network Centric Operations: Challenges Associated with the Human-in-the-Loop", *DRDC TR 2005-001*, 11 Available at http://pubs.drdc-rddc.gc.ca/inbasket/owhite.050117_1500.p523184.pdf; Internet: accessed 20 March 2009.

the Australian Army, the army is on the "cusp of an era when every soldier will be an individual node in a networked battle group; a strategic private."[22] This, I would argue, applies equally to other governmental agencies and departments who's "foot soldiers" are increasingly active at the pointy end of delivering multidisciplinary effects. For example, company commanders are required to involve themselves in political, military and economic fields of activity on Op ATHENA.[23] They are responsible for the daily operations of District Centers where they are involved in political and economic negotiations. Simultaneously, they conduct tactical operations against insurgents and they are involved in local economic development. In the current and future operational environments, "effective leaders of small combat arms units must think like human intelligence collectors, counterpropaganda operators, nongovernmental organization workers, and negotiators."[24]

With the human dimension so omnipresent and considering the critical role of the human strategic private/corporal in delivering pertinent actions, comprehensive knowledge[25] is no longer merely a command commodity and certainly no longer military-centric. Furthermore, war fighting clearly extends to all national elements of power and will therefore no longer be military-centric. Therefore, a shared understanding, culture and architecture must be achieved amongst all of Canada's war fighters which include political (leadership/bureaucracy), military,

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[22] Lieutenant General Leahy "Towards the Hardened and Networked Army", *The Australian Army Journal*, Vol II, No.1, Winter 2004,.35.

[23] Authors experience on Op ATHENA Roto 4

[24] Henri Bore (Col Retd), "Complex Operations in Africa: Operational Culture Training in the French Military" *Military Review March-April 2009*, Available http://usacac.army.mil/CAC2/MilitaryReview/Archives/English/MilitaryReview_20090430_art011.pdf ; Internet Accessed 19 March 2009

[25] Comprehensive knowledge here includes cultural, criminal, anthropological, economic, psychological knowledge and comprehension.

academics and others. Canada needs to effectively leverage on all agents of cognition[26] in order to develop the institutional cognition required to project pertinent, timely actions against target audiences.

From the above, the requirements levied on Canada's war fighting capabilities are primarily cultural, architectural and cognitive. In the future, warfare will be predominantly waged against individual and societal perceptions. This necessitates a more multidisciplinary approach to conducting warfare. To support the multidisciplinary war fighter, a whole of government or comprehensive approach, defined as an all agency involvement at the strategic, operational and tactical levels, is required.

For this support to be rendered, Canada, internally and with it's international partners, must achieve pre-Babel status, that is shared operational architecture and institutional/group cognition. Cultivating a shared (inter-departmental, inter-governmental) comprehension of the adversary and populations at all levels of command is critical to the formulation and delivery of pertinent policy, to transform into strategic, operational and tactical actions.

In the next portions, key constraints specific to military forces will be outlined.

[26] Agents of cognition are all those organizations and specialists who can effectively contribute to the development of institutional cognition- understanding/comprehension of the war environment. These include academia, governmental departments and advisors, intelligence organizations and individual operators and commanders.

Constraints

The requirements for future operations were outlined above. These related primarily to architectural, cognitive and cultural dimensions and imperatives pertaining to government departments and agencies. In the next paragraphs, certain institutional constraints specific to military forces, will be outlined as these impact directly remedial actions.

The CF, like all Western military forces, is subjected to considerable organisational constraints arising from the very nature of its prime activity – waging war. Although change is possible, the fundamentals of the military profession requires significant levels of hierarchical command and control and discipline (rigidity) to mitigate the impacts of risk, friction and fog of war. In essence, although the business community, society, the scientific community and academia have been able to adopt a highly networked, nodal construct, military organisations would be degraded by adopting similar constructs. However, this construct's negative impact is that "rigid bureaucratic structures, endemic in hierarchies, have difficulty changing policies and shifting resources that are optimal for one set of environmental conditions"[27]. In the end, a paradox exists. Although organisational and architectural changes are required, the CF is limited by institutional constraints which ensure it's operational effectiveness.

In the end, particularly within the military, there exists significant institutional constraints, based on the nature of the CF's prime activity (warfare) which limit future transformation. Rigidity and hierarchy can be mitigated to some extent, however the core

[27] Marshall Van Alstyne, "The State of Networked Organisations", *Journal of Organizational Computing*, MIT Sloan School, 2007 available at http://ccs.mit.edu/papers/CCSWP192/ccswp192.html#5f Internet: accessed 20 April 2009.

requirement for these architectural and organisational considerations are valid and must be considered in future changes.

In the next paragraph, Canada's current war fighting capability will be explored.

Where we stand today

In the next portion, I will detail where Canada stands vis-à-vis the requirements identified above. In short, I will demonstrate that cultural and cognitive compartmentalisation remains a debilitating element in Canada's efforts to effectively wage war on the moral plane. In essence, Canada suffers the Babylon syndrome; multiplicity of language (cultural divide) and compartmentalisation (lack of a shared inter-departmental operational architecture).

The last 20 years have resulted in tremendous and profound changes within the Government of Canada. During this period emerged "cultural and organizational differences between DND/CF and the other government departments"[28] which affects Canada's ability to plan and execute defence and security operations in an integrated manner. "The difficulty for Canada is that there may be two ways of warfare in the nation: a domestic, politically supported way and a military way and they often compete with each other."[29] Inter-departmental rivalries, fuelled by a competition for increasingly scarce resources, led to compartmentalisation and

[28] Dr Sandy Babcock Defense Scientist "Policy Challenges in the Development of Integrated Network Enabled Operations in Canada" , 12, Available at http://www.dodccrp.org/events/10th_ICCRTS/CD/papers/193.pdf ; Internet accessed 21 May 2009

[29] Douglas L Bland, "War in the Balkans: Canadian Style " *Options Politiques* (Octobre 1999), 4. Available at http://www.irpp.org/po/archive/oct99/bland.pdf ; internet Accessed 21 May 2009. The author speaks of the competing forms of warfare in Canada.

ultimately the elimination of any inter departmental operational architecture that may have existed.

Specifically, driven by a thirst for peace dividends and lured by the cost savings prospects afforded by technology and by a recent shift from soft to hard power, the CF and DFAIT were radically transformed. Research has demonstrated:

> that the last time DND's was budget cut was in 1998 when funding fell 5.38 per cent. The next year it was up more than nine per cent and has continued on an upward trend. In 2007, it grew 14 per cent, amounting to $16.9 billion. Today, the Defence budget has risen a further 14 per cent to $19.2 billion. [30]

For DFAIT's part:

> Foreign Affairs has seen fairly drastic fluctuations in its funding in past years. The 1990s were especially difficult, when, according to the department's website, between 1988 to 1998, its budget was cut 10 times, dropping by a total of $292 million. As a result, missions abroad were operating without any Canadians,… Money for servicing Canadian missions abroad has been cut from $650 million in 2006 to $579 million next year, and the department's full-time staffing levels, at 12,975 this year, will drop to 12,301 in 2010-2011… our infrastructure of foreign policy has atrophied and remains inadequate.[31]…. new figures show that the government is in the midst of slashing the Department of Foreign Affairs' budget by nearly $639 million from 2007 levels, while at the same time increasing the Defence Department's budget by more than $2.4 billion … Over the past two years, the documents show, DFAIT's budget has been cut 23.8 per cent, with many key areas of diplomacy being affected. Meanwhile, DND's budget has increased 14 per cent….DFAIT's activities across the spectrum are being torn up by the funding cuts, according to the department's 2007-2008 and 2008-2009 reports on plans and priorities.[32]

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[30] M Collins "Foreign Affairs Hit with $639 Million in Cuts" *Embassy Magazine*, {Embassy a division of Hill Times Publishing 2009) Available at http://www.embassymag.ca/mobile/story/foreign_affairs_cuts-3-18-2009 ; Internet Accessed 10 March 2009

[31] Ibid

[32] Ibid

In the end, shifting policy priorities and funding has compartmentalised Canadian Government departments and debilitated Canada's ability to shape the international community strategically and, by extension, operationally and tactically.

As another symptom of the cultural and architectural divides, from a policy standpoint, Defense and foreign affairs policy papers have been designed independently from each other:

> Aside from now being grossly out of date, these documents (White Papers) did little to link political, economic, and military elements of power in support of Canadian values and interests…. Outside observers often are puzzled as to why Canada does not have a national security strategy or an interagency process to coherently support its implementation.[33]

Canadian Forces and DFAIT transformations were "neither by (strategic) design nor positive"[34] and transformation had no impact in mitigating the divide in the government's defense and security apparatus, nor in providing for strategic guidance and the mechanisms required to provide for coherence and synergy.

> Unless the bureaucratic and organizational barriers between defence, diplomacy and development information sharing, and joint and dynamic planning and operations are overcome, a truly integrated approach is unlikely, is not possible.[35]

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[33] Ibid p 87.

[34] Joseph R. Nunez, "Canada's Global Role: An Assessment of it's Military Power", *Parameters*, US Army Quarterly, Fall 2004, 83.

[35] Dr Sandy Babcock Defense Scientist, "Policy Challenges in the Development of Integrated Network Enabled Operations in Canada" , 12, Available at http://www.dodccrp.org/events/10th_ICCRTS/CD/papers/193.pdf ; Internet accessed 21 May 2009

As a result of disjointed inter-departmental operational architecture,[36] fractured organisational cultures and a lack of institutional cognition, Canada lacks lateral and horizontal[37] synchronicity between and within departments. "Culture is part of the overall organizational design to enable widespread information flow".[38] Fractured cultures results in a lack of institutional cognition and therefore, a lack of strategic coherence.[39] In essence, lack of shared culture and compartmentalisation constrains our defence and security capabilities, especially as pertains to warfare on the moral plane and IO.

Internally to the CF, constant and ad hoc transformation resulted in a constant focus on tactical level warfare. The "big head, small body" transformation within the Army, and the Western focus on network centric warfare/Network Enabled, rapid decisive operations, joint response force operations, parallel warfare, and effects-based operations all clearly reflected this tactical orientation to transformation. Internally, in the late 1990s. at the strategic/operational level, the CF adopted a techno-centric approach to IO with the creation and employment of the

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[36] Gary Wheatley (R Adm Retd), Dr David Noble " A Command and Control Operational Architecture for Future War fighters" *RTO SAS Symposium* (12-14 January 1999). Available at http://ftp.rta.nato.int/public//PubFullText/RTO/MP/RTO-MP-038///$MP-038-17.PDF; Internet Accessed 20 March 2009. Operational Architecture is defined as The operational concept and connectivities that determine how a system will be used.

[37] This refers to synchronicity between governmental organizations which should be involved in war fighting, and synchronicity between command levels.

[38] Yvonne Du Plessis, Crystal Houde, "An Operational Project Management Culture Framework" South African Journal of Human Resource Management, (Pretoria 2006), 37, Available at http://74.125.95.132/search?q=cache:CyJ6P_4W0LsJ:www.sajhrm.co.za/index.php/sajhrm/article/viewPDFInterstitial/79/79+operational+culture&cd=46&hl=en&ct=clnk Internet Accessed 18 May 2009.

[39] The authors experience on Op RECUPERATION (97 ice storm), Op ABACUS (Y2K 2000), Op RUISSEAU (1997 Quebec natives crisis), Op QUADRILLE (Summit of the Americas 2001), Op SUPPORT (Response to 9/11) Op ATHENA (roto 4), Op SABOT demonstrates that the strategic level of command, (military and political), is ineffective as a result of transformational foci on operational and tactical levels of command. All recent focus has been on the development of operational and tactical capabilities to the detriment of a strong strategic command. Canada has lost it's ability to strategise politically and militarily. This is further amplified by our history of peacekeeping and lack of war fighting history which has fundamentally negated the government's ability to strategise in defence and security issues.

Canadian Forces Information Operations Group.[40] For its part, confronted by a totally different dynamic, the Army took a human centric approach to IO, creating such core enablers as PSYOPS and CIMIC.[41]

Although all significant in one way or another, and although each offered some potential operational and tactical improvements, all "say more about how U.S. [and others] forces are to perform on the battlefield than about how and why the enemy is to be defeated."[42] Each of these tactical concepts emerged and evolved independently of the other with no cultural, procedural, architectural point of synchronicity uniting them. Furthermore, and more significantly, no substantive realisations have been achieved towards closing the cultural and architectural gap between the CF and other government departments and agencies.

From a cognitive and architectural perspective, interdepartmental and intradepartmental compartmentalisation and cultural divides significantly degraded/degrade Canada's war fighting. Institutionally, the CF and Canada comprehend very little about the Afghanistan insurgency even though we have been present for six years. Individual departments and organisations within each department, possess particular/specialised knowledge, but compartmentalisation between entities and a lack of operational architecture results in an inability to cultivate and share the required

[40] CFIOG is responsible for network operations, including defense and offensive computer network operations. CFIOG is focused solely on information systems (technological). For additional details, see http://www.img.forces.gc.ca/org/cfi-goi/index-eng.asp Internet accessed 21 May 2009

[41] Both capabilities emerged through the Land Force Reserve Restructure. The author was intimately involved in the creation of both capabilities, a task afforded to Secteur du Quebec de la Force Terrestre between 2000 and 2006.

[42] Merrick E. Krause, "Defense Horizons Decision Dominance: Exploiting Transformational Asymmetries", Center for Technology and National Security Policy (National Defense University, February 2003), 1 available at http://www.ndu.edu/inss/DefHor/DH23/DH23.pdf Internet accessed 27 March 2009.

comprehensive knowledge. There exists no functional inter-departmental/inter-service point of information fusion and knowledge development.[43] As a symptom of these conditions:

> The Canadian-led PRT in Kandahar also displays signs of the fragmentation and uncoordinated effort that prevail throughout the programming of international development aid in Afghanistan. Effectiveness would be enhanced by aligning national and departmental priorities and operations more closely—and more collaboratively.[44]

Recognising Canada's shortfalls in institutional cognition and operational architecture, the Manley Panel on Afghanistan reported:

> To ensure a better integrated and more consistent Canadian policy approach should be led by the Prime Minister, supported by a special cabinet committee and a single full-time task force involving all key departments and agencies.[45]

In spite of this recommendation and measures implemented towards achieving this end, within government, inter-departmental rivalries, statute and regulatory limitations and incoherent information management debilitate our ability to collect, fuse, analyse, comprehend and share comprehensive knowledge.

Finally, in a broader perspective, Canada and more specifically the CF has little to no ability to leverage specialists in academia in order to complete the comprehensive knowledge

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[43] Although there exists some coordinating entities, such as the Integrated threat assessment committee, this remains largely dysfunctional and victim of inter service rivalries. No true all source sharing occurs, with the result being an incomplete comprehension of intelligence problems.

[44] Ibid, 26.

[45] John Manley, et al, "Independent Panel on Canada's Future Role in Afghanistan". *Report Prepared for the Government of Canada*, (Ottawa: Public Works and Government Services, 2008), 34.

required. Any linkages are personality/individually based and dissipate as individuals move from one position to another within organisations. In the end, our lack of operational architecture results in Canada's inability to leverage critical knowledge dimensions of future warfare, such as anthropology, culture, and criminology, key elements to waging war on the moral plane.

In spite of the above deficiencies which remain prevalent, the last years have seen significant refocus and improvements in defence and security management in Canada. As intimated previously, 911 led to the creation of the Public Safety Minister and Emergency Management Committee, a critical enabler to continental security and defence operations. For it's part, our Afghanistan experience and Manley Panel recommendations led to the creation of the Afghanistan Task Force within Privy Council Office. The Afghanistan Task Force seeks to bring some strategic direction, coordination, communication and synchronisation between DFAIT, National Defence, Treasury Board, CIDA and PCO.[46] Both are embryonic but both illustrate a potential change in Canada's defence, security and war fighting apparatus with a promise of synchronicity.

Finally, from a technological point of view, we have made advances in network enabled operations at the tactical level, albeit not truly by design.[47] However, our technological overmatch is negated, particular as concerns Canada's ability to shape the moral plane. We

[46] Mandate according to the Privy Council Office Available at www.pco-bcp.gc.ca/index.asp?lang=eng&page=secretariat&sub=afghanistan&doc=index-eng.htm Internet: Accessed 12 April 2009.

[47] This relates to the fact that in large part, digitization etc is a result of technocrat efforts, and not command, operator driven. This is from the Authors experience as Co Lead in Transformation process initiated within Secteur du Quebec de la force Terrestre/Joint Task force East HQ.

possess or exploit a multiplicity of predominantly compartmentalised information systems and networks within the CF and within the Government of Canada.[48] Tactically, the level of automation and the CF's connectivity has improved our ability to detect, define strike and shield with phenomenal precision and speed.[49] However, as a result of how technological networks have been ill defined and integrated within the military and within Government as a whole, compartmentalisation and informational clutter significantly limit our span of activities and capabilities. "There is little value in generating quicker and better information if it does not lead to more effective action",[50] yet this is what we have to date achieved. The Canadian experience has resulted in:

> …the organization is so layered and compartmentalized that the right information fails to reach the right people at the right time, and if operators are unable to derive action relevant knowledge from information presented to them.[51]

. "Everyone is in agreement…that there is a crisis in information management in the federal government as well as in every jurisdiction we have studied." [52] Our limited ability to leverage technology's potential, particularly as concerns the moral plane of warfare, has resulted in our current adversaries effectively negating much of our technological overmatch. They resort to unhindered offensive IO, targeting our perception and through human and technologically

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[48] These include SPARTAN, LOCE, BICES, TITAN, LCCS, and to these we must add those networks/information systems created specifically for operations, including WIKI-INT, CIMIC and PSYOPS databanks. This number expands exponentially when we add in other parallel departmental information systems such as DFAIT's SIGNET,[48] Records documents information management system of Transport Canada (RDIMS), Public Safety's internal networks, provincial information systems as well as coalition and US information systems including SIPRNET, NIPRNET, ISAF Secret and so forth.

[49] Authors experience on Op Athena Roto 4 as CO ASIC.

[50] Brigadier Gerard Fogarty, "Progressing the Human Dimension of NCW in the ADF", Australian Department of Defence, Russell Offices, (Canberra, ACT, 2006), p2 available at http://www.dsto.defence.gov.au/attachments/Keynote%20Address%20Brigadier%20Fogarty_Progressing%20the%20Human%20Dimension%20of%20NCW%20in%20the%20ADF.pdf Internet: accessed 11 March 2009.

[52] Andre Delagrave, "Access to Information Review Task Force Report", (Government of Canada Ottawa 12 June 2002) Available at http://www.atirtf-geai.gc.ca/report/key_points-e.html Internet; accessed 10 March 2009

enabled networks,[53] they maximise shielding, adaptability, fluidity. They have also effectively adopted low technology means such as the use of suicide bombers, improvised explosive devices, intermingling with the local populace and swarming techniques which include "irregular fighters and close-range snipers that swarm to attack, and then disperse quickly."[54] Furthermore, our focus on insurgents and combat, resulting in our ignorance of the insurgency, results in their ability to effectively shield the moral plane. In essence, their tactical deficiencies are increasingly mitigated by exploiting low technology and outmatching us on the moral plane. In the end, the issue of effective and efficient connectivity, a core component of operational architecture, is lacking and as a result, Canada's war fighting ability is degraded, particularly as concerns Canada's ability to fight on the morale plane.

In conclusion, although some improvements are noted, Canada continues to suffer from two cultures and fractured operational architectures and compartmentalisation, both organisationally and informationally. Reconciling these schisms by the appropriate integration of IT and enhanced acculturation is critical if we are to achieve shared operational architecture and institutional cognition. The following portion deals with these elements.

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[53] Network enabled here refers to human networks. Our adversaries essentially are networked, with some technological enabling, but the crux of the issue is the human dimension of networks they exploit.

[54] Clay Wilson, "Improvised Explosive Devices in Iraq: Effects and Countermeasures", *CRS Report RS2233* (28 August 2008). Available at http://www.fas.org/sgp/crs/weapons/RS22330.pdf Internet: Accessed 20 April 2009

REMEDIATION

Significant deficiencies are noted in Canada's war fighting capability. These pertain predominantly to the cultural, architectural and cognitive domains. The next portion focuses on those dimensions of change which will serve to mitigate Canada's current vulnerabilities and offset Canada's deficiencies. These changes involve enhancing inter-departmental acculturation and redefining inter-departmental IT integration. In essence, collaborative inter-departmental efforts are required to enhance Canada's war fighting capability. The creation of a shared operational architecture involves leveraging on IT which corresponds to all department's requirements, visions and culture and enhanced acculturation through shared experience, shared training and shared education. Each will be discussed below. I will now continue with the issue of cognition and technology.

Leveraging Information technology

Within the war fighting community, IT is a significant enabler which will mitigate organisational vulnerabilities and offset constraints. If properly defined and implemented, IT will provide the basis for increased connectivity between departments and agencies, a key component of shared operational architecture.

> Network enabled Operations (NEOps) is an information age concept that contends that a robustly networked force improves information sharing. With information sharing and collaboration, the quality of information and shared situational awareness is improved. Shared situational awareness results in improved collaboration and self-synchronization, and these, in turn, increase mission effectiveness. … Network Enabled Operations (NEOps) represent an approach to the conduct of military operations characterized by common intent, decentralized empowerment and

> shared information, enabled by appropriate culture, technology and practices.[55]

In essence, if IT is well defined to meet organisational cultures and practices, IT enhances organisational and operational effectiveness through enhanced information and knowledge creation and sharing. In the current complex operational environment "without appropriate digital communications (particularly in a non contiguous setting), this would not be practical, and made all the more unlikely…."[56]

> Information technology has established more rapid point-to-point communications with more numerous channels and significant reductions in information delay … as more agents contribute data, and computation aids processing, improvements in accuracy, retention, and timeliness can lead to better decisions, more coordinated problem solving and greater handling of complexity.[57]

In essence, the broader the network, the greater the number of contributing nodes, and the more diversified those nodes are, the greater the accuracy and comprehensiveness/completeness of the knowledge. For this to occur, two elements have to be considered. The first is the creation of relational conditions that facilitate interpersonal transfers through technology. This includes system architecture/design,[58] information management and most critically a culture of trust and risk management vice risk aversion. The second involves creating the structural conditions that, within organisational constraints defined earlier, facilitate fusion of information into comprehension and sharing.

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[55] David S. Alberts, John J. Garstka and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority* ,2nd Edition (Department of Defense C4ISR Cooperative Research Program, Feb 2000), 88-90

[56] John Kiszely, "General Warns Over Digitisation split", *International Defence Review*, Jan. 01, 2002 Available at www.dodccrp.org/events/7th_ICCRTS/Tracks/pdf/101.PDF *Internet accessed 10 March 2009*

[57] Marshall Van Alstyne, "The State of Networked Organisations", *Journal of Organizational Computing*, (MIT Sloan School, 2007) Available at http://ccs.mit.edu/papers/CCSWP192/ccswp192.html#5f Internet: Accessed 20 April 2009

[58] System design implies hardware, software and human (practices, culture) components.

The next portion deals with the first condition only, that of relational conditions, that is, with relational conditions required.

> The human element seems to underlie virtually all the functional shortcoming chronicled in official reports and media stories: information operations, civil affairs, cultural awareness, soldier contact, and most glaringly, intelligence, from national to tactical.[59]

In essence, contrary to the Canadian experience where business imperatives, business solutions and technocratic ambition drove technological change in the CF, "… successful innovation in large organizations depends on understanding how technology will impact on the organization's culture and vice versa."[60] Culture being so central to information systems design, collaborative inter-departmental efforts in defining and implementing IT is critical as well as ensuring systems design involves, intimately, operators and commanders versus technocrat-centric designs.

Furthermore, "to be a knowledge-based organization means that the ways that knowledge is acquired, processed, and deployed must be continually appraised, tried, and adapted based on the results."[61] In order for the system to become truly knowledge-centric, the "domains in which command takes place must be fully understood and the impact of networking

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[59] MGen Scales, Robert (Ret'd), "Culture Centric Warfare" in *Proceedings*. (US Naval Institute. Oct 2004), 32-41.

[60] Dr Allan English, Dr Richard Gimblett, Vice-Admiral (retired) Lynn Mason, Mr Mervyn Berridge Sills "Command Styles in The Canadian Navy" DRDC Toronto CR 2005-096 (19 January 2005), vii, Available at http://pubs.drdc-rddc.gc.ca/inbasket/ahawton.050331_1440.CR_%202005%20-096_final.pdf Internet: Accessed 9 March 2009.

[61] Anklam Patti, Adrian Wolfberg "Creating Networks at The Defense Intelligence Agency" *Knowledge Management Review* Mar/Apr 2006, 7, available at http://findarticles.com/p/articles/mi_qa5362/is_200603/ai_n21390985 Internet: Accessed 12 March 2009.

appreciated by those who are in the face of battle."[62] To achieve the above level of proficiency requires acculturation between key players so that systems may be defined to respond to all pertinent organisations' and agencies' requirements. In essence, systems architecture must be built by and for those who require such systems, commanders and operators.

Cultural imperatives and the requirement for operator involvement in designing systems logically points to the requirement for a government wide/inter-departmental consultative and collaborative process to define, design and implement inter-operable IT/IS. The challenge such an inter-departmental group would have is to facilitate "the evolution from today's emphasis on information and distributed data to emerging systems for knowledge and distributed intelligence"[63] and this can only be achieved if commanders, operators and "strategic corporals" from pertinent department and agencies persistently involve themselves in the definition and validation processes of information systems.

Repositioning operators and commanders from all departments, at the center of the IT equation will effectively lead to the deployment of IS which afford different departments' geographically dispersed forces the ability to "create a high level of shared battle space awareness that can be exploited via self-synchronization and other network-centric operations to achieve commanders' intent."[64] This dimension of connectivity, a critical component of shared operational architecture, is key to collaborative planning, decision dominance, the cultivation

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[62] Orrick White, "Network Centric Operations: Challenges Associated with the Human-in-the-Loop", *DRDC TR* 2005-001, 6, Available at http://pubs.drdc-rddc.gc.ca/inbasket/owhite.050117_1500.p523184.pdf Internet: Accessed 9 March 2009.

[63] "Knowledge Networking" Available at http://www.cisl.ucar.edu/info/FORMS/KNP1-6.html Internet: Accessed 20 April 2009.

[64] David S. Alberts, John J. Garstka, and Frederick P. Stein, "Network-Centric Warfare", Washington DC: *C4ISR Cooperative Research Program*, (1999), 88.

and sharing of knowledge, the maintenance of a common governmental operating picture, and the comprehensive knowledge and trusted connectivity.

To date, although the Treasury Board is charged with the development of information management policy,[65] we have no standing or temporary committee on inter-departmental IS/IT definition.

A second issue is that of trust, a key consideration for the establishment of a shared operational architecture. As stated above, there exists little to no connectivity between departmental information systems. In contrast, IT benefits only truly pay off once all levels of command, between departments share unhindered, trusted connectivity. Only in this manner can institutional cognition emerge and only in this manner can comprehensive, multidisciplinary knowledge be created and shared broadly.

The issue of trust is often a cultural issue more than an actual imperative. In fact, restrictive and complicated security regulations and inter-departmental/ inter-organizational mistrust further contributes to a degradation in the quality of knowledge. "Commanders often choose stringent release rules to avoid problems"[66] which results in “more time spent overcoming system limitations then in exploiting the potential of systems.”[67] In essence, there is

[65] For more information, see http://www.tbs-sct.gc.ca/cio-dpi/index-eng.asp Internet Accessed 10 March 2009.

[66] John Kiszely, “General Warns Over Digitisation Split”, *International Defence Review*, (01 Jan. 2002,) 11 Available at www.dodccrp.org/events/7th_ICCRTS/Tracks/pdf/101.PDF Internet accessed 10 March 2009

[67] From experience in domestic (inter agency) and expeditionary (multinational/coalition).

a tendency to overly restrict the releasability of information[68] which negatively impacts Canada's ability to fully leverage all agents of cognition.

> More learning may then be said to occur when information is shared more broadly, when more numerous and varied interpretations are developed, when different organizational members comprehend each other's interpretations -- even if their own interpretations differ, and when latent information is recognized as potentially useful and stored… volatile environments increase the value of learning by grafting (trusting networks which allow plug and play integration of new agents/organizations).[69]

Even within the constructs of a constrained military organisational structure, this level of shared comprehension is enabled by technology if it extends to all agents of cognition in a trusted manner. Research demonstrates that:

> Complementary knowledge sources are important to solving large scale integrative problems but agents are indispensable to their expertise -- implying that agents may only gain by working in groups. To function as a group, they need to establish mutually agreeable goals, a coherent group identity, and norms for action and reciprocity that enable and disable group and non-group actions respectively.[70]

Fundamentally, flattened management structures emerging from trusted connectivity between nodes results in horizontal and vertical collaboration and enhanced knowledge production. This, in turn, allows for near real time sharing of experience and knowledge and the

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[68] Authors experience as CO ASIC ATHENA R 4, J2 QG SQFT, J2 JTF SQFT Op QUADRILLE, Op SABOT 1996-2005, J2 (A) JTF SQFT Op RECUPERATION, J2 JTF SQFT Op SUPPORT. Operators and analysts have a tendency to increase, unwarrantedly the security classification of information. Personal and institutional risk aversion is the principal cause. In more then 80% of the cases I witnessed, information was of a lower classification than indicated or it could easily be edited so that the essence and the quality of the information is maintained while sensitive details are protected.

[69] Marshall Van Alstyne, "The State of Networked Organisations", *Journal of Organizational Computing*, MIT Sloan School, 2007. http://ccs.mit.edu/papers/CCSWP192/ccswp192.html#5f Internet: Accessed 20 April 2009.

[70] Ibid.

realisation of the sought after "self synchronisation" between units, nodes and knowledge agents.[71] Trust "between war fighters across different levels, and trust between war fighters and their supporting agencies"[72] is critical to inter-departmental collaboration and for the development of knowledge and comprehension of the battle space. How this is realised is twofold, acculturation and the use of technology.

As concerns acculturation and it's impact on trust and the establishment of broad networks, IT :

> can commingle distinct internal structures through lateral communication just as it can intermingle network and external structure through tighter coupling. Tighter cross-functional ties and stronger buyer / supplier relations can lead to the interpenetration of boundaries. Strong links can potentially flatten organizational hierarchy first by enabling a redistribution of resources, decision rights, power and control and second by attenuating status distinctions. Cues marking age, race, gender, and dress might not accompany non-verbal communication. Information technology also permits workers to perform new tasks, reducing the skill requirements for integrated work.[73]

In essence, IT can accentuate acculturation and, by extension, contribute to enhancing trust between organisations thereby contributing directly to the connectivity aspect of shared operational architecture.

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[71] Elias Oxendine IV, "Managing Knowledge in the Battle Group Theatre Transition Process", Student Thesis, Monterey CA: Naval Postgraduate School, Sept. 2000, 18.

[72] Brigadier Gerard Fogarty, Progressing the Human Dimension of NCW in the ADF", *Australian Department of Defence*, Russell Offices, (Canberra, ACT, 2600),1 Available at http://www.dsto.defence.gov.au/attachments/Keynote%20Address%20Brigadier%20Fogarty_Progressing%20the%20Human%20Dimension%20of%20NCW%20in%20the%20ADF.pdf Internet: Accessed 11 March 2009

[73] Marshall Van Alstyne, "The State of Networked Organisations", *Journal of Organizational Computing*, MIT Sloan School 2007 http://ccs.mit.edu/papers/CCSWP192/ccswp192.html#5f Internet: Accessed 20 April 2009

In addition to the effects acculturation will have on reaffirming trust, and to further mitigate the effects of institutional rigidity inherent in military forces, automated information scrubbing applications[74] facilitate the releasability of information to wider audiences. Rather than maintain physical separation between networks, as is currently the case, technological filters (scrubbers) are required to facilitate the passage critical information between departments and organisations, when such information raw cannot be integrally shared.

In conclusion, repositioning the human at the center of the equation will allow for the proper definition, integration, and subsequently, the exploitation of IT. This significantly enhances the production of comprehensive knowledge, accentuates synchronicity between critical nodes and serves to mitigate cultural divides. Inter-departmental involvement in the definition process and a change in culture to enhance trust also significantly enhance the potential offered by IT. Finally, IT enablers, such as scrubbing applications, will further mitigate the impacts of institutional constraints relating to security.

The next issue discussed will be that of culture and the ensuing architectural impacts.

[74] Information scrubbing involves the removal of sensitive/classified information from content. This can be done in an automated manner and automatically distributed to lower classification networks and systems. In essence, a Top Secret document can be "scrubbed" of Top Secret information and injected into a Secret system. Secret information can again be scrubbed and the remaining information placed on a lower classification system. All this occurs with little degradation to the value of the content of the information and allows for the broad sharing of information.

Acculturation

The issue of culture and architecture within Canada's war fighting apparatus is the next portion dealt with. A shared, common operational architecture amongst Canada's war fighting agents must be achieved and this requires comingling of values, beliefs, language and processes between those agencies involved in war fighting. This is critical to the development of institutional cognition and connectivity. "When applied to systems larger than individual actors, distributed (institutional) cognition is deliberately framed in a way that keeps culture in mind".[75]

> Shared culture seems to provide far more than merely a shared language for the establishment of the human organizations which enable our adaptation to, or alteration of, our varied environments. It also may provide the stabilizing mechanisms needed to overcome many of the canonical and idiosyncratic failure modes inherent to such organizations.[76]

The criticality of culture is therefore apparent in systems. Although technology itself can mitigate the vulnerabilities of current cultural divergences, the cross cultural development of war fighters, civilian and military, becomes increasingly critical towards the acquisition, cultivation, development and sharing of multidisciplinary/comprehensive knowledge.

Building on technological advantages proposed above, shared experience, education and technology can overcome current deficiencies, but this must be broad based. We currently have far fewer interfaces with other government departments then we do with multinational military

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[75] N.J Enfield, Stephen C Levinson, Wenner Gren Foundation for Anthropological Research, *Roots of Human Sociality: Culture, Cognition and interaction* (Breg Publishers 2006), 377

[76] Roderick Wallace Deborah Wallace, "Institutional Cognition" 12, Available at http://cogprints.org/4960/ ; Internet accessed 21 May 2009.

organisations. And in large part, our interfaces with other government departments are financial in nature. In an environment where whole of government is critical to future warfare, this imbalance must be resolved. A common understanding of departmental and agency operations, objectives, imperatives are key. With common education and experience will come shared language, comprehension and a shared culture. Achieving this level means overcoming institutional logic and rivalries. The issue becomes; how, where and when this acculturation occur?

The current education and training system in Canada affords inter-departmental training at the Lcol and Col level at the Executive Leaders Programme and the Canadian Security Studies Programme[77] offered at CFC. However, government department defence and security operations intersect at the combat team level (Major and civilian equivalent level). Although we require that our majors' professional competencies extend to the political and economic domains, there exists no formal inter-departmental training or education opportunities for this rank level, and therefore no means for acculturation. The result is that military and civilian counter-parts who are required to operate collaboratively generally meet for a first time once they arrive in theatre. They are generally unfamiliar with each other's doctrine, cultures, language and operating procedures.[78] As a consequence, collaboration is limited and more time is spent learning of each other's operational culture than in collaboration in advancing common goals.

From this reality, it is logical to determine that Canadian Land Forces Staff and Command College ready key personnel (Senior captains, junior majors) are the targeted rank

[77] See http://www.cfc.forces.gc.ca/214-eng.html for information regarding the Executive Leader's Programme

[78] Authors experience during OP ATHENA Roto 4 as CO ASIC.

level for acculturation and exchange/secondment programs to form networks and of potential collaborators from other departments in future operations. An inter-departmental Defence and Security Programme aimed at the senior capt and major rank level, and civilian equivalent, would allow for enhanced acculturation, shared education and training and would, in the end, greatly contribute to mitigating cultural divides between departments.

In the end, common experience is being acquired currently at the mid and junior management/operator level in Afghanistan. Common training, currently limited to senior level management, can be expanded to lower levels of management in order to target the appropriate rank levels for acculturation. Finally, technology can, as it has in business and society, over ride many additional cultural constraints if linkages between departments are expanded. The resultant will be a shared culture, architecture and increased synchronicity.

Conclusion

In conclusion, IO and warfare on the moral plane rest on shared architecture and institutional cognition amongst all war fighting agents. In the future conflict space, these include military, other government departs, academia and segments of society at large. Although Canada possesses numerous IO enablers, current cultural architectural and organisational divides are debilitating Canada's ability to effectively wage war on the moral plane. Breaking the Babylon syndrome by reinstituting a shared inter-departmental operational architecture, shared organisational culture and enhancing our ability for institutional cognition will rest on enhancing acculturation and reforming our IT to extend to all war fighters and contributors to warfare.

Developing shared experience, shared education at the pertinent rank levels and on the proper integration of IT to mitigate any remaining cultural and cognitive divides. These will significantly contribute to achieving the cultural and cognitive ends and synchronicity required for conducting IO.

Already Canada's experience in Afghanistan has provided the impetus for change towards the development of a shared operational architecture. Canada has progressed in converging information systems, although this remains predominantly intra-departmental. Canada has also progressed with the creation of the Afghanistan Task Force and Public Safety Department's Emergency Management Committee, foundations to future synchronicity, coordination and connectivity between departments involved in defence and security issues. Additionally, inter-departmental acculturation occurs, albeit to a limited level, in the senior management levels at the Canadian Forces College. These developments are clearly promising. However, much remains to be accomplished it Canada are to truly become effective on the moral plane of warfare.

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