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TRANSFORMATION BY INNOVATION: DEFENDING CANADA AND ITS INTERESTS

By /par Maj/maj P.R. Kouri

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ABSTRACT

History has shown us that it is usually non-dominant players that have leveraged revolutions in military affairs with greatest effect. Not only must Canada look externally, and consider the developments of our allies and closest trading partner, but internally as well; and leverage our untapped or underutilized strengths. Technology is not the driver for change but the catalyst. The intellectual dexterity with which we exploit technology is as cultural as it is educational. As a consequence, organizational and doctrinal evolution must be more agile.

In order for Canada to have influence on the world stage, it must be able to assume a leading role on issues considered vital to our national interest. This is a much larger issue that simply responding to the supposedly 'new' security threats posed by transnational terrorism, and keeping pace in the 'information age'. Internationally, Canada's principal allies and trading partners have all embarked on major transformational initiatives. Consequently, in order to remain relevant at home and abroad, the Canadian Forces must implement significant strategic transformation by embracing innovation, not just managing change.

INTRODUCTION

> And it ought to be remembered that there is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, then to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new.
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> Machiavelli[1]

Military strategy in support of political aims has existed since its first documentation in the *History of the Peloponnesian War* by Thucydides in 431 B.C.[2] Since that time, military commanders' have sought better ways and means to achieve the political ends, using less blood and treasure. Modern militaries became models of leadership and innovation for commerce to emulate.[3] The pendulum has since swung, and the growing importance of fiscal control measures has nurtured increasing use of business terminology and practices to 'manage' change within the military.[4]

So what then is the Canadian impetus for change from the status quo? The fundamental reason is ambition. Canada is no longer simply a colony of the British Empire, nor a staid NATO middle power fulfilling a tactical role in the defence of Europe. If Canada wants to have influence on the world stage, it must be able to assume a leading role on issues considered vital to our national interest. This is a much larger issue that simply responding to the supposedly 'new' security threats posed by transnational

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[1] Nicollo Machiavelli, *The Prince*, http://www.blackmask.com/books83c/tprncdex.htm

[2] Thucydides. *The History of the Peloponnesian War*. Trans. by Richard Crawley. Internet. Available from: http://classics.mit.edu/Thucydides/pelopwar.html; Internet; accessed 21 October 2004.

[3] There is a variety of military advice to business management books such as Eric K. Clemons, *The Marine Corps Way: Using Maneuver Warfare to Lead a Winning Organization;* or Jeff Cannon, *Leadership Lessons of The Navy SEALs: Battle-tested Strategies For Creating Successful Organizations and Inspiring Extraordinary Results.*

[4] Michel Maisonneuve. "NATO's Move Towards an Independent Change Management Organization." *Bravo Defence*, Director General Strategic Change, Department of National Defence, Ottawa. Winter 2003.

terrorism, and keeping pace in the 'information age'. "An underlying and unified strategic concept should in principle determine the structuring, composition, and employment concept of the armed forces."[5]

The Government of Canada, with the intention of mitigating threats to security and public safety, has adopted a more inclusive and integrated approach to security issues. The cooperation and information sharing between federal, provincial, and municipal departments and other agencies, as envisioned in Canada's National Security Strategy, is designed to provide a more coherent and rapid response to protect Canada and its interests.[6] Internationally, Canada's principal allies and trading partners have all embarked on major transformational initiatives. Consequently, this paper will argue that in order to remain relevant at home and abroad, the Canadian Forces must implement significant strategic transformation by embracing innovation, not just managing change.

The implosion of the Soviet Union has left the world with a single super-power, and several diminished great-powers. The former bi-polar world has fragmented into several new and sometimes overlapping regional economic and security zones; all of which are undergoing some form of transformational initiative. For example, the European Union has just established the European Defence Agency,[7] and the Association

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[5] Williamson Murray and Macgregor Knox. "The future behind us." In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 181.

[6] Privy Council Office, "Securing an Open Society: Canada's National Security Policy." Government of Canada, April 2004.

[7] The Council of the European Union, "European Defence Agency," 12 July 2004; available from http://ue.eu.int/cms3_fo/showPage.asp?id=277&lang=EN; Internet; accessed 17 December 2004.

of South-East Asian Nations (ASEAN) now openly discuss defence and security issues in what was previously a purely economic forum.[8]

It follows that transformation is not the product of any one military institution or country, nor based uniquely on innovative new technologies. Commercial transformation may be limited to the optimization of business and operational practices, or the comprehensive replacement of existing systems. But for governments and their militaries, strategic transformation is the promotion of new concepts and capabilities; based on the optimized combination of emerging and legacy equipment, to field systems whose effects are best able to meet the challenges of the new security and technological environment.[9] Strategic change may result from political, technological, cultural, or organizational influences; but in Canada's case, they must also be examined within the context of dependence on trade with, and proximity to, the United States.

The United States will maintain their pre-eminence in the international security environment and "'command the commons,' the global air, sea and space domains."[10] While they will not hesitate to act unilaterally, they will prefer to work with 'coalitions of the willing.' That is not to suggest that can act with impunity, but rather will continue to experience difficulty in countering asymmetric threats and 'contested zones' overseas. The United States remains vulnerable to domestic terror attack, and will not tolerate any

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[8] Association of South East Asia, "Declaration Of ASEAN Concord II (Bali Concord II)," 7 October 2003. http://www.aseansec.org/15159.htm

[9] Defence Research and Development Canada. "Transformation: Reading Package for the 2004 DRDC Manager's Workshop Transformation Session." March 30, 2004.

[10] Phillipe Lagasse and Joel J. Sokolsky, "The Evolving Security Environment and The Canadian Forces: What Capabilities will be Most Important?" A paper submitted to the Assistant Deputy Minister (Policy), Department of National Defence, Canada. 4-8.

perceived threat based out of Canada.[11] Consequently, Canada is compelled to act on some security threats, and can exercise greater discretion with some others. Clearly, the first priorities are the closely related areas of domestic security and continental defence, as the Canadian Public's safety and economic well-being depend on them. It is in the fielding of a credible expeditionary capability however that discretion can be exercised. It has long been apparent that Canada cannot afford to field all the requisite capabilities to respond to all contingencies across the spectrum of conflict. As articulated in the National Security Policy, Canada must be "selective and strategic when considering the deployment of our armed forces."[12] That does not mean relegating the Canadian Forces to a niche role, but rather transforming them into "a more agile, lethal, deployable, and knowledge-based force, better suited to the strategic environment of this century."[13]

This paper will examine historical examples of strategic change in order to provide a framework for current defence policy and planning.[14] The first chapter, 'The Nature of Change', will start with an overview of transformation and its linkages to Military Revolutions and Revolutions in Military Affairs. The second chapter, 'How and Why Militaries Innovate', will examine the historic importance and types of innovation, and provide examples of how innovative organizations are better suited to adapt to new realities, and highlight the pitfalls of slavish adherence to doctrine. The third chapter, 'American Revolution in Military Affairs or Transformation?', discusses the reported

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[11] Lagasse and Sokolsky, "The Evolving Security Environment …" 4-8.

[12] Privy Council Office, "Securing an Open Society…" 50.

[13] Paul Mooney and Greg Poehlmann. "Army Transformation: Setting our Soldiers Up for Success," *Bravo Defence*, Director General Strategic Change, Department of National Defence, Ottawa. Vol. 4, Fall 2004. 15.

[14] Colin S. Gray. *Strategy for Chaos: Revolutions in Military Affairs and the Evidence of History*. London: Frank Cass Publishers. 39.

American Revolution in Military Affairs, and the United States approach to transformation. The fourth chapter, Canadian Forces Transformation, will discuss the theories that support the ongoing transformation of the Canadian Forces, and its relevance to Canada –United States relations. This paper will end with a summary of the principle observations, and conclude that innovative, knowledge-based organizations are better suited to respond to the winds of change, and political whim.

CHAPTER ONE – THE NATURE OF CHANGE

Governments must shed their hidebound attitudes to peace and war. They must find a way of applying armed force to frustrate the violent actions of their foes at the least possible time, resources and above all blood – in other words, with the least possible disturbance of peacetime life and relationships. By the same token, established armed forces need to do more than just master high-intensity maneuver warfare between large forces with baroque equipment. They have to go one step further and structure, equi

entails more than just technology and modernization; it also incorporates how operations will be conducted, the nature of participants, and new ways of thinking. [18]

REVOLUTION IN MILITARY AFFAIRS

Military historians and theorists have linked previous instances of transformation with a Revolution in Military Affairs. This paper will use an adaptation of Colin Gray and Jeffrey Cooper's definitions of Revolution in Military Affairs, in that it constitutes a "radical change in the character or conduct of war" and/or "a discontinuous increase in military capability and effectiveness."[19]

Michael Roberts first coined the term 'Military Revolution' in 1955 at the University of Belfast. He hypothesized that a military revolution was prompted by the tactical innovations of Maurice of Nassau and Gustavus Adolphus of Sweden, dating from about 1560 to 1660.[20] He observed that their tactical innovation was based on "the use of linear formations of drilled musketeers had led to a massive increase in the size of armies, which in turn had dramatically heightened the impact of war on society." As a consequence, they created larger and more disciplined armies than had ever been seen before, making "it possible to execute more complex strategic plans."[21]

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[18] Michael Roi, "Briefing Note on Canadian Forces Modernization and Transformation." Directorate of Defence Analysis, Department of National Defence Headquarters, Ottawa. 4 November 2004.

[19] Colin S. Gray, *Strategy for Chaos: Revolutions in Military Affairs and the Evidence of History*. London: Frank Cass Publishers. 4. Also see Jeffrey R. Cooper, *Another View of the Revolution in Military Affairs*. Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, 15 July 1996. 21.

[20] Michael Roberts, "The Military Revolution, 1560-1660," in Clifford J, Rogers (ed.), *The Military revolution Debate: Readings on the Military Transformation of early Modern Europe*. Boulder, CO: Westview Press, 1995. 13-35.

[21] Clifford J. Rogers, "The Military Revolutions of the Hundred Years' War." *The Journal of Military History,* vol. 57. 1993; available from http://www.deremilitari.org/RESOURCES/ARTICLES/rogers.htm; Internet; accessed 23 November 2004. Also see Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800*. 2nd Ed. Cambridge: Cambridge University Press. 1996. i.

Roberts's concept of military revolution in early modern military history remained virtually unchallenged for two decades, until the release of the 'Parker Variation'.[22] Geoffrey Parker published his article "The Military Revolution, 1560–1660'—A Myth?" challenging the accepted view, [23] and observed that "early modern warfare involved far more sieges than battles, and that 'actions' between men with firearms in and around the trenches proved far more common than full-scale encounters decided by saber and lance in the field.[24] Since that time, the debate over what exactly constitutes a revolution in military affairs continues to this day. For the purposes of this paper, revolutions in military affairs will be bound by the following three criteria: "greater than simply technology, changes the nature of warfare, and strategically significant."[25]

The first and possibly most revealing fact for contemporary analysts is that technology alone does not drive change. Indeed, when considering other perspectives on revolution in military affairs, political scientist Colin Grey took particular exception to Andrew Krepinevich's definition, which emphasized the importance of technological advances as a precursor for revolution in military affairs.[26] Conversely, history has shown that technology, at best, functions as a catalyst. The markedly low-tech Vietnamese Communist Party was able to oust one great power, and later one

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[22] Jeremy Black, *A Military Revolution? Military Change and European Society 1550-1800*. London: Macmillan, 1991. 4-7.

[23] M. J. Petersen, The Air & Space Power Chronicles, Internet, available from http://www.airpower.maxwell.af.mil/airchronicles/bookrev/rogers.html; Internet; accessed 23 November 2004.

[24] Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800*. 2nd Ed. Cambridge: Cambridge University Press. 1996. 155.

[25] Dr Paul T. Mitchell, "The Revolution in Military Affairs," (lecture given to Canadian Forces College, Toronto, ON. 27 April 2005).

[26] Gray, *Strategy for Chaos…,* 4-5. For Dr Krepinevich's version of the definition of RMA, see Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, No. 37 (Fall 1994). 30-42.

superpower, by combining the revolutionary fanaticism of the French Revolution, with Soviet bureaucratic organization, and Chinese abetted xenophobic traditional culture.[27] Technology therefore cannot abolish war's central essence of Clausewitzian "friction, uncertainty, and of the clash of wills." [28] Processing power can no more replace discernment and moral courage at the strategic level than on the battlefield itself; "machines do not win battles, even if battles are won with machines – a very great difference." [29]

When the German armoured divisions broke through French defences in May 1940, they did not have the benefit of superior technology. The *Wehrmacht* tanks were only comparable, if not inferior to those of the French.[30] Which brings us to the second criterion, in that revolutions in military affairs change the nature of warfare. They often represent a coherent framework of doctrine and operational constructs, based upon highly pragmatic service cultures.[31] This is based on the services ability to glean lessons learned from operations and experimentation, in an attempt to provide some degree of coherence, to the otherwise chaotic nature of war. In order to encourage a learning environment, the *Reichswehr* laid the groundwork for the *Wehrmacht,* by nurturing a culture of honesty, and encouraged frank and "open discussion of the lessons of combat and exercise," albeit largely limited to the tactical and operational level. They placed high value on exercises,

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[27] Williamson Murray and Macgregor Knox, "Thinking about revolutions in warfare." In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 6-7.

[28] Carl von Clausewitz, *On War*. Ed and trans by Michael Howard and Peter Paret. Princeton, New Jersey: Princeton University Press, 1984. 80.

[29] *Ibid*.

[30] Murray and Knox, "The future behind us." 192-3.

[31] The pragmatism of militaries, particularly that of the post-cold war era U.S., was brought into question by A.J. Bacevich, "Preserving the Well Bred Horse," *The National Interest* No. 37. Fall 1994. 43-49. His concerns will be addressed in Chapter 3 of this paper.

particularly during times of budgetary restraint, with emphasis placed on the planning and their post exercise analysis. As such, their aim was to increase understanding of the tactics being employed, rather than "the validation of doctrine, concepts, or weapons systems." Ultimately, there is little benefit to exercises if no quantifiable action is taken to follow up on the lessons learned and implement necessary procedural changes. Should the after-action reports reveal limitations in doctrine or concepts, they too were amended accordingly.[32]

The third and final criterion for a successful revolution in military affairs is that they are strategically significant. Revolutions in military affairs should change the nature of war in both the military strategic and political context. As such, revolutions in military affairs are born of, and confined by, strategic limitations and ambition. They are often designed for a particular theatre of operations, to defeat a particular enemy. These innovations were successful because they were defined by the requirement to resolve issues with real or imminent adversaries. They used their actual or projected capabilities, with a view to the realization of their strategic aims in support of their overriding political ambitions.[33] As summarized by Rogers, "improvements in weapons and military organization do not consistently win battles unless employed as part of an effective tactical system, and strong tactics do no bring lasting victory unless military leaders first develop and implement strategies that create the right circumstances for their employment, then translate battlefield success into political results."[34]

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[32] Gray, *Strategy for Chaos…,* 139-140. and Murray and Knox. "The future behind us." 192-3.

[33] *Ibid.*

[34] Clifford J. Rogers, "As if a new sun had arisen: England's fourteenth-century RMA," In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 34.

Of all the revolutions in military affairs starting in early modern Europe, there were six pre-eminent ones that are highly illustrative of the three criteria. First was the Infantry Revolution of Edward III of England which saw "[t]he country's abrupt transformation from a third rate military power into the strongest and most admired martial nation in Europe." [35] Secondly, the improvements in artillery during the Hundred Years War, both qualitative and quantitative, resulted in the Artillery Revolution, with gunpowder weapons eclipsing "the long-standing superiority of the defensive in siege warfare."[36] The third was the Artillery Fortress Revolution, which witnessed the improvements to defensive works with their sunken profiles *a la trace italienne*.[37] The fourth, during the Napoleonic Revolution, "France led the way in a transformation of the character and conduct of *grande guerre* on land." The *levee en masse*, and establishment of army corps, permitted France to mount "armies of unprecedented size, [who prosecuted] campaigns of conquest through decisive manoeuvre and, usually, battle."[38] Fifth were the Inter-War Revolutions which saw the conceptualization of *Aufstragstaktik* and *blitzkrieg*. In that regard, the linear thinking that gave rise to the Maginot Line worked as designed, however the non-linear Germans simply drove around it.[39] The final

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[35] Rogers, "As if a new sun had arisen…," 15.

[36] Clifford J. Rogers, "The Military Revolutions of the Hundred Years' War." *The Journal of Military History,* vol. 57. 1993; available from http://www.deremilitari.org/RESOURCES/ARTICLES/rogers.htm; Internet; accessed 23 November 2004. See also Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800*. 2nd Ed. Cambridge: Cambridge University Press. 1996. 24.

[37] Parker, *The Military Revolution…,* 24-39. See also Rogers, "The Military Revolutions …" available from http://www.deremilitari.org/RESOURCES/ARTICLES/rogers.htm; Internet; accessed 23 November 2004.

[38] Gray, *Strategy for Chaos…,* 140.

[39] Williamson Murray, "May 1940: Contingency and Fragility of the German RMA." In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 154-174.

selection in this short list of revolutions in military affairs is the Nuclear Revolution. Futurists Alvin Toffler and Heidi Toffler point to the development of the atomic bomb as the epitome of mass destruction in total or absolute war.[40] Andrew Krepinevich, on the other hand, saw the Nuclear Revolution as the focusing of warfighting doctrines and organizations on the avoidance of war altogether, [41] however both viewpoints clearly categorize the introduction of the atomic bomb as a revolution in military affairs.

As this summary has illustrated, the interpretation and realization of revolutions in military affairs as indicators of important change; while instructive, is insufficient to ensure future success. The unconditional failure of the Third Reich on the Russian Front is one of many examples of how revolutions in military affairs; in this case *Blitzkrieg*, failed to guarantee the Germans strategic gains in that theatre of operations, largely due to a different context. All revolutions in military affairs give rise to a whole host of direct counter-measures and "asymmetrical responses."[42] This is, as Edward Luttwak defined, "the paradoxical logic of conflict."[43] Colin Gray also observed that, "[s]uccess today, may not mean success tomorrow if its sources become formulaic in the face of an enemy willing and able to learn from his own, and others mistakes. The idea of a 'winning formula' in strategy – understood narrowly as a plan of action – is an oxymoron. Any method that becomes a formula must invite and reward the development of

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[40] Alvin Toffler and Heidi Toffler, *War and Anti-War*. New York, NY: Warner Books, 1993.

[41] Elinor C. Sloan, *The Revolution in Military Affairs: Implications for Canada and NATO*. Montreal, QC: McGill-Queens University Press, 2002. 21-22. and Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, 37 (Fall 1994). 30-42.

[42] Murray and Knox, "The future behind us." 192-3.

[43] Edward N. Luttwak, *Strategy: The Logic of War and Peace*. Cambridge MA: Harvard University Press, 1987.

countervailing methods. It is surprising how frequently this elementary logic is neglected." [44]

MILITARY REVOLUTIONS

Consequently, attempts to use revolutions in military affairs as predictive tools in the formulation of national security strategy are somewhat lacking. In an attempt to discern a pattern of critical past revolutions, Williamson Murray built upon the work established by Clifford Rogers on Military Revolutions.[45] Murray posits that there are but five strategic military revolutions that brought about systematic changes in both international relations and domestic politics, and ultimately their societies. They all shared the characteristics that they were "uncontrollable, unpredictable, and unforeseeable; and their impact continues." [46] While Rogers saw revolutions in military affairs preceding military revolutions, Murray saw revolutions in military affairs as succeeding the more cataclysmic military revolutions, which being completely unforeseen, strike at the core of militaries and nations.[47]

The first military revolution proposed by Murray was the seventeenth century conception of the modern nation-state, based principally on the comprehensive reorganization of their militaries. The second and third occurred in the late eighteenth century, and were the French and Industrial Revolutions respectively. The former merged mass politics and warfare, into the *levee en masse*. France was able to mobilize national political and economic might, and wage warfare that for the first time resulted in the total

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[44] Gray. *Revolutions in Military Affairs …,* 8.

[45] Rogers, "The Military Revolutions …" available from http://www.deremilitari.org/RESOURCES/ARTICLES/rogers.htm; Internet; accessed 23 November 2004.

[46] Murray and Knox. "Thinking about Revolutions in Warfare." 7.

[47] Sloan, *The Revolution in Military Affairs…,* 22-23. and Murray and Knox. "Thinking about Revolutions in Warfare," 6. and "The Future Behind Us," 192.

destruction of an enemy on the battlefield. The Industrial Revolution, "made it possible to arm, clothe, feed, pay, and move swiftly to battle the resulting masses." Great Britain leveraged their financial and economic industrial capacity with mass production and centralized manufacturing, resulting in the largest 'big-gun' battle fleet in the world. [48]

According to Murray, the three previous military revolutions culminated in the fourth, the First World War. The Great War combined the French and Industrial revolutions and set the precedent for twentieth-century warfare. The three-dimensional battlespace was created here with the advent of combined arms tactics and operations. Signals intelligence, submarine warfare, and strategic bombing all got their start during this period.[49]

The fifth and final military revolution was the introduction of nuclear weapons. Mutually Assured Destruction (MAD) confirmed the bi-polar world and ushered in the Cold War. The nuclear weapons of the North Atlantic Treaty Organization (NATO) and the Soviet-led Warsaw Pact effectively ruled out the viability of another major European conflict, which had a subsidiary effect on regional balances of power worldwide. This led to increased lethality of conventional munitions, precision strike capabilities, and stealth; with the command and control enabled by computer networks.[50]

These military revolutions affected not only the states and their societies, but military organizations as well. Well beyond subordinate revolutions in military affairs, military revolutions ultimately delimited the nation-states' ability to establish and project military power. As such, third world states that have not yet dealt with the ramifications

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[48] Murray and Knox. "Thinking about Revolutions in Warfare." 6,13.

[49] *Ibid*. and Gray. *Revolutions in Military Affairs…,* 170-221.

[50] Murray and Knox. "Thinking about Revolutions in Warfare." 6,13.

of earlier military revolutions cannot easily maintain being a regional power simply by buying the latest technology, or learning the latest doctrine. The Iraqi Ba'ath Party used vast oil profits to procure significant holdings of Soviet and French equipment. But as witnessed during the 1991 conflict, their ability to buy material and equipment did not translate into an effective and modern armed force. Iraqi forces were "conscripted from a society that possessed neither a modern state, nor the solidarity and resilience generated through mass politics, nor the breadth and depth of technological skill common throughout societies that passed through the Industrial Revolution." [51]

Most of the examples discussed here, highlight the fundamental importance of strategy, political engagement, and synergy in the realization of a revolution in military affairs and military revolutions. Military revolutions and revolution in military affairs, like strategy, are "complex open system[s] whose several, even many, parts always function holistically." The symbiotic relationship between technology, doctrine, culture and geography, has a direct bearing on the degree of military success. Ultimately, that military success must contribute to "strategic effectiveness."[52]

As Clausewitz observed, "in war more than in any other subject we must begin by looking at the nature of the whole, for here more than elsewhere the part and the whole must always be thought of together."[53] Put into more recent context, strategic analyst Steven Metz offered, "the information revolution is increasing interconnectedness and

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[51] Murray and Knox. "Thinking about revolutions in warfare." 7.

[52] Gray. *Revolutions in Military Affairs …,* 118.

[53] Clausewitz. *On War*. 75.

escalating the pace of change in nearly every dimension of life. This in turn shapes the evolution of armed conflict."[54]

[54] Steven Metz. *Armed Conflict in the 21st Century: The Information Revolution an Post-modern Warfare*. Carlisle, PA: Strategic Studies Institute, US Army War College, April 2000. 2.

CHAPTER TWO – HOW AND WHY MILITARIES INNOVATE

In their analysis of innovation during the interwar period, military theorists Murray and Watts[55] considered the "technological, conceptual, operational, and organizational factors that underlay successful transformations during times of peace." They concluded that there were four factors common to successful transformation. The first was the importance of developing a future vision, and supporting transformational strategies, which are both conceptually balanced and grounded in operational reality. The second is the necessity of internal bureaucratic acceptance to achieve peacetime innovation, "as the potential for civilian or outside leadership to impose a new vision is, at best, limited." The third was the importance of institutional processes for exploring, testing, and collecting empirical evidence; and the ability to refine future concepts of operations. The final factor underlined the non-linear nature of transformation. As acknowledged by Defence Research Development Canada, "[c]hance, luck, non-linearity and pure serendipity are part and parcel of the transformative process. Transformation is unlikely to be tidy, and attempts to remove this aspect may be the surest way to kill the innovation necessary for successful transformation." In charting the way ahead for the Canadian Forces, they cite the requirement for, "a clear transformational vision along with the requisite intellectual atmosphere and institutional processes are necessary to maximize the chances for long-term success."[56]

The Canadian Forces, like most militaries, has historically been amenable to most ideas or inventions that offered a tangible advantage in combat, as in the adoption of the

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[55] Watts and Murray, "Military Innovation in Peacetime." 326-328.

[56] Defence Research Development Canada, "Transformation: Reading Package for the 2004 DRDC Manager's Workshop Transformation Session." March 30, 2004.

aeroplane, tank, combined arms tactics, and more recently, battlefield digitization. Obviously, any military that opts to minimize the loss of life and limb by way of an innovation, will usually become one of its most vocal proponents. Yet not all militaries realize the same successes in innovation, despite having access to the same technology. The difference lies in the employment of technology. Witness the evolution of the German *Blitzkrieg* tactics successfully exploiting the massing of armour in their Panzer corps during World War Two. France on the other hand, fielded *l'offence a l'outrance* yet suffered unequivocal defeat. Consequently, the fundamental issue is not one of whether militaries innovate, but more accurately under what circumstances and when. However, even when some militaries implement change, we have seen significantly different outcomes when designing doctrine to exploit new technology.[57]

EVOLUTIONARY INNOVATION

In contrast to other government departments, National Defence must continuously consider innovation in times of war and peace. Unlike conventional security forces, the military, is the court of last resort. As such, it must be ready for conflict at all times; against an unnamed adversary, in support of uncertain political criteria, in any theatre of operations. Ultimately, the Canadian Forces must be prepared to operate at a level of intensity that can never be fully reproduced in a training environment outside of actual hostilities. This creates a demand for a level of professionalism, moral courage, and character found in few, if any, other institutions. That in turn requires the military leadership to maintain a level of trust that transcends ordinary obedience. The "soldiers, sailors and airmen must remain steadfast in the face of terrifying conditions, while their

[57] Murray and Knox, "The Future Behind Us." 180.

psychological instinct for self-preservation urges them to flight. [However] disciplined organizations rarely place a high value on new and untried ideas, concepts, and innovations."[58] As a result change in the military is usually evolutionary, rather than revolutionary.

Governments place great stead in their militaries, as symbols of rational, determined support of national interest. As such, the governments, as indeed the militaries themselves, place a premium on their predictability and stability. [59] The evolutionary process of innovation in militaries is more often than not, a protracted, complex undertaking that engages "organizational cultures, strategic requirements, the international situation, and the capacity to learn realistic, honest lessons from past as well as present military experience." This incremental evolution of innovation is realized over extended periods during which time, "the tactics, equipment, and conceptions change on a gradual basis." [60] This perspective is supported by naval strategist Mahon who wrote, "The student will observe that changes in tactics have not only taken place *after* changes in weapons, which reasonably is the case, but that the interval between such changes has been unduly long."[61] The research done by Murray confirmed that the actual realization of innovation on a year-to-year basis is usually quite modest, but that over the course of time, incremental change can lead to quite significant change. This is reinforced by the findings of military theorist Clifford Rogers, who stated that, "[t]he length of the time

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[58] Williamson Murray, "Innovation: Past and Future." In *Military Innovation in the Interwar Period*. Williamson Murray and Allan R. Millett Eds. New York: Cambridge University Press, 1996. 301.

[59] Barry S. Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars*. Ithaca: Cornell University Press, 1984. 47.

[60] Murray, "Innovation: Past and Future." 308-309.

[61] A.T. Mahan, *Naval Strategy – Compared and Contrasted with the Principle and Practice of Military Operations on Land*. New York: Greenwood, 1975.

involved [in a revolution] can range from a year to a century, depending on the scope of the revolution – depending on whether it is a government, a social structure, an idea or an economy which is overturned…"[62] That was further reinforced by Richard Simpkin, who remarked, "an army is at root a social organization rather than a functional one. Even a small army is a very large organization by any standards…Thus an army by its very nature possesses an organizational inertia several times greater than its size would suggest."[63] Consequently, the extent of organizational change would depend more on that organization's focus over the long term, rather than a specific individual's ability to influence the direction of change in the short term. Therefore, military leadership would have the most influence on innovation by inculcating long-term cultural changes rather than seeking immediate short-term decisions.[64]

REVOLUTIONARY INNOVATION

By extension, revolutionary innovation should be more prevalent in organizations where determined leadership drives a specific transformational agenda. Recent examples of high-tech 'top-down' leadership demand that their proponents be equally knowledgeable about the technological and conceptual characteristics of their proposed innovation. These business leaders are brought by in their boards to achieve specific aims by design.[65] In the profession of arms however, Murray's research reveals that much of military history is chance. He cites the haphazard approach of finding the right man, at

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[62] Rogers, "The Military Revolutions …, 76.

[63] Simpkin, *Race to the Swift…,* 4-5.

[64] Murray, "Innovation: Past and Future." 308-309. What this observation means is that innovation displays the extreme sensitivity to current and initial conditions that gives rise to completely different outcomes and can spell the difference between successful innovation and failure. 375.

[65] Business sites on the Internet are replete with 'insights' on managing change. Change management theories quotes the web: looking for a winner, top-down approach, top-down critical to change, etc.

the right place, at the right time; further hampered by the unlikelihood for promotion, and inter-service politics. His examination of the inter-war period revealed a number of incidents of similar top-down leadership that had a "disastrous impact on the process of innovation." Ultimately, the lesson he drew from his examination of past and present innovations is that when organizations luck out with the right person, "top-down leadership will allow you to get it very, very right. If you get it wrong, however, you will get it very, very, wrong."[66]

ARCHITECTURAL INNOVATION

Architectural innovation argues that the traditional categorization of innovation as either incremental or radical is incomplete and potentially misleading. It defines innovations that change the architecture of a product without changing its components. As such, it seeks to explain how seemingly insignificant improvements in technology, can result in significant new doctrinal innovations. Architectural innovation is less flexible when organizations seek to implement doctrinal and technological innovation concurrently. Ultimately, architectural innovation seeks to explain why organizations that initially dominate a new technological field, can still fail by not fully exploiting the opportunity to evolve the doctrinal employment effectively. Unfortunately architectural innovation fails to adequately account for the highly nonlinear process of innovation, particularly during times of peace. [67]

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[66] Murray, "Innovation: Past and Future." 306-308. Murray cites several examples such as the RAF pursuit of two-seater Defiant aircraft over the Hurricanes and Spitfires, French *l'offence a l'outrance*, RAF strategic bombing etc.

[67] Rebecca M. Henderson and Kim B. Clark, "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms." *Administrative Science Quarterly,* 3 January 1990. Cornell University Graduate School of Management.

ORGANIZATIONAL AND DOCTRINAL INNOVATION

Grand strategy, and its subordinate military doctrines are defined by organizational theory.[68] Given the twin processes of institutionalization and technological specialization, the environment for innovation in military doctrine is inhospitable by design. According to organization theorists, hierarchical organizations influence their members' behaviour by distributing adequate power to ensure the completion of key tasks. As a direct consequence, members develop a "vested interest in the distribution of power and in the purposes it protects. Generally, it is not in the interests of most of an organization's members to promote or succumb to radical change." [69] Faced with the prospect of increased operational uncertainty, leaders will attempt to quickly re-establish standing procedures and programs. Military 11shou

when 11fidence declines and efficiency lags behind expectations. Innovation is difficult to achieve becausepit alters the status quo, and usually involves some degree of risk. It creates uncertainty due to the need to establish c11fidence in the new equipment, training and doctrine. "The military is naturally reluctant to discard historically reliable equipment e the battlefield advantag es of innovations have received a full, complete and objective test."[70]

As the court of last resort, a nation's military cannot be unavailable during times

doctrine to the new. “Under combat conditions, even a bad doctrine may be better than no doctrine.”[71] Technology that has not been proven in combat is unlikely to be able to serve as the catalyst for doctrinal innovation in and of itself. More often than not, militaries simply supplant new pieces of technology on top of the old ones using the same doctrine. As Bernard Brodie has noted, “Conservatism of the military, about which we hear so much, seems to have been confined to their adaptation to new weaponry rather than their acceptance of it.”[72] Consistent with organization theory, it follows that a new technology “will normally be assimilated to an old doctrine rather than stimulate change to a new one.” [73] Yet, despite the institutional barriers to change, militaries have been the source of many doctrinal innovations. As presciently noted by Clausewitz, militaries prefer the offence, [74] but defensive doctrine, [illegible] innovatio

organization is paramount. These militaries develop novel approaches to integrate emerging tactical doctrine and operating procedures, sometimes with the benefit of new technology. As such, they may also require time and sponsorship to see them through the necessary experimentation and simulation, which is not always successful. [75]

This approach requires an environment that is conducive to innovation, and an intellectual discourse "unfettered by dogma." Their impact at the strategic level is limited to the aggregate of operational successes that contribute to the larger strategic objectives, however tenuous.[76] As observed by Millet and Murray, "[m]istakes in operations and tactics can be corrected, but political and strategic mistakes live forever."[77] Given the complexity of combined systems innovations and potential impact of the high technological content of modern warfare, the ability of "one or two vocal visionaries" is insufficient to realize true transformation. Failing an institutional acceptance of innovative thinking, and an investment in higher risk enterprises by the military leadership, evolving the military will continue to be a series of half measures. Bureaucracies by their very nature "are not supposed to innovate,"[78] therefore attracting and retaining forward-thinking officers will continue to be a challenge.[79]

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[75] Murray and Knox, "The Future Behind Us." 180.

[76] *Ibid*.

[77] Allan R. Millett and Williamson Murray, "Lessons of War." *The National Interest*, Winter 1988/1989

[78] Steven P. Rosen, *Winning the Next War: Innovation and the Modern Military*. Ithaca, 1991. 2.

[79] Watts and Murray, "Military Innovation in Peacetime. 409.

> In the dreadful presence of suffering and danger, emotion can easily overwhelm intellectual conviction, and in this psychological fog it is so hard to form clear and concise insights that changes of view become more understandable and excusable. Action can never be based on anything firmer than instinct, a sensing of the truth.[80]
>
> Carl von Clausewitz

Historical examples of successful innovation demonstrate an "evidentiary-driven process such as the German Army and the US naval aviation community created after World War One." An intellectual atmosphere within the sub-cultures of the militaries involved drives this process. As shown by Murray and Watts, the ability of militaries to scrutinize their own performances in post-deployment reviews objectively and without recrimination are fundamental to substantive peacetime innovation. It is that willingness to leverage all experiences, including failures, and learn by them, that encourages novel approaches to problem solving as demonstrated by *Reichswehr* under Seeckt. [81]

The German practice of critical self-examination surpassed their lessons-learned processes of the Great War. They continued to formally review all their field manoeuvres in order to learn from their mistakes. Once again, their approach centered on novel approaches in the employment of new equipment and standing procedures. "They saw mistakes as a learning experience, not a cause for reproof."[82] Further encouragement to promote this frankness may be found in the propensity of militaries that 'hide' bad news during training, ultimately practice it during times of conflict as well. Watts and Murray found that "[t]he RAF's failure before and during the early years of World War II to deal with the problems of locating targets, much less accurately bombing them, would appear

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[80] Clausewitz, *On War*. 108.

[81] Watts and Murray, "Military Innovation in Peacetime." 411.

[82] Murray, "Innovation: Past and Future." Available from http://www.findarticles.com/p/articles/mi_m0KNN/is_34/ai_113052673; Internet; accessed 23 November 2004.

to be a graphic instance of this sort of intellectual 'bad habit' carrying over from peacetime to wartime." [83]

The Germans discovered that one of the principle components in nurturing meaningful innovation during the interwar period was the encouragement for officers to employ their imagination in the pursuit of potential innovations. They found that by institutionalizing an innovative approach to learning, their officers were far more effective in the development of innovative approaches than those, "where the values of military education never formed a significant portion of the officer's world view, the result was less successful or flawed innovation."[84] As Steven Rosen observed, "[p]eacetime innovation has been possible when senior military officers with traditional credentials, reacting not to intelligence about the enemy but to a structural change in the security environment, have acted to create a new promotion pathway for junior officers practicing a new way of war."[85]

It was not that the German inter-war leadership sought a new form of warfighting,

CIVILIAN-LED INNOVATION

Military crisis coupled with civilian intervention can also result in innovation. When military expectations are not met, the public may get angry or become afraid, and pressure may be placed on the military directly or indirectly. The government can become disappointed with the return on investment from one of the services and reallocate resources to another. This reallocation may provide the fiscal impetus for the other services to consider innovation. The penalized service will attempt to regain lost ground by attempting to transform itself as well. "Interservice rivalry in postwar America may have produced some benefits – a menu of innovations for policy-makers. Arguably, the interservice rivalry has been a major factor in … increased US security. Similarly, aggrandizement at the expense of another service may be motive for innovation." [88]

Barry Posen further suggests that civilian intervention into military doctrine is the prime motivation for innovation. While public engagement in military affairs would be a refreshing development, it also engenders some challenges as well. The current classification of security issues between the various government departments and National Defence is marked. Independent interest groups can have refreshing views on security approaches, but less likely to be able to articulate whole new doctrines. As a consequence, informed intervention would be largely dependant on their sources of military knowledge.[89] None of the established western world leaders are subservient to their militaries. "Civilians do affect military doctrine. Their intervention is often

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[88] Posen, *The Sources of Military Doctrine…,* 57.

[89] *Ibid*. and Russell F. Weigley, "Military Strategy and Civilian Leadership," in *Historical Dimensions of Security Problems*, ed. Klaus Knorr. Lawrence, KS: University Press of Kansas, 1976. 38-39.

responsible for the level of innovation and integration achieved in a given military doctrine." [90]

INNOVATION IN PRACTICE

As discussed, revolutionary innovation is somewhat the exception. Murray and Knox found that "most successful organizations avoided wild leaps into the future; their innovations remained closely tied to past experience, derived from conceptually sophisticated and honestly assessed experiment, and depended on the ability to learn from both success and failure." [91] By way of example, they point to Seekt's avoidance of the tendency to jump to conclusions, however pressing the issue, to emphasize the importance of the evolutionary nature of deliberate planning to cope with identifiable problems.[92]

The Germans' based their innovations on detailed analysis of past events. They principally employed open-ended experimentation exercises in which they tested their theories to the point of failure, rather than trying to shore up hypotheses or validate pet projects. They felt that factual observations and open communication between the superiors and their subordinates were essential components of experimentation. Instead of assigning blame, or condemning actions, the Germans' maintained unit focus on the principal aim of the experiments and exercises; which was "to improve the effectiveness of units and the service as a whole."[93]

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[90] Posen, *The Sources of Military Doctrine…,* 227.

[91] Murray and Knox, "The Future Behind Us." 185.

[92] *Ibid*.

[93] *Ibid*. 188.

Military forces depend on adherence to policies and procedures for good reason. They practice their procedures during exercises, not only to facilitate planning, but to ensure their forces continue to function in circumstances of extreme stress. An unintended consequence of this practice however, is a reluctance for forces to undergo procedural change. When confronted with doctrinal innovation, service personnel are taken out of their comfort zone.

> Change encounters less obstacles shortly before the outbreak of a war … A danger sensed by all muffles the voice of intrigue, and the innovation appears as a smaller evil that must be accepted to avoid a greater. [94]
>
> Friedrich von Decken, 1800

The inter-war French forces clung to their offensive doctrine rather than implementing previously identified and necessary defensive measures. Prior to adopting the Maginot Line, the French under Petain, acknowledged the requirement for defence in depth. [95] "By the late 1930s, [under Marshal Foch], the French however had largely abandoned such understanding in favour of a rigidity in defensive tactics that mirrored their approach to offensive war."[96] That 'rigidity' was exacerbated by their proclivity to suppress any questioning of commonly held truths, doctrine, or lessons learned initiatives like their German counterparts.[97] For that matter, the British Army did not appreciate the benefits of instilling best practices via a 'lessons learned' mechanism either. Neither they nor the French pursued institutional learning based on their battle experiences. As a

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[94] Friedrich von Decken, a Hanoverian staff officer under Wellington. As quoted in Byron E. Greenwald, "The Anatomy of Change: Why Armies Succeed or Fail at Transformation," *The Land Warfare Papers* No. 35. Arlington, VA: The Association of the United States Army, September 2000. 11.

[95] Robert Doughty, *The Seeds of Disaster: The Development of French Army Doctrine, 1919-1939*. Hamden, CT. 54.

[96] Murray, "Innovation: Past and Future." 322.

[97] *Ibid*. 323.

consequence, 'lessons from the front', both good and bad, were never incorporated into the training of recruits " preparing to go into combat for the first time."[98]

The French and British armies sought to reduce the uncertainty of battle by pursuing an offensive doctrine. By seeking the offense, armies attempt to retain the initiative, and hence, a degree of control over the unfolding of the battle. That allows them to exercise their 'standard scenarios' while denying their adversary the same. For the troops to prepare for the envisioned scenario, they must first have standardized drills and procedures. Therefore, militaries nurture a degree of conformity, and compliance in their forces. This provides the side holding the initiative, time to exploit the confusion created in the enemy, thereby furthering their advantage and enhancing their own chances of ultimate success. "Taking the offensive, exercising the initiative, is a way of structuring the battle." [99]

There are also hazards in basing future actions on experiments, exercises and even past experiences. Firstly, even with modern technology, it is virtually impossible to accurately reproduce the horror of war during times of peace. While militaries can exercise in uncertain conditions with imperfect information, transferring the Clausewitzian friction and fog of war to computer simulation can never be entirely accurate. Even the best recalled accounts of historical battles must be viewed with a certain degree of suspicion. It is in this environment that military innovation attempts to distil the right lessons from experiences shaped by chance and non-linear actions down into their simplest forms. In assessing past innovations, it is difficult to gauge the impact

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[98] Williamson Murray, " British Military Effectiveness: the World War II Experience," in *Military Effectiveness*, ed. by Alan Millett and Williamson Murray, vol 3, 90-136.

[99] Posen, *The Sources of Military Doctrine…,* 48.

of improvements in weaponry as compared to the doctrinal or educational advances. The most benefit can be derived through a holistic systems analysis.[100]

CULTURAL INFLUENCES ON INNOVATION

The organizational culture of militaries is such that, out of fiscal necessity, they undertake change very assiduously during times of peace. This military culture can be related in part to the sum of the intellectual, professional, and traditional values of its officer corps. These professional values play a central role in how officers assess the external environment, and how they optimize the possible responses to 'the threat'.[101] Despite these shared challenges, several militaries were able to innovate successfully during the interwar period, while others, failed miserably. Of the many factors common to most successful innovations, the pre-eminent factor is that of military culture. Military culture can be defined as the sum of the intellectual, professional, and traditional values promoted by an officer corps. It forms the underpinning of how officers assess their external milieu, and the way they respond to threats. As such, it is fundamental to how militaries innovate in preparation for war.[102]

> The utility of military history as a vehicle for inculcating soldiers with the military's professional ethic breeds a romantic attachment to the equipment and doctrine of its history. Thus, part of the military's resistance to change may stem from its efforts to instil pride, foster unit cohesion, and improve military effectiveness.[103]

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[100] Murray, "Innovation: Past and Future." Available from. http://www.findarticles.com/p/articles/mi_m0KNN/is_34/ai_113052673; Internet; accessed 23 November 2004.

[101] Samuel Huntington, *The Soldier and the State, The Theory and Politics of Civil-Military Relations*. Cambridge, Massachusetts. 1957.

[102] Murray, "Innovation: Past and Future." Available from. http://www.findarticles.com/p/articles/mi_m0KNN/is_34/ai_113052673; Internet; accessed 23 November 2004.

[103] Greenwald, "The Anatomy of Change…," 11.

This military culture is an essential element for successful innovation for armed forces preparing themselves for combat. As Murray noted, there are a number of complex factors that influence military cultures. First of all, it is rarely the case, if ever, for militaries to innovate with a clear slate. The replacement of legacy systems when restrained by responsibilities of tradition can block innovation. This clearly is not without reason. The lessons learned from both the successes and failures of previous battles were often derived at a significant cost in 'blood and fortune'. As a direct consequence, military cultures have tended to change slowly, particularly during times of peace. Murray takes issue with military historians' oft quoted axiom 'that generals prepare for the last war', and their hypothesis that this is the reason militaries have difficulty adapting to the challenges of the next conflict. Murray contends that "most armies do nothing of the kind, and because they have not distilled the lessons of the last war, they end up repeating most of the same mistakes." [104] He cites the example of how the Germans, the most successful in developing innovative defensive and offensive tactics in World War I, ensured that a thorough study be conducted. They ensured that the *Reichswehr* maintained a firm grasp of what had transpired, and stayed abreast of the developments in emerging land warfare. The fundamental German approach was the examination of errors or troubles experienced when fielding new equipment or procedures. The *Reichswehr* considered these inconveniences as an integral part of professional development, not as personal transgressions or shortcomings on the part of their officers. This enabled them "to see the forest for the trees and change the context of

[104] Murray, "Innovation: Past and Future. 312-315.

offensive war." [105] The net result was their decisive victory in the French Campaign. The Reichswehr's ability to distinguish between problems with training and doctrine from individual limitations was the principle factor in facilitating German consistent successes in "tactical operations, and most of the time at the operational level as well, throughout World War Two."[106]

Unfortunately, this was not the approach practiced by the British Army or its colonies. The Commonwealth remained honour bound to the cultural traditions of its component regiments. As Michael Howard suggested, "[t]he evidence is strong that the army was still firmly geared to the pace and perspective of regimental soldiering as it had been before 1914; that too many of its members looked on soldiering as an agreeable and honourable occupation rather than as a serious profession demanding no less intellectual dedication that that of a doctor, the lawyer or the engineer."[107] This was further reinforced by Barry Posen's observations that, "[t]hese values are inimical to innovation. Individuals within organizations develop personal stakes in particular elements of their organizations. They have little interest in change. For these reasons, students of organizational behaviour have more frequently addressed incremental change than innovation." [108]

That military ethos provided for the Prusso-German advances in warfighting that had evolved over a century. Their commanders had to be encouraged to devolve their authority, thus allowing their subordinate commanders the freedom to prosecute the battle

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[105] Murray, "Innovation: Past and Future. 312-315.

[106] *Ibid.*.

[107] Michael Howard, "The Liddell Hart Memoirs," *The Journal of the Royal United Services Institute*, February 1966. 61.

[108] Posen, *The Sources of Military Doctrine…,* 47.

in keeping with the overall intent. This unprecedented and largely counterintuitive step, was expanded beyond the junior officers to the senior non-commissioned members. This required new doctrine, schooling and exercises to encourage the judicious use of their newfound latitude to manoeuvre. The aim, as stated by Hans von Scheeckt in 1921, was to make "of each individual member of the army a soldier who, in character, capability, and knowledge, is self-reliant, self-confident, dedicated, and joyful in taking responsibility (*verantwortungsfreudig*) as a man and as a military leader."[109] In short, military culture can serve as an impediment, or an essential element of innovation.

FISCAL INFLUENCES ON INNOVATION

The costs of establishing and maintaining a nation's security are profound. As former United States Secretary of Defence, Casper Weinberger remarked, "[w]e can never afford to buy the capabilities sufficient to meet all of our commitments with one hundred percent confidence."[110] While domestic economies may benefit from defence expenditures, the costs associated with modern peace support operations or other limited forms of warfare can be problematic. "The development of the state as a fiscal entity was thus related to the type of military activity in which it was engaged."[111] The high personnel and maintenance costs of recruiting, training, equipping and projecting a large military force during times of relative peace, can be debilitating. Consequently,

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[109] Williamson Murray, "May 1940: Contingency and fragility of the German RMA." In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 160-1.

[110] Casper W. Weinberger, " U.S. Defence Strategy," *Foreign Affairs*, Vol 64, no. 4, Spring 1986. 678.

[111] I.A.A. Thompson, ' "Money, money and yet more money!" Finance, the fiscal-state, and the military revolution: Spain 1500-1650', in Clifford J. Rogers ed., *Military Revolution Debate*, Boulder:, 1995. 290.

governments, with good reason, seek economies from their militaries where possible.[112] The introduction of business management models in 1961 by United States Secretary of Defence McNamara, however, had a disastrous effect on group morale and cohesion. According to General Sir John Hackett's assessment, "[s]oldiers came more and more to be treated as impersonal items in an inventory, … [officer's] careers often came to be seen as more important than the units in which they were developed."[113] Trying to apply business models indiscriminately may result in unreasonable, and perhaps lethal consequences. In the case of the United States involvement in Vietnam, "[q]uantitative indicators of theoretical efficiency were not merely irrelevant to battlefield effectiveness, but its mortal enemy."[114] The conduct of warfare always entails massive expenditures, but underinvestment in intellectual capital and framed by common sense, will ultimately prove to be even more costly. "Finally, as the case of Anglo-American theories of strategic bombardment underscores, the adverse consequences of military theories unchecked by evidence, or based on fundamental misunderstanding of combat processes, can be extremely costly in both blood and treasure when put to the test of combat." [115]

Fiscal prudence on the part of militaries is a fundamental of good governance, however commanders must be the final arbiters when weighing effectiveness against efficiency.

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[112] Government of Canada, Report of the Auditor General, "National Defence - The Proper Conduct of Business." Ch. 12. 2001. Available from http://www.oag-bvg.gc.ca/domino/reports.nsf/html/0112ce.html#ch12hd3s; Internet; accessed 5 October 2004.

[113] John W. Hackett, *The Profession of Arms.* London: Sidgwick & Jackson, 1984. 194-195.

[114] Murray and Knox, "The Future Behind Us." 192.

[115] Watts and Murray, "Military Innovation in Peacetime." 412.

GEOGRAPHIC INFLUENCES ON INNOVATION

Geography plays an important role in innovation as well. Historically, geography has had a great influence on individual services' priorities, and their ways and means to shape their respective battlespace. The United States and Japan's development of amphibious warfare, was shaped in their mutual strategic dependence on the Pacific Ocean, both militarily and economically. The Allies steadfast belief in strategic bombing, largely on the part of British and American aviators, was facilitated by their virtual exemption from land-based threats unlike the other continental powers. Similarly, it is not surprising that the Germans, whose focus was largely land centric, applied the lessons learned from the Great War, to develop manoeuvrist doctrine so as to avoid the horrific losses and the virtual stalemate of trench warfare.[116]

INDUSTRIAL INFLUENCES ON INNOVATION

Contrary to popular opinion, technological advances have not simplified war, they have rendered it that much more complicated. With each "new scientific development, each new weapons system (a notion born, if not fully exploited, in the war of 1914-18) demanded fresh thought and ever-greater tactical, technical, and logistical expertise."[117]

Following the collapse of the Soviet Union, more and more defence industries are being consolidated into fewer and fewer multi-national consortiums. With the exception of the United States, defence budgets are shrinking, and militaries world-wide are rationalising their standing inventories. Increasing numbers of western nations have been cashing in their so-called 'peace dividend.' As a consequence, the defence industry has responded to the reduced demand, and will now only produce for assured markets.

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[116] Murray, "Innovation: Past and Future." 304.

[117] Murray and Knox, "The Future Behind Us." 176-177.

Legacy system defence industries have vested interest in attempting to maintain their market share by preserving the status quo, which requires no expensive re-tooling, or training of personnel. "There are naturally constituent pressures applied by the industrial half of the military-industrial complex which are usually focused on legacy systems."[118] Concurrent with reduced demand overall, militaries are slowly responding to the more 'visible' threat of terrorism, and mitigating other threats lower down the spectrum of conflict, with more rapidly deployable medium and light forces.[119]

As a result of the defence reforms initiated in the late 1990s, coupled with fewer players capable of pulling together major capital projects, has resulted in "a small number of mega-primes that can provide comprehensive systems integration and management capabilities." [120] Proponents of this development cite the complexity and cost of integrating emerging technologies into viable systems, coupled with merging new systems into legacy ones. Underpinning new systems architectures are revitalized government-private sector collaborations. Transformational initiatives are ultimately sustained by government procurement. As such, integrating industry as part of a comprehensive approach to innovation is "not only desirable, but essential."[121] The 'mega-primes', in direct consultation with government, will establish, "system of systems, or a group of system capabilities, … to be networked in creating an evolving

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[118] Joseph I. Lieberman, "Techno-Warfare: Innovation and Military R&D." *Joint Forces Quarterly*, Summer 1999. 16-17. Available from: http://www.dtic.mil/doctrine/jel/jfq_pubs/0522.pdf; Internet; accessed 12 November 2004.

[119] Robbin F. Laird, "Transformation and the Defence Industrial Base: A New Model." *Defence Horizons*. Center for Technology and National Security Policy. May 2003. 2.

[120] *Ibid*.

[121] Robert Wagner, "Security Planning and Military Transformation after Iraqi Freedom," 34th IFPA-Fletcher Conference on National Security Strategy and Policy. 3 December 2003. 22. LGen Wagner was the Deputy Commander of USJFCOM at the time.

synergistic joint and combined capability." [122] More recent western military-industrial collaborations, "ha[ve] shown that if the customer and designers share in all product development decisions from the initial design, the degree of innovation is much higher, the product acceptance rate is much greater, and the pace of technological change is much faster." [123]

Using this collaborative approach in determining, and ultimately fulfilling requirements, governments define the system of systems approach to be used in each security domain, be they domestic or international. This approach positions the prime-contractor as a systems manager within the larger system of systems architecture. Individual corporations initially shoulder some of the research and development burden, as well as the seamless integration of their system into the larger matrix. The incentive for the various firms participating in the venture, is not the initial building of the system, but the increased profitability "in the second phase in which it manages the system architecture." [124] So the firms working in conjunction with the prime-contractor, no longer simply provide parts for a specific platform; they provide systems and the respective subsystem elements and components of a capability. All parties share some risk in this systems of systems approach in the provision of national security. Firms risk venture capital on potentially high pay-off long-term projects. Governments assume risk in turn, by employing private sector expertise in order to exploit potential efficiencies. [125]

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[122] Laird, "Transformation and the Defence Industrial Base…" 2.

[123] Lieberman, "Techno-Warfare …," 16-17. Available from: http://www.dtic.mil/doctrine/jel/jfq_pubs/0522.pdf; Internet; accessed 12 November 2004.

[124] Laird, "Transformation and the Defence Industrial Base …," 2.

[125] *Ibid.*

One of the advantages of the system of systems design is the ability to quantify macro levels effects and establish verifiable levels of performance of competitive concepts by using modeling and simulation and experimentation. The added benefit establishing quantifiable effects is that military capabilities may become scalable in accordance with the threat and the level of conflict. Leveraging existing technology in a system of systems approach can further enhance military capabilities. Command and control, communications, computers and information networks are no longer reliant upon massive infrastructures, thus enhancing their mobility, functionality and survivability. "Autonomous robotic systems; precision direct and indirect fires; airborne and ground organic sensor packages; precision, three-dimensional air defence; and non-lethal and adverse-weather reconnaissance, surveillance, targeting, and acquisition," can all be improved in a systems approach. [126]

Not only does a systems-based approach have the potential to encourage like-minded nations, or alliance members to contribute in a meaningful way to international peace and security, but they will benefit economically as well. An enhanced defence industrial model improves opportunities for multi-national collaboration on various systems that may further nurture cooperation and assuage concerns of national prerogative. Laird posits that the development and management of the systems architecture would likely be restricted to an American or European Union model. "But with regard to systems and subsystems capabilities plugging into architectures and system of systems approaches, European, Asian, and American firms could contribute

[126] Laird, "Transformation and the Defence Industrial Base …," 4.

equally to American or Allied capabilities." [127] It is precisely the capabilities provided by those systems and subsystems, which serve to improve collective operations. "Interactive military transformation would be the result."[128]

Unfortunately, this leads to the reality that once the new system is in place, it becomes profitable for the commercial interests and nations involved. As was the case for the preceding legacy systems, this results in a disincentive for governments and contractors to innovate. Having obviated potential risks involved in sustained production of established platforms, manufacturers are "virtually guaranteed profits." The only subsequent government disbursements are for contractors to maintain and upgrade existing systems, not develop new ones. As such, there is higher risk for firms to expend limited capital on research and development on new ventures. Consequently, many firms live in the here and now, focusing on short-term returns for their stakeholders. [129]

Bearing that reality in mind, medium and long-term technologies and capabilities need a clearly identified market, with the obvious stakeholders being the governments and the people for whom they serve. Regrettably however, some governments' strategic vision will only last until the next opinion poll, which in some cases will relate more to preserving existing outmoded platforms and infrastructure. As such, the road to realization of a genuinely innovative system is fraught with peril. Potentially innovative firms risk significant losses if their proof of concept fails, or if there is no market. It follows then, that a specific office within the Department of National Defence must serve as the champion for innovation. That entity would have to be able to "capitalize on novel

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[127] Laird, "Transformation and the Defence Industrial Base …," 6.

[128] *Ibid*.

[129] Lieberman, "Techno-Warfare…," 16-17. Available from http://www.dtic.mil/doctrine/jel/jfq_pubs/0522.pdf; Internet; Accessed on 12 November 2004.

technologies," and promote their rapid "incorporat[ion] into our organizations, doctrine, or systems." [130]

As remarked by defence industrial analyst Robbin Laird, "[t]he key test of transformation is what happens with land power." He lists several criteria to test the degree of innovational success militaries are experiencing. The first measure is how quickly and effectively new capabilities of a global force are fielded into deployed capabilities. The second measure is the degree of integration of joint and combined initiatives; and finally the authority "land forces have [to direct] other elements of joint power in operating on a global basis to ensure effective military operations."[131]

POLITICAL INFLUENCES ON INNOVATION

Innovation occurs at all levels, from the strategic to the tactical. The most problematic are those that manifest themselves in the political realm, resulting in a disruption in the balance of power; which in turn facilitates war. With the advent of total war in 1792, the French Revolution and the Napoleonic era, "fundamentally altered the rules and unleashed a period of nearly 25 years of constant war." [132] As Clausewitz observed:

> War, untrammelled by any conventional restraints, had broken loose in all its elemental fury. This was due to the people's new share in these great affairs of state; and their participation, in turn, resulted partly from the impact that the revolution had on the internal conditions of every state and partly from the danger that France posed to everyone.[133]

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[130] Lieberman, "Techno-Warfare…," 16-17. Available from http://www.dtic.mil/doctrine/jel/jfq_pubs/0522.pdf; Internet; Accessed on 12 November 2004.

[131] Laird, "Transformation and the Defence Industrial Base…," 4.

[132] Murray, "Innovation: Past and Future." 304.

[133] Clausewitz, *On War*. 592-3.

Great leaders with a clear vision are insufficient to guarantee that their organization will successfully innovate their equipment and doctrine, no matter how pressing. Watts and Murray's research shows that military leaders' transformational vision "must also be balanced and well connected to operational realities."[134] It follows that individual nations, even within alliances, may have significantly different interpretations of international activities and agendas. These in turn will shape the degree and the extent to which those nations will innovate.

> No amount of operational virtuosity… redeemed fundamental flaws in political judgement. Whether policy shaped strategy or strategic imperatives drove policy was irrelevant. Miscalculations in both led to defeat, and any combination of politico-strategic error had disastrous results… This is because it is more important to make correct decisions at the political and strategic level than it is at the operational and tactical level. Mistakes in operations and tactics can be corrected, but political and strategic mistakes live forever.[135]

One of the defining features of western democracies is civilian control over their militaries. Accordingly, the greater the scale of innovation or transformation being undertaken, the greater the involvement of their respective governments. J.C. Fuller and Liddell Hart both sharply criticised the British Army's failure to innovate with tanks. However, the army's preparations for the war were completely in keeping with the British government's strategic assessment of potential threats. Murray cites the "failure to prepare for a mobile, high-density armoured war in fact reflected the very strategy of 'limited liability' that Liddell Hart spent so much of the 1930s propagandizing."[136]

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[134] Watts and Murray, "Military Innovation in Peacetime." 407.

[135] Millett and Murray, "Lessons of War." 37.

[136] Murray, "Innovation: Past and Future." 305.

STRATEGIC INFLUENCES ON INNOVATION

In their examination of the inter-war years, Millett and Murray identified some enduring themes from the successes and failures of military innovation during that era. Most successful innovations have one point in common; the attainment of a national strategic objective in the resolution of specific military problem. The best example they offer is the concurrent development of the aircraft carrier by both the United States and Japanese navies. They both wanted to extend their strategic reach and enhance the ability of their battle fleets to strike anywhere in the Pacific archipelago. The urgency of which was that they recognized the threat posed by the other and that the portent for war was looming. By extension, the fact that the United States considered Japan a threat in this arena helped focus the advances in amphibious warfare undertaken by the United States Marine Corps. [137] The perspective of European nations was to extend their reach by land-based aviation, a far more cost-effective and less risky option. Their navies remained focussed on the ability to exercise sea control over their territorial waters, and eventually, the Mediterranean Sea. At that time, Germany and Italy in particular, could not rationalize the increased cost and risk associated with carrier warfare. In the case of the United Kingdom, the development of carrier-based aviation was a moot point. Most of the Royal Navy airmen had been transferred to the Royal Air Force in 1918, rendering the transformation undertaken by the Americans and Japanese almost impossible. Unfortunately, some staff were willing to disregard history or distort findings so as to validate existing doctrine and beliefs. In this instance, the British air staff in 1924 acknowledged some reservations in the application of ‘lessons learned’ in a

[137] Murray, “Innovation: Past and Future.” 310-11.

memorandum to the Chiefs of Staff Committee. "This staff study argued that the forces employed in attacking an enemy nation,

> can either bomb military objectives in populated areas from the beginning of a war, with the objective of obtaining a decision by moral effect which such attacks will produce, and by the serious dislocation of the normal life of the country, or, alternatively, they can be used in the first instance to attack enemy aerodromes with a view to gaining some measure of air superiority and, when this has been gained, can be changed over to the direct attack on the nation. The latter alternative is the method which the lessons of military history seem to recommend, but the air staff are convinced that the former is the correct one.[138]

The importance of strategic influence on innovation is so telling that it becomes a defining element of transformation. "Our conclusion, therefore, is that one precondition for significant military innovation is a concrete problem which the military intuitions involved have vital interests in solving."[139]

UNSUCCESSFUL REVOLUTIONS

The pursuit of a revolution in military affairs is no guarantee of success. In the late 1950s, the United States was experiencing 'concrete problems' following the war in Korea, "technology, changing views of the nature of war, and the fiscal principles of the Eisenhower administration produced widespread doubts about the utility of traditional land forces." [140] The United States Army reorganized to fight on the atomic battlefield

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[138] Air Staff Memorandum IIA, PRO, AIR 20/40, March 1924. As quoted in Murray. "Innovation: Past and Future." 320.

[139] Williamson Murray, *The Change in the European Balance of Power, The Path to Ruin*. Princeton, New Jersey: Princeton University Press, 1984. 45-47 and 115-117. and Murray. "Innovation: Past and Future." 320.

[140] A.J. Bacevich, *The Pentomic Era: the U.S. Army between Korea and Vietnam*. Washington: National Defence University Press, 1986. 142-143. "The incessant emphasis on technology was little more than an artful dodge concealing the emptiness of the Army's thinking. The futurists who proclaimed that changing technology was reshaping the face of warfare succeeded only in laying the Service open to doctrinal fads. The contrast between the Army's attitude toward strategic and tactical nuclear weapons provides the best illustration." The Army leadership "fashioned a critique of strategic nuclear weapons that was thorough, cogent and wise. Convinced nevertheless, that tactical variants of nuclear weapons would be helpful in preserving the Army's legitimacy, these same soldiers rebuilt the Service around missiles and low-yield nuclear weapons and plunged into the ill-conceived, unrealistic Pentomic experiment." 147-150.

using units of five: "five platoons per company, five companies per battle group, up to the newly christened 'Pentomic' division." [141] By 1961, the Army had fielded the XM-29 (Davy Crockett) weapon system. Looking similar to a recoilless rifle mounted on a jeep, it gave *battalion*-level commanders the ability to launch a 150 pound rocket-propelled nuclear warhead 1.25 miles. President Kennedy succeeded Eisenhower in 1961 and implemented the concept of 'Flexible Response'. The "Army abandoned its 1950s initiatives with almost unseemly haste." [142] By the mid-1970s, Active Defence had superceded Vietnam's Counter-Insurgency Warfare, only to be replaced in quick succession by AirLand Battle, and then Light Infantry.[143]

The misemployment of weapons was not unique in history. When machine guns were first deployed by Britain, they were emplaced next to the artillery in an indirect fire role. That resulted in this tremendous innovation being squandered, and ultimately destroyed by counter-battery fire. The British ended up shelving the machine-gun in the late 1800s. The acrimony towards it was so great, that J.F.C. Fuller was reprimanded for writing a staff paper extolling the virtues of the machine gun in 1910. It was not until 1918, that American factories mass-produced them for Britain, unfortunately too late to help in the Great War.[144]

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[141] *Ibid*. 142-143.

[142] Bacevich, *The Pentomic Era…,* 3-5

[143] *Ibid.* 147-150.

[144] John Ellis, *The Social History of the Machine Gun*. London: PIMLICO, 1976. 56-76, 178. "In response to the machine gun the tank was developed and mechanized warfare advanced one stage further. Increasingly the quality of a country's weaponry and the capacity of its industrial output became the determinants of success, rather than any will to win born of idealism, faith or personal self-respect. This dehumanization of war has continued unabated. On the conventional battlefield men are increasingly being replaced by electronic devices."

After reviewing the many factors that are considered in innovation, perhaps the best summation has been provided by Sir Michael Howard. He considers there are but three conditions that, "underwrite any military innovation, particularly in peacetime – technical feasibility, operational [/strategic] requirement and financial capability."[145]

[145] Michael Howard, "Military Science in an Age of Peace," *Journal of the Royal United Services Institute for Defence Studies*. March 1974. 3-9.

CHAPTER THREE – AMERICAN REVOLUTION IN MILITARY AFFAIRS OR TRANSFORMATION?

Following the collapse of the Iron Curtain, the United States has emerged as the sole global superpower, with arguably the only military capable of projecting, and sustaining, a credible expeditionary force anywhere in the world. While the United States may be unrivalled in power projection, there is an increasing body of research that points to indicators that "military pre-eminence based on perfected industrial age warfare will have dubious value in the new information age." [146] The term 'American Way of War' was coined in 1998 by Cebrowski and Gartska in their article, "Network-Centric Warfare: Its Origins and Future."[147] The fundamental weakness with this approach is that it advocates using emerging technology and new networks with old doctrine; thus achieving the same ends, only more efficiently. As Pentagon analyst Thomas Barnett observed, "I saw all this great technology being put to seemly very old uses …net-centric warfare …was lots of power in search of moral principle." [148] Regardless, just the technological advantages of network-centric warfare will still provide the United States a marked advantage for the foreseeable future. As Canada's principal ally, an understanding of the American perspective and ongoing transformational initiatives is crucial.

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[146] James L. Boling, "Rapid Decisive Operations: The Emperor's New Clothes of Modern Warfare"; available from http://www.ndu.edu/inss/books/Books_2002/Essays2002/05_ch03.htm; Internet; accessed 12 November 2004. There is also a wide body of business literature based on the work on disruptive innovation by Clayton Christensen.

[147] Arthur K. Cebrowski and John J. Gartska, "Network-Centric Warfare: Its Origins and Future." *Proceedings of the U.S. Naval Institute*, January 1998. 28-35.

[148] Thomas P.M. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-first Century.* New York, NY: Penguin, 2004. 328.

AN AMERICAN REVOLUTION IN MILITARY AFFAIRS?

Interestingly, many power brokers in the current United States Administration in general, and the Department of Defense in particular, continue to use the terms of technological innovation and transformation almost synonymously. To this end the United States, as *primus inter pares*, has devoted considerable time and energy in advancing the pursuit of what some observers have characterized as the "American Revolution in Military Affairs." The categorization of the potential ongoing revolution in military affairs as being an entity, or being solely American is misleading. In his testimony before the United States Senate Armed Services Committee, Andrew Krepinevich clarified several misconceptions about an American revolution in military affairs, and made clear the distinctions between innovation, revolution in military affairs, and transformation. He was equally direct in his assessment the transformational approach of the Joint Staff, "Regrettably, the current Joint vision statement [*Joint Vision 2010*] does not present … a compelling vision… Indeed, stripped of their adjectives, the characteristics of effective 'maneuver,' 'engagement,' 'logistics' and 'protection' would be those desired by *any* military organization, in *any* era." [149] If revolutions in military affairs are reduced to the process of administering innovation, the primacy of civil government is lost. Revolutions in military affairs cannot become mere procedures devoid of any political context. "Great RMAs are made by people with powerful and

[149] A.F. Krepinevich, "Defence Transformation" Transcript of Testimony Before the United States Senate Committee on Armed Services. April 9, 2002.; available from http://www.au.af.mil/au/awc/awcgate/transformation/krepinevich.pdf; Internet; accessed 12 February 2005. Dr Krepinevich was testifying before the committee in his capacity of Executive Director of the Center for Strategic and Budgetary Assessments at the time. Transformation can be thought of as innovation on a grand scale. … Periods of military transformation are typically associated with a revolution in military affairs, or an RMA, in which a combination of technology, warfighting concepts and organizational change combine to bring about a dramatic leap in military effectiveness… Transformation is not a "monopoly" of the United States military… Transformation is *not* synonymous with a revolution in military affairs. (Emphasis in original)

generally quite specific political motives, even if the process of innovation includes a lengthy period of gestation, experiment, and evaluation in peacetime."[150]

Some observers have characterized the United States' approach as the "quest for the Holy Grail of 'dominant battlespace knowledge,' while ignoring the persistence of friction on the modern battlefield."[151] Military historian Andrew Bacevich was even less charitable in his dismissal of the American revolution in military affairs as "techno-chic." He pronounced that,

> [i]n embracing technology as their chosen instrument for salvaging their profession, soldiers are willfully blinding themselves to other powerful elements that shape warfare …[A] military establishment fixated by revolution is more truly engaged in an effort to evade the past.[152]

Proponents of the proposed technical 'silver bullet', or 'American revolution in military affairs', to countering the threats to the United States national security have little historical evidence to substantiate their hypothesis. Perhaps the most graphic proof of this concept occurred during the United States Civil War. It was the harbinger of the horrific attrition of protracted battle to be experienced during the First World War, despite many new technological innovations. "But since both [the Union and Confederate Armies] made extensive use of these new technologies, the prized asymmetry of the Pentagon-

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[150] Colin S. Gray. *Revolutions in Military Affairs and the Evidence of History*. London: Frank Cass Publishers, 2002. 271.

[151] Mackubin T. Owens. "Technology, the RMA, and Future War," *Strategic Review*, Spring 1998. 63-70. Other comments include "The United States military is reluctant to embrace new ways of war, particularly those that threaten existing weapons, doctrine, and organizations. Rather than adapt to the information age, they see the services as perpetuating increasingly outmoded approaches to combat." See Mahnken and FitzSimonds. *The Limits of Transformation.* 105.

[152] A.J. Bacevich, "Preserving the Well Bred Horse," *The National Interest* No. 37. Fall 1994. 45, 49.

style RMA was not in evidence. The technologies were mere epiphenomena."[153] As remarked by Colin Gray, "The structural complexity and substantial non-linearity of strategy is always likely to frustrate some or all of the promise in an RMA." [154]

Some other questions remain from 'cold-warriors' concerned about the emergence of a near-peer competitor. Much has been written about an information-led American RMA ability to contend with the ascendant star in the east, China. While there are credible concerns that China's energy demands will put her in direct opposition to the United States, Gray posited that China may be garnering more attention due to the fact that, "global terrorism [is] probably too difficult, [and] too asymmetrically challenging, to win election [as the] principal enemy." [155]

In 2000, the United States Naval War College commissioned a study on officer attitudes toward the implied current revolution in military affairs, in an attempt to define the limits of transformation. In the study, the authors use the terms innovation, revolution in military affairs, and transformation almost interchangeably. The study's implied aim was to draw a correlation between officer attitudes towards an ill-defined 'American RMA' and/or transformation, and the likelihood that they will "support or inhibit risk-taking and innovation." [156] At the time of their study, the concept of an ongoing revolution in military affairs was not well understood. Indeed, the closest Admiral

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[153] Mark Grimsley, "Surviving Military Revolution: The U.S. Civil War." In *The Dynamics of Military Revolution, 1300-2050*. Macgregor Knox and Williamson Murray ed. New York: Cambridge University Press, 2001. 77.

[154] Gray, *Revolutions in Military Affairs …,* 8.

[155] Gray, *Revolutions in Military Affairs …,* 271.

[156] Thomas G. Mahnken and James R. FitzSimonds, *The Limits of Transformation: Officer Attitudes toward the Revolution in Military Affairs*. Center for Naval Warfare Studies, Newport Paper Number Seventeen, Newport, Rhode Island: Naval War College Press, 2003. 1-3.

Owens, the Vice Chairman of the Joint Chiefs of Staff at the time, could come to a definition was,

> the integration of those [robust] technologies with each other and with military organization and doctrine … It is no wonder, then, that we have not reached a consensus on the doctrinal and structural implications of the revolution. Yet, as in deciding to embark on the revolution, we have committed ourselves to working them out.[157]

It is not surprising therefore, that the International Institute of Strategic Studies labelled his followers the "Uncertain Revolutionaries."[158]

What the studies authors failed to appreciate is the importance of the profound sense of hierarchy and deference afforded the American military leadership, and its Commander in Chief. The lack of dialogue about America's strategic interests is not limited to the American popular media. The high regard afforded the current leadership however, is a two edged sword. The requirement for 'top-cover' on most military decisions of consequence both mitigates against squandered time and resources, but also severely limits personal initiative. That being said, once a commander provides guidance on transformation to their formation, let there be no doubt, it will be achieved.[159]

That sense of purpose has facilitated the blurring of traditional boundaries between the United States' foreign and domestic security organizations; and with good

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[157] William A. Owens, "The American RMA" Joint Forces Quarterly. Winter 1995–96. 37-38. Admiral Owens, was the Vice Chairman of the Joint Chiefs of Staff at the time. Also see Thomas J. Welch. "Technology and Warfare." In Keith Thomas (ed.), *The Revolution in Military Affairs: Warfare in the Information Age*. Canberra: Australian Defense Studies centre, 1997. 28. The Office of Net Assessment's Associate Director Thomas J. Welch, informs us that "[f]or the Office of Net Assessments [*sic*], a revolution in military affairs occurs when technological change makes possible material, which *when combined with organizational and operational change*, result in a transformation in the conduct of warfare." *Italics* in original.

[158] International Institute of Strategic Studies, *Strategic Survey1995/96*. Oxford: Oxford University Press. 1996. 33-36.

[159] Author's discussions with serving members of the U.S. Military over the course of past twenty years.

reason. The information sharing, enhanced security measures, and recent combining multiple agencies under the Department of Homeland Security,[160] however, have also generated some legitimate concerns. Civil libertarians are questioning further incursions on individual privacy, and even the constitution:

> While the information-driven RMA is changing the character of wars fought by the United States, it also seems to be shifting the war powers "balance" in favor of the executive branch. The RMA appears to be strengthening virtual Presidential war powers, while weakening the position of Congress.[161]

AMERICAN TRANSFORMATION DEFINED

Historically, the relative strengths between the pre-eminent nations in world affairs have always fluctuated. This is due in large part to the disparities in growth rates between different societies, and their relative abilities to realize technological and organizational breakthroughs; ultimately facilitating an advantage of one society over another.[162] As a consequence, the United States has undertaken comprehensive change initiatives aimed at better situating their forces to contend with the uncertainties of the future with the adoption and exploitation of emerging technologies. Their attempt to "maintain a qualitative military edge has triggered a comprehensive redesign of the joint forces that will enhance, evolve, and ultimately transform its war fighting capabilities."[163]

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[160] Government of the United States of America, Department of Homeland Security. "DHS Organization" As of 1 March 2005; available from http://www.dhs.gov/dhspublic/theme_home1.jsp; Internet, accessed 3 March 2005.

[161] Lukasz Kamienski, "The RMA and War Powers," *Strategic Insights*, Vol II, Issue 9. Montery, CA: Center for Contemporary Conflict, Naval Postgraduate School. September 2003.

[162] Paul M. Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*. New York: Vintage Books, 1989. xv-xvi

[163] James L. Boling, "Rapid Decisive Operations: The Emperor's New Clothes of Modern Warfare"; available from http://www.ndu.edu/inss/books/Books_2002/Essays2002/05_ch03.htm; Internet; accessed 12 November 2004.

Transformation, as articulated by United States Secretary of Defence Rumsfeld, in *US DOD Transformation Planning Guidance*, is defined as:

> A process that shapes the changing nature of military competition and cooperation through new combinations of concepts, capabilities, people, and organizations that exploit our nation's advantages and protect against our asymmetric vulnerabilities to sustain our strategic position, which helps underpin peace and stability in the world. [164]

This vision is intended to shape not only how the United States intends to fight, but how defense procurement takes place, and how it relates to its allies; with specific impact on how the North Atlantic Treaty Organization evolves. The proximity of the United States Joint Forces Command, and double-hatting of its Commander as the head of NATO Allied Command Transformation, means that NATO's viability as an organization is now, more than ever, inextricably linked to both the United States' transformational direction, and its degree of success. Their transformation vision includes a full range of initiatives, from new high-tech weapons to changing the way the alliance thinks, trains, exercises, fights and future partnerships in a complex world. Given the hegemonic influence of the United States within the alliance and our bi-national interests, it is worth looking at their approach in more detail.

TRANSFORMATION DIRECTION

The United States strategy for transformation consists of three main parts: transforming their capabilities through force transformation; transforming processes through risk adjudication using future operating concepts; and, transforming their culture through innovative leadership. They also identify two 'transformation dilemmas' facing

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[164] Donald H. Rumsfeld, *Transformation Planning Guidance*, April 2003, p. 3; available from http://www.oft.osd.mil/library/library_files/document_129_Transformation_Planning_Guidance_April_2003_1.pdf; Internet; accessed 23 November 2004.

any organization. The first is the need to balance near-term, operational risk against future risk in investment decisions; and second, the need to invest now in specific technologies and concepts that are deemed transformational, while remaining open to other paths towards transformation.[165]

In his testimony before the Terrorism, Unconventional Threats, and Capabilities' Subcommittee of the House Armed Services Committee, The Director of Force Transformation, Admiral Cebrowski remarked that transformation in the United States, "is happening much faster than what we expected." [166] He further elaborated that, "[t]he increasing complexity and accelerating change of the security environment demands adaptively, unpredictability, and dynamic fitness – measures of effectiveness vice efficiency. . . We look for the "big bets" – high payoff technologies, or concept and technology pairings, that can not only alter our capabilities but alter the very character of military competition – in effect, creating a whole new game by rewriting the rules." [167]

TRANSFORMATION ADMINISTRATION

While the United States retains the strongest national economy and military, eventually it must face challenges to its longevity, like every major power that has gone before it. It remains to be seen whether the United States can delay that eventuality by 'rewriting the rules' or "whether, in the military/strategic realm, it can preserve a reasonable balance between the nation's perceived defence requirements and the means it

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[165] United States of America. Department of Defense, *Elements of Defense Transformation*; available from www.oft.osd.mil/library/library_files/ document_383_ElementsOfTransformation_LR.pdf; Internet; accessed 23 November 2004.

[166] Arthur K. Cebrowski, Director, Office of Force Transformation Office of the Secretary of Defense. Testimony before the 'Terrorism, Unconventional Threats, and Capabilities' Subcommittee of the House Armed Services Committee, February 26, 2004 available from http://www.afei.org/transformation/pdf/TransTrends_2004_march_2.pdf; Internet; accessed 5 December 2004

[167] *Ibid.*

possesses to maintain those commitments; and whether, as an intimately related point, it can preserve the technological and economic bases of its power from relative erosion in the face of the ever-shifting patterns of global production." [168]

In considering current transformational initiatives, Williamson Murray cautioned on potentially adverse approaches based on the overt "bureaucratization of innovation – particularly in the current framework of the U.S. military – [would likely] guarantee its death." [169] His primary observation was that, "specific, detailed plans to enhance innovation probably represent a non-starter." [170] He posited that instruction on innovation, innovation offices, and the establishment of innovation specialists would only serve to attract officers "interested in safe 'career' niche, rather than driving innovative crusaders for innovation." [171] Ultimately, he is of the opinion that any concerted effort to "institutionalize innovation will inhibit rather than foster the process." [172] It would appear that any prospect of inculcating an innovative spirit in a highly hierarchical organization therefore, is dependant on it becoming way of life.

The other challenge relates to the sheer magnitude of any military, particularly one the size of the United States, to implement any policy change.

> So long as management is overwhelmed by the details of task performance, planning and policy will not occur . . . That is, until what is routine is systematized and performance replicable without extensive management attention, management attention will necessarily focus on the routine. [173]

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[168] Paul M. Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000*. New York: Vintage Books, 1989. 514-515.

[169] Murray, "Innovation: Past and Future." 325.

[170] *Ibid.* Murray's comments are prescient of the Canadian experience in the 1990s with 're-engineering'.

[171] *Ibid.*

[172] *Ibid.*

[173] Marian Jelinek, *Institutionalizing Innovation*. Westport, Connecticut: Praeger Publishers, 1979. 138-139.

The United States currently expends almost 40 percent of the world's total defence disbursements in order to "maintain a qualitative and quantitative military hegemony." [174] Their 'command of the commons', and ongoing action in Iraq, is costing them over $300 billion dollars a year; "more than Russia, China, Great Britain and France combined."[175] According to Ivan Eland of the Washington based Cato Institute, "only about $20 billion of the 45 billion increase [to the 2003 US defense budget] went to things that could loosely be deemed 'anti-terrorism.' Major weapons systems are grossly over funded, and Special Forces are under funded."[176] Consequently, despite their unparallel size and reach, the United States can still be "confronted repelled and defeated in 'contested zones', which may include enemy territory, lower altitudes, coastal and littoral waters, landlocked areas, cities, mountains and forests."[177]

Despite the inconsistencies, misnomers, and potential misappropriations, the United States is pursuing *transformation*. They have not achieved a rapid increase in capability or the disproportionate advantage of a true revolution in military affairs, *yet.* However, the United States has embarked on the path of strategic reorientation, and has

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[174] Barry R. Posen. "Command of the commons: The military Foundations of U.S. Hegemony," *International Security*, Summer 2003. 18.

[175] Barry R. Posen. "Command of the commons: The military Foundations of U.S. Hegemony," *International Security*, Summer 2003. 18.

[176] Michael Moran, "Fewer Contractors, bigger pie." MSNBC News, February 10, 2003. Internet, available from: http://msnbc.msn.com/id/3071477/ Last accessed 28 February 2005. Of the $382 billion total US 2003 defense budget, only about $3.2 billion, or less than 1%, went to the procurement of the most commonly used arsenal for the war on terror: "Raytheon's Tomahawks, Boeings JDAMS smart bomb kit and Northrop Grumman's Unmanned Arial Vehicles, or UAVs. …all of them 'disruptive innovations' that threaten more profitable systems."

[177] Phillipe Lagasse and Joel J. Sokolsky, "The Evolving Security Environment and The Canadian Forces: What Capabilities will be Most Important?" A paper submitted to the Assistant Deputy Minister (Policy), Department of National Defence, Canada. 4.

started to optimize their armed forces for the future security environment. There should be no doubt as to their motivation to prevail.

CHAPTER 4 - CANADIAN FORCES TRANSFORMATION

> There are three mistakes that people make when trying to imagine the future. The first is to believe that it will not be constrained by what has gone before, that it will be entirely different. The second is to believe that it will be exactly the same, that nothing ever really changes. The third, and the worst, is not to think about it at all.[178]
>
> Horsman and Marshall

The strategic employment of the Canadian Forces during the past few years has confirmed their operational construct, in that they "must be prepared to fight and win the 'three-block war'." [179] General Charles Krulak, former Commandant of the United States Marine Corps, popularized the term 'three-block war'. He foresaw that a military force could potentially be acting in three different types of operation across the spectrum of conflict, concurrently, and in relatively close proximity to each other. For example, one element could be delivering, or assisting others in the provision of, humanitarian aid. At the same time in another proximate locale, a second element may be conducting stabilization or peace support operations. Meanwhile a third element may be engaged in a high-intensity fight. All of these forces must be able to fulfill these diverse functions, beyond conventional fields of manoeuvre, in large urban centres and complex terrain.

NON-LINEAR WAR AND COMPLEXITY THEORY

Having accepted the premise of the 'three block war', it follows that the Canadian Forces have moved beyond the Newtonian paradigm of a linear interpretation of cause

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[178] Mathew Horsman and Andrew Marshall, *After the Nation-State: citizens, Tribalism, and the New World Disorder*. London: Harper Collins Publishers, 1994. 270.

[179] Department of National Defence, A Soldier's Guide to Army Transformation; Available from http://www.army.forces.gc.ca/lf/English/5_4_1_1.asp; Internet; accessed 3 December 2004.

and effect in warfare.[180] It follows that war is a non-linear, dynamic process, not a thing.[181] Once again, the writings of Clausewitz are illustrative:

> The military machine—the army and everything related to it—is basically very simple and therefore seems easy to manage. But we should bear in mind that none of its components is of one piece: each piece is composed of individuals, every one of whom retains his potential of friction ... A battalion is made up of individuals, the least important of whom may chance to delay things or somehow make them go wrong. [182]

Complexity theory is the "study of systems which exhibit complex, self-organizing behavior." [183] For the purposes of this paper, a complex system is described as "any system composed of numerous parts, or agents, each of which must act individually according to its own circumstances and requirements, but which by so acting has global effects which simultaneously change the circumstances and requirements affecting all the

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[180] "Linearity is excellent for the systems we design to behave predictably, but offers a narrow window on most natural and social systems. That narrowness sets blinders on our perception of reality and offers a weakness for an opponent to exploit. But if we know our limits, we can minimize the extent and duration of our surprise, reducing its value to someone else. And an expanded sense of the complexity of reality can help us be more successfully adaptive amid changing circumstances. By thinking more constructively about nonlinearity [disproportionate effects and unpredictability], we might be able to design more robust systems when we need them." For more see Alan B. Meyerchen, "Clausewitz, Nonlinearity, and the Importance of Imagery," In *Complexity, Global Politics, and National Security*. David S. Alberts and Thomas J. Czerwinski, eds. Washington, D.C.: National Defense University, November 1996.

[181] Alvin M. Saperstein, "Complexity, Chaos, and National Security Policy: Metaphors or Tools?" In *Complexity, Global Politics, and National Security*. David S. Alberts and Thomas J. Czerwinski, eds. Washington, D.C.: National Defense University, November 1996

[182] Clausewitz. *On War*. 119.

[183] John F. Schmidt, "Command and (Out of) Control: The Military Implications of Complexity Theory" In *Complexity, Global Politics, and National Security*. David S. Alberts and Thomas J. Czerwinski, eds. Washington, D.C.: National Defense University, November 1996; available from http://www.ndu.edu/inss/books/books%20-%201998/Complexity,%20Global%20Politics%20and%20Nat'l%20Sec%20-%20Sept%2098/index.html; Internet; accessed 5 April 2005. Complexity suggests that, just as evolution does not have a predetermined destination, military plans should not prescribe detailed end-state conditions which are instead always changing in response to developments. We should not think of a plan as a closed-form solution to a problem but as an open architecture which maximizes evolutionary opportunities. A good plan becomes the basis for adaptation through evolution. Planning is "solution by evolution" rather than "solution by engineering."

other agents." [184] Complex systems therefore, "are based on the individual 'decisions' of their numerous agents." Complexity theory currently provides the best understanding of these complex systems and behaviours of individual actors. It caters to quantifying uncertainty, asymmetric threats, and 'three block wars.' If we accept the complexity theory, then military action is no longer an operation, but an evolution. [185] For Canada to instigate an evolutionary approach would require the Canadian Forces to be able to understand and contend with abstract ideas and processes. Consequently, they would require a "familiarity with non-linear analyses to a greater degree than [may be] currently the case." [186] Consequently, the impact of non-linear warfare on conventional top-down command and control will greatly exceed that experienced today. Out of necessity, commanders will only experience control by virtue of feedback from their subordinates and autonomous sensors. This reciprocal influence permits greater freedom of action and adaptability. Plans become the basis for adaptation through evolution. How we deal with this reality within the Army, and in combined/joint operations, needs greater elaboration. The relatively conservative nature of Canadian Forces training environments, coupled with a technology driven emphasis on engineering, do not always lend themselves to imaginative, innovative mindsets. As a consequence, many military members may think of innovation, "in quantitative and qualitative terms of equipment and techniques rather

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[184] Schmidt, "Command and (Out of) Control…"; available from http://www.ndu.edu/inss/books/books%20-%201998/Complexity,%20Global%20Politics%20and%20Nat'l%20Sec%20-%20Sept%2098/index.html; Internet; accessed 5 April 2005.

[185] Ibid.

[186] Murray, "Innovation: Past and Future." 326.

than in conceptual terms." [187] If the Canadian Forces is to transform itself successfully, it must be cognizant of those conceptual changes, and the effect on its members' behaviour.

MILITARY CULTURE AND CHAOS THEORY

Chaos theory accounts for "the underlying patterns in an organization that determines its behavior. These patterns come in many shapes and sizes. There are patterns that upset the dynamic balance between an organization and its environment by creating either chaos or a steady state." [188] So if the Canadian Forces attempts to achieve conflicting goals, be they by accident or design, it can expect behavioral patterns to fluctuate. In the case of the environmental commands, many of these base patterns are the result of their component units' histories and traditions; "they do not appear out of thin air. They have become, as it were, part of the culture and identity of the organization: That's the way we do things around here and it has worked so far."[189] Therefore, future innovation may dictate changes to service cultures, and how the environmental commands prepare for operations, both individually and collectively, in joint and combined missions. "Until, however, there is a wider recognition of the difficulties involved in innovation, the services will not see significant change."[190]

IMPLEMENTING CHANGE

Like any major initiative, the first prerequisite is the will to implement change, and the second is a lot of time. In a society that consumes complex issues in 30-second sound bites, implementing a patient and protracted cultural change initiative will be

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[187] Murray, "Innovation: Past and Future." 326.

[188] Leon de Caluwe and Hans Vermaak, *Learning to Change: A Guide for Organization Change Agents*. Thousand Oaks, CA: Sage Publications, 2003. 20.

[189] *Ibid*.

[190] Murray, "Innovation: Past and Future." 328.

extremely trying. Murray offers some interesting proposals on how the Canadian Forces might pursue incremental change. One example is to frame innovative approaches by realistic parameters. Doctrine writers must define current and future capabilities for combat and conflict resolution "with real opponents, with real capabilities, and with real strategic and political objectives." [191] Exercise planners and staff college war game scenarios must be designed using tangible scenarios against realistic adversaries, who actually fight back. It follows that exercise scenarios must consider all three levels of war: strategic, operational, and tactical. As a consequence, the abandonment of the hopelessly antiquated attrition-based force models is required.

With diminished resources, be they fiscal, material, or human; and increased operational demands, all services have already started to rationalize their operations and training tempo. Every training opportunity must be closely considered to confirm not only the validity of the training, but that it has been optimized to meet the tactical objectives within a strategic context. As a consequence all levels are acutely aware of the impact their actions have on their subordinates, peers, and superiors. The importance of exercises, particularly when resources are limited, is derived from the planning, execution, and particularly in the 'lessons-learned' analysis. The after-action process therefore, must consider the doctrine, training, and procedures at all levels. [192]

Ultimately the success of the exercises is predicated on the motivation and capacity of the participants to discern that which was successful and what failed to achieve the aim, or did so at an unacceptable cost. The intellectual challenge of connecting the disparate approaches and processes and linking them into "new military

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[191] Murray, "Innovation: Past and Future." 326.

[192] *Ibid.* 326-7.

systems, operational concepts, doctrines, and organizational arrangements – are literally a *sine qua non* of successful military innovation during peacetime." [193] Hence the emerging strategy of Effects Based Operations is derived from a systems-of-systems innovative approach that strives to optimize the militaries' use of equipment, doctrine, employment concepts, and organizational structures to better meet today's threats. Effects Based Operations can be defined as:

> Effects-based operations are operations conceived and planned in a systems framework that considers the full range of direct, indirect, and cascading effects, which may—with different degrees of probability—be achieved by the application of military, diplomatic, psychological, and economic instruments.[194]

Based on controlled experimentation during recent staff college exercises, effects-based operations, or planning in this case, proved very effective. Planning staffs found themselves considering campaign design in a new light. What were previously functional lines of operation became objective-based using effects-based planning. The net results were more flexible and holistic plans, which were deemed superior by the commander. They employ a full analysis of the political, military, economic, social, informational and infrastructure nodes through which actions are taken to achieve the desired effects.[195] Effects-based plans were very adaptable, and highly suited to the challenges of planning

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[193] Watts and Murray. "Military Innovation in Peacetime." 411.

[194] Paul K. Davis, *Effects-Based Operations (EBO): A Grand Challenge for the Analytical Community*. Available from http://www.rand.org/publications/MR/MR1477/MR1477.ch2.pdf; Internet; accessed 22 February 2005.

[195] United States Joint Forces Command, "Definitions" Effects Based Planning - An operational planning process to conduct effects-based operations within rapid decisive operations. EBP is results-based vice attrition-based. EBP closely mirrors the current joint planning process, yet focuses upon the linkage of actions to effects to objectives. EBP changes the way we view the enemy, ourselves, and what is included and emphasized in the planning process. EBP uses a flexibly-structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer formal joint boards. It employs virtual, near-simultaneous planning at all echelons of command. Available from http://www.jfcom.mil/about/glossary.htm; Internet; accessed 22 February 2005.

and executing the 'three-block war'.[196] If effects-based operations realize their full potential, they may prove to be the precursor to the illusive 'American revolution in military affairs' that has preoccupied political scientists, strategists, and historians alike.

CANUS RELATIONS IN TRANSFORMATION

Political scientist and security expert, Barry Posen posits that grand strategy can be conceived of as "a chain of political ends and military means." [197] The effectiveness of grand strategy is dependant on how closely related the ends and means are related to one another; political-military integration. Their relationship is reduced to the determination of whether the government has the military means to achieve their "political goals deemed essential to the security of the state." [198] Conversely, the determination of whether those political goals, "fall within the state's military means, and whether the military means selected unnecessarily inhibit the discretion of political authorities.[199] The challenge for Canadian Forces planners, is the determination of exactly what political discretion may be exercised, "Canadians are attached to [a] diversity of values. Hence we would have a hard time …to say specifically what those values are."[200]

The United States 'command of the commons' but continued susceptibility to attack in 'contested zones' is an important consideration in the shaping of Canadian defence policy. Canada doesn't need to contribute to the United States' command of the commons and help "secure the high seas, the air or outer space. That leaves Canada the

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[196] Canadian Forces College Exercises Stalwart Warrior and Final Lance 2005.

[197] Posen. *The Sources of Military Doctrine…* 25.

[198] *Ibid.*

[199] Barry S. Posen. *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars*. Ithaca: Cornell University Press, 1984. 25.

[200] Rob McRae, Director General of the Department of Foreign Affairs Policy Planning Bureau quoted in Olivia Ward, "Our Dwindling Role: How Canada Lost Credibility" *The Toronto Star*, January 29, 2005. A22.

option of structuring its forces to pursue its own national security priorities abroad; or join with like-minded nations in support of international security or United Nations missions. As a result, Ottawa should not concern itself with threats to the commons, since American armed forces are amply equipped to quash any such threats."[201] That is not to suggest that the United States can unilaterally with impunity. As remarked by Pentagon analyst Thomas Barnett, while the United States can pursue their national interests,

> without asking anyone's permission or help, … the idea that the [United States] can somehow wage war isolated from the web of economic and political transactions …conduct[ed] with the outside world is simply ludicrous. In the era of globalization, there is only *war within the context of everything else*.[202]

In this era of globalization, the ethno-cultural nuances of conflict require greater understanding of world history and cultural awareness. This is where ethnically diverse and multi-cultural countries like Canada, can leverage their linguistic and cultural fluency to compliment future 'coalitions of the willing'. Critics of the United States approach to foreign, and sometimes domestic, policy cite their lacking that very knowledge leaves them vulnerable and forms an "impediment to the formulation of a coherent strategic vision."[203] That impediment can be addressed by Canada as part of its contribution to the 'Global War on Terrorism'; but only if it has a seat at the table.

Canada has an obvious interest in how the United States homeland security efforts proceed. The continued relevance of the Permanent Joint Board on Defence, North American Aerospace Defense Command, and the Bi-National Planning Group are

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[201] Phillipe Lagasse and Joel J. Sokolsky, "The Evolving Security Environment and The Canadian Forces: What Capabilities will be Most Important?" A paper submitted to the Assistant Deputy Minister (Policy), Department of National Defence, Canada. 4-5.

[202] Thomas P.M. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-first Century.* New York, NY: Penguin, 2004. 312.

[203] Murray and Knox. "The Future Behind Us." 180-181.

testimony to the trust and importance of the Canada – United States continental security arrangements. Canada has recognized the importance of an integrated domestic and continental security force in the latest National Security Policy. [204] These efforts should help put Ottawa "in a better position to seize the initiative and shape binational continental security policies in directions favourable to Canada." [205]

The requisite interoperability between Canadian and American forces employed in the continental security roles, implies a coordinated approach to transformation. This mutual understanding in no way limits Canada's security options, it enhances them. By ensuring American security concerns are assuaged, Canada secures its unfettered access to the United States' markets, and increased appreciation of its security efforts. In so doing, Canada can legitimately decline some invitations of the coalition of the willing, by clear demonstrations of commitment to continental defence. [206] While this approach implies a greater emphasis on domestic capabilities, albeit potentially at the expense of expeditionary availability, it ensures the Canadian Forces relevance to her key allies, and more importantly, to her citizens. Transformation of the Canadian Forces is not only achievable, it is necessary for its continued relevance.

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[204] Privy Council Office, "Securing an Open Society: Canada's National Security Policy." Government of Canada, April 2004. 49.

[205] Lagasse and Sokolsky, "The Evolving Security Environment …" 8.

[206] *Ibid.* 6-9.

CHAPTER 5 - CONCLUSION

History has shown us that it is usually non-dominant players that have leveraged revolutions in military affairs with greatest effect. Not only must Canada look externally, and consider the developments of our allies and closest trading partner, but internally as well; and leverage our untapped or underutilized strengths. Technology is not the driver for change but the catalyst. The intellectual dexterity with which we exploit technology is as cultural as it is educational. As a consequence, organizational and doctrinal evolution must be more agile.

If Canada wants to have influence on the world stage, it must be able to assume a leading role on issues considered vital to our national interest. This is a much larger issue that simply responding to the supposedly 'new' security threats posed by transnational terrorism, and keeping pace in the 'information age'. Internationally, Canada's principal allies and trading partners have all embarked on major transformational initiatives. Consequently, in order to remain relevant at home and abroad, the Canadian Forces must implement significant strategic transformation by embracing innovation, not just managing change.

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