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CANADIAN FORCES COLLEGE / COLLÈGE DES FORCES CANADIENNES  
CSC 32 / CCEM 32

EXERCISE/EXERCICE

NEW HORIZONS

**PERSUASIVE AEROSPACE POWER: METHODS AND MEANS**

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## ABSTRACT

This paper argues that in order for the Canadian Air Force to contribute effectively to the full-spectrum of contemporary conflict it must adopt and enable a mindset best characterized as 'persuasive.' Considerations of the character of future conflict and evolving Canadian societal expectations for the conduct of military activities must be anticipated to result in restraints on military operations. At the same time, strategic objectives aimed at achieving lasting peace through changes of behaviour and long-term attitudes are increasingly the focal point of integrated diplomatic, defence and development efforts. As a result, military doctrine that lends itself purely to the application of force is becoming impracticable. The paper concludes by recommending that a persuasive mindset, enabled by an effects based approach to operations and an array of lethal and non-lethal means, will allow aerospace power to reach its full potential as an instrument of national power for the new century.

My concern is whether the evolution of air and space doctrine will be mostly in the mainstream—with the traditional roles and missions we have come to associate with fighting and winning the nation's wars—or out on the frontiers, in new or long-forgotten roles and missions for air and space power.

Carl H. Builder<sup>1</sup>

Think and act on the basis of forward-looking analysis and active scenario-based planning.

*Strategy 2020*<sup>2</sup>

As one of two alert strike-fighters roared out of its parking spot for an immediate take-off the aircraft captain was already in contact with the mission commander on board the command, control and communications (C<sup>3</sup>), intelligence, surveillance and reconnaissance (ISR) platform orbiting 25,000 feet overhead. The fighter leveled-off at 3000 feet above ground level, accelerated rapidly to 350 knots and started an arcing turn to the west of the target.

Two thousand feet above the fighter an uninhabited aerial vehicle (UAV) received commands from the ground to begin laser designating the roof of a large building located on the southeast corner of a crowded city intersection. The UAV's operators estimated that nearly 300 people had gathered in the nearby-by streets, and more, armed with rocks and sticks, were streaming toward the location through the surrounding alleys. On board the C<sup>3</sup> platform the crew commander viewed multiple images of the area from the UAV's infrared camera video feed and the ISR platform's own onboard sensors. She confirmed the location of the UAV's laser designation, aware that the datalinked location was currently being displayed on the strike-fighter's moving map display and was part of the jet's armament computer generated release solution. After reconfirming that no ground forces were in the mission area the commander radioed to the striker clearance to engage.

Seconds later, only 3 minutes after brake release on the tarmac of the sprawling city's international airport 12 miles away, a canister fell cleanly away from the speeding jet's left outboard pylon. Almost immediately a bright orange parachute blossomed from the end of the 3 foot long cylinder, starting its slow drift across the target location. As it dropped within a few hundred feet of the gathered crowd a timer on-board the canister opened an orifice in the downward pointing nose cone to begin releasing a fine spray of liquid droplets across the intersection. The fluorescent orange marker dye would stain the clothes and skin of those below for some 96 hours before fading away. In the meantime, it would be obvious who had been involved in the melee on the ground, making the work of the local police that much easier during their ensuing investigation. Ten minutes after the jet's pass, a flare released from the orbiting C<sup>3</sup> aircraft drifted slowly over the scene, removing the cover of darkness and discouraging others from joining the remaining crowd. Such tactics had resulted in a dramatic reduction in the

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<sup>1</sup>Carl H. Builder, "Doctrinal Frontiers," *Airpower Journal*, Vol. IX, No. 4 (Winter 1995): 9.

<sup>2</sup>Proactivity as a critical attribute of the Canadian Forces Strategic Direction. (Department of National Defence, *Shaping the Future of the Canadian Forces: A Strategy for 2020* (Ottawa: DND Canada, 1999), 6.

number and scope of civil disturbances across the city during the preceding three weeks as the loss of anonymity and the pervasive presence of authority became apparent to the local population. Feedback from the intelligence community indicated that a sense of security and normalcy was returning to the city.

Meanwhile, the strike-fighter was being vectored to the north in pursuit of a vehicle that had been seen speeding away from the intersection when the melee had first begun. Two known insurgents had been identified by the ISR crew as they assaulted a local political leader in what they thought was the safety of a dark alley, lost in a maze of shantytown mud walls and tin roofs. Tracking the two men with available on-board sensors, including night vision goggles and a system capable of triangulating cellular telephone signals, the C<sup>3</sup> crew worked with the strike-fighter's pilot to ensure that the 50 pound warhead of the precision munition released from the jet would precisely destroy the jeep once it was clear of built-up areas.

Since the earliest days of military aviation, doctrine based on coercion has dominated thinking about aerospace power. While coercion will continue to be the vital dominion of military power, and the Air Force has equally proven its ability to contribute to supportive humanitarian operations, aerospace power has demonstrated relative weakness in its ability to contribute to stabilization operations in the transition between war and peace. This paper argues that in order for the Canadian Air Force to contribute effectively to the full-spectrum of contemporary conflict it must adopt and enable a mindset best characterized as 'persuasive.'

The paper begins by exploring how Canadian Forces operations in this century will be defined by the civilized restraints placed on military operations, by the national strategic requirement to win lasting peace and not simply the decisive battle, and by the complex urban environments in which non-state actors will attempt to confine the overwhelming technological superiority of western militaries. In these situations, the audience for military activities will not solely be the enemy, but will include neutral and supporting civilian populations, coalition partners, non-governmental organizations and other governmental departments. In this context, a persuasive mindset, focused on

simultaneously influencing both short-term behaviours (human activities) and long-term attitudes – rather than merely on ‘servicing targets’ with kinetic weapons – will be facilitated by an effects based approach to operations. Armed with an appreciation for the subtleties and challenges associated with adopting Effects Based Operations (EBO) methods, the paper goes on to recommend a number of critical requirements for its implementation, including a need for greater expertise in the human sciences and adaptation of current measures of success. Ultimately, combining an effects based approach to operations with the inherent strengths of aerospace platforms and a choice of focused lethal and non-lethal means will enable aerospace power to pursue a sophisticated array of persuasive, coercive and supporting courses of action.<sup>3</sup>

Despite the promises of diplomacy and development supplanting conflict in the resolution of differences, the armed forces of the world continue to be essential contributors to national security and provide governments with options for participating in international enforcement of resolutions for peace. For these reasons, the Canadian Forces are expected to deliver to the Government of Canada robust capabilities with which to exercise national power and influence throughout the spectrum of military operations, from peace through armed conflict and war.<sup>4</sup> Still, the clear status of military

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<sup>3</sup>“Combat-capable, multipurpose forces and aerospace platforms that are capable of being used for more than one purpose provide the flexibility necessary to be capable of being employed across a spectrum of activity and conflict. Flexibility stems from adaptability and versatility. Adaptability means being able to adjust to new circumstances and versatility means having an aptitude for various tasks.” (Department of National Defence, A-GA-007-000/AF-004 *Strategic Vectors: The Air Force Transformation Vision* (Ottawa: DND Canada, 2004), 40.

<sup>4</sup>Although expressed in policy statements that are subject to periodic reissue (for example, Department of Foreign Affairs and International Trade, *Canada’s International Policy Statement, A Role of Pride and Influence in the World: Overview* (Ottawa: Government of Canada), 14.), the fundamental measures of CF relevance to the government’s domestic and international affairs are unlikely to change.

activities at the margins of this spectrum of operations – peace and war – have become something of an exception since the end of the Cold War.

Intra-state conflicts between ideologies, ethnic, religious and criminal groups and government authorities are increasingly the focus of western military operations. In pursuing its national strategy, the Canadian government will predictably find itself involved in failing and failed states, such as Kosovo, Haiti and Afghanistan, with two overlapping objectives: to contribute to stabilization efforts that protect civilian populations, and in doing so to address the sources of global terrorism that threaten the Canadian way of life. These situations, normally involving coalitions of western nations and non-state actors, are typically asymmetric in terms of both the expectations and capabilities of the antagonists.

While terrorists and insurgent groups have radically displayed their lack of moral limits on numerous occasions, the expectations of Canadians for military conduct during conflict continue to be captured in concepts such as the protection afforded non-combatants by the Laws of Armed Conflict, and by the Just War theory that only sufficient force should be employed to meet national objectives. These long-standing legal and moral restraints on war have merged with contemporary societal concepts in ethical thinking, as captured in Canada's advocacy of governments' responsibilities to protect civilians by respecting fundamental human rights as an imperative in domestic and international relations.<sup>5</sup> Furthermore, because intra-state conflicts do not directly threaten the survival of western nations, there are additional expectations placed on

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<sup>5</sup>The statements to this affect contained in *Canada's International Policy Statement, A Role of Pride and Influence in the World: Overview* (page 20) are reflections of Canadian values and societal expectations.

national and military strategies: Not only will civilian lives be protected during a conflict and beyond, limitations are imposed on the destruction of civilian property and infrastructure, and on collateral harm that may be done to the environment. An effective military strategy for winning a war that does not heed these expectations will likely suffer a lack of popular support, and may not complement a national strategy aimed at setting the conditions for lasting peace. In contrast, the strength of strategies aimed at “winning hearts and minds” have been demonstrated back to at least the Malayan Emergency (1948-1960) during which strict controls were placed on military operations in order to protect the civilian population and its property from harm; the same strategy of restraint was found to be effective in maintaining coalition cohesion.

From a purely pragmatic perspective, Canadian strategic culture is unlikely to sustain a costly conflict on the other side of the world if such activities undermine national values. Threats to Canadian sovereignty and security are generally perceived as remote and national defence has rarely been a priority for the expenditure of Canada’s national wealth. Any conflict short of unrestricted war that results in a substantial loss of life in a far away developing country, or that undermines Canada’s national identity as a civil nation, is unlikely to maintain the support of the general Canadian population. Similarly, with national involvement extending beyond the decisive defeat of an enemy to the establishment of a sustainable peace, consideration of post-conflict reconstruction costs should also be factored into military strategies that will be scrutinized by the public.<sup>6</sup>

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<sup>6</sup>The cost of reconstruction following the two wars in Iraq and Kosovo – reputedly won primarily as a result of doctrinally driven airpower strikes against key infrastructure – has been estimated at between 15 and 30 billion U.S. dollars each. (Carl Conetta, *Reconstructing Iraq: Costs and Possible Income*



Complicating military strategy for achieving national objectives has been the move of military operations away from the open battlefields of Europe and the first Gulf War into the urban<sup>7</sup> terrain of towns and cities such as Mogadishu, Baghdad and Kabul. The continuing concentration of military effort within the urban centers of failed and failing states has been the result of three significant factors. To begin with, conflicts such as those in Iraq and the former Yugoslavia, involving formed armies requiring significant space to manoeuvre, are relatively infrequent. When these large scale battles do occur in spite of increasingly effective global diplomacy, they are quickly and decisively won by conventional forces leaving the military involved for extended periods in the transition to peace. Secondly, developing regions of the world have become increasingly urbanized and “Almost all the growth of the world’s total population between 2000 and 2030 is expected to be absorbed by the urban areas of the less developed regions.”<sup>8</sup> Insurgencies, guerilla warfare, “criminal war”<sup>9</sup> and various other descriptions of military operations other than war are likely to take place in urban environments simply because “that is

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*Sources*, Project on Defense Alternatives Briefing Memo #28, 25 April 2003.  
<http://www.comw.org/pda/fulltext/0305BM28.pdf>; Internet; accessed 6 February 2006.)

<sup>7</sup>“From a tactical perspective, any area sufficiently built up that it channels movement of forces, restricts fields of fire, extends infantry combat vertically above and below the surface of the earth, and provides defenders a multiplicity of ‘natural’ defensive strong points, concealment, and the potential for unobserved movement through buildings, is *urban*.” (Alan J. Vick, *et al*, *Aerospace Operations in Urban Environments: exploring new concepts* (Santa Monica, CA: RAND Corporation, 2000), 6.  
[http://www.rand.org/pubs/monograph\\_reports/MR1187/](http://www.rand.org/pubs/monograph_reports/MR1187/); Internet; accessed 9 March 2006.)

<sup>8</sup>United Nations Department of Economic and Social Affairs Population Division, *World Urbanization Prospects: The 2003 Revision*.  
<http://www.un.org/esa/population/publications/wup2003/WUP2003.htm>; Internet; accessed 2 March 2006.

<sup>9</sup>Mueller suggests that what is perceived in the west as insurgency is quite often the work of criminals. (John Mueller, “Policing the Remnants of War,” *Journal of Peace Research*, Vol. 40, No. 5 (2003): 507-518. <http://psweb.sbs.ohio-state.edu/faculty/jmueller/jpr2003.pdf>; Internet; accessed 22 February 2006.

where the people are.”<sup>10</sup> Thirdly, the overwhelming forces and technologies of western nations – mostly notably including their aerospace forces – have made it exceedingly difficult for opponents to operate in the open. By blending with the civilian population concentrated in urban centers, irregular forces benefit from closer identification and interaction with the population while making it difficult for opposing forces to isolate and target combatants using current technologies.<sup>11</sup> Further restricting the freedom of operations in complex urban environments may be the presence of coalition militaries and members of non-governmental organizations.

Together, considerations of the character of future conflict and evolving Canadian societal expectations for the conduct of military activities must be expected to result in restraints on military operations. These restraints should manifest themselves in the national strategic objectives handed-down by elected political leaders, and will be translated to the military operational and tactical levels through rules of engagement. In spite of these challenges, military leaders will be expected to provide viable options and supporting capabilities to fulfill national objectives within a coordinated ‘whole of government’ construct of defence, diplomacy, development and trade activities.

As an institution, the Canadian Forces has historically placed its primary focus on being prepared for conflict at the demanding extreme of war, where the defence of

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<sup>10</sup>Max G. Manwaring, *Shadows of Things Past and Images of the Future: Lessons for the Insurgencies in Our Midst*, U.S Army War College Strategic Studies Institute, November 2004. <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=587>; Internet; accessed 9 March 2006.

<sup>11</sup>Despite the conclusion that “the urban-warfare strategy has been ineffective” for insurgents (Bard E. O’Neill, *Insurgency & Terrorism: Inside Modern Revolutionary Warfare* (Dulles, VA: Brassey’s Inc., 1990), 47.) counter-insurgency operations must be both effective and efficient – in other words, as rapid and inexpensive as possible – to be judged successful.

Canadian sovereignty permits the nearly unrestrained employment of force.<sup>12</sup>

Recognizing that a war of national survival is an exceedingly unlikely activity, the Canadian Forces are also prepared for military operations other than war, such as stabilization operations involving irregular forces in urban settings.

In these demanding and complex environments, where civilians mix with friendly, neutral or opposing forces, often in urban areas, our military must be prepared to perform different missions—humanitarian assistance, stabilization operations, combat—all at the same time.<sup>13</sup>

The simultaneous conduct of such a range of military activities is commonly characterized as “full-spectrum operations,”<sup>14</sup> and calls for a choice of matching approaches, from support, through persuasion to coercion. Robust military options to respond to these situations may involve either single services (Army, Navy, Air) or joint forces, and are increasingly adapted to work within the broader context of an integrated national level response that may involve diplomatic and development activities. In establishing the ‘order of battle’ for these operations, a guiding principle for the effective employment of capabilities will be to “select forces to participate in operations based on their utility, expertise, combat readiness and functions – not equality.”<sup>15</sup>

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<sup>12</sup>“...the fundamental and most demanding role for the Air Force is to generate, apply and sustain aerospace power in combat operations...” (Department of National Defence, A-GA-007-000/AF-004 *Strategic Vectors: The Air Force Transformation Vision* (Ottawa: DND Canada, 2004), 39.) Constabulary and niche roles are viewed as sub-sets of the capabilities of a combat capable, multi-purpose military such as the Canadian Forces.

<sup>13</sup>Department of National Defence, *Canada’s International Policy Statement, A Role of Pride and Influence in the World: Defence* (Ottawa: Government of Canada), 3.

<sup>14</sup>The term “full-spectrum operations,” adopted by the Canadian Forces, is synonymous with “three block war” as defined by General Krulak, Commandant of the Marine Corps (1995-1999). “Full-spectrum operations” refers to the simultaneous conduct of missions across the spectrum of conflict, from disaster relief and humanitarian assistance through constabulary and counter-insurgency operations to war fighting.

<sup>15</sup>Department of National Defence, B-GJ-005-300/FP-000 *Canadian Forces Operations*, Change 2 (Ottawa: DND Canada, 2005), 1-8.

Flexibility and versatility, synergistic effects and persistence are tenets of aerospace power that should ideally lead to every Air Force platform, suitably configured and equipped, to be a candidate for participation in conflicts of every description on behalf of the government. The air component of the Canadian Forces has a long history of service to Canadians. Operating independently or jointly with the Army and Navy, the Air Force has conducted a range of missions, including for example: counterair and counterland by its fighter force, surveillance and reconnaissance by its maritime patrol aircraft and airlift by its tactical helicopter and transport fleets.<sup>16</sup> Nevertheless, during recent operations in Afghanistan, the aerospace power weapon systems available to the joint force commander have provided limited options for participation. Despite the investment that they represent, many of these weapons systems proved simply unsuitable to the task, or the benefits that they could bring to the operation were too limited to justify the cost of their participation.<sup>17</sup> As a result, expensive weapon systems were left out of the task forces.

Operations such as those in Afghanistan and Haiti, where insurgents, guerillas, criminals or terrorists attempt to fill the void left by failed authorities, or use techniques of subversion to destabilize existing regimes, are likely models for future Canadian Forces deployments.<sup>18</sup> In these scenarios, rather than openly contesting control of

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<sup>16</sup>Department of National Defence, A-GA-007-000/AF-002 *The Aerospace Capability Framework: A guide to transform and develop Canada's Air Force* (Ottawa: DND Canada, 2003).

<sup>17</sup>The cost of participation is measured in dollars, as well as the reduction in capacity to fulfill competing obligations.

<sup>18</sup>“...failed states have become a dominant security concern. A strong case can be made that they represent the primary source of international instability today and will probably continue to do so in the years ahead. Failed and failing states provide a potential refuge for transnational terrorists, [transnational criminal organizations] TCOs, pirates as well as drug and human smugglers. They are breeding grounds for refugee crises, political and religious extremism, environmental degradation and organized criminal

territory with an opposing combatant force, the strategy of insurgents is typically to undermine the legitimacy of constituted authorities, often through an indirect campaign of fear. In contrast, military forces such as Canada's must demonstrate that they support a positive alternative. This objective is optimally reached along two parallel lines of operation: coercion,<sup>19</sup> isolation and attrition of insurgents; and, the persuasive,<sup>20</sup> constructive establishment of security and protection for non-combatants while societal institutions can be built to support long-term peace.<sup>21</sup>

While the Canadian military is well-prepared for coercive operations in unrestricted terrain, and has a solid reputation as a supportive peacekeeping and humanitarian force, it, like many western armed forces, has been confronted with the challenge of how to transform<sup>22</sup> itself in order to better deal with small wars, low-

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activities. Afghanistan under the Taliban regime is a recent example of how non-state actors can use a failed state to carry out a campaign against a state adversary with global consequences for the rest of the international community." (Peter Johnston and Dr. Michael Roi, *Future Security Environment 2025*, Department of National Defence Directorate of Operational Research, Project Report 2003, 14 September 2003. [http://www.vcds.forces.gc.ca/dgsp/pubs/rep-pub/ord/fse2025/intro\\_e.asp](http://www.vcds.forces.gc.ca/dgsp/pubs/rep-pub/ord/fse2025/intro_e.asp); Internet; accessed 25 February 2006.)

<sup>19</sup>“Coercion is the use of threatened force, including the limited use of actual force to back up the threat, to induce an adversary to behave differently than it otherwise would.” (Daniel L. Byman, Matthew C. Waxman and Eric Larson, *Air Power as a Coercive Instrument* (Santa Monica, CA: Rand, 1999), 10.)

<sup>20</sup>“...persuasion: a successful intentional effort at influencing another's mental state through communication in a circumstance in which the persuadee has some measure of freedom.” ((Daniel J. O'Keefe, *Persuasion: Theory & Research*, 2<sup>nd</sup> ed. (Thousand Oaks, CA: Sage Publications, 2002.), 5.)

<sup>21</sup>In his paper “Breaking the Will of the Enemy During the Vietnam War: The Operationalization [sic] of the Cost-Benefit Model of Counterinsurgency Warfare,” in which he concludes that a purely suppressive strategy is unable to bring victory, Schultz observes that “invading foreign armies frequently meet with popular resistance, especially when they place heavy reliance on coercion and force to control the area invaded.” (Richard Schultz, “Breaking the Will of the Enemy During the Vietnam War: The Operationalization ((sic)) of the Cost-Benefit Model of Counterinsurgency Warfare,” *Journal of Peace Research*, Vol. 15, No. 2 (1978): 114; <http://www.jstor.org>; Internet; accessed 15 February 2006.)

<sup>22</sup>The Department of National Defence defines transformation as a “process of strategic re-orientation in response to anticipated or tangible change to the security environment, designed to shape a nation's armed forces to ensure their continued effectiveness and relevance.” (Department of National Defence, A-GA-007-000/AF-002 *The Aerospace Capability Framework: A guide to transform and develop Canada's Air Force* (Ottawa: DND Canada, 2003), 46.)

intensity conflict, irregular warfare, stabilization operations<sup>23</sup> or constabulary operations<sup>24</sup> (call them what you will) in urban settings, an integral part of the “3 Block War” construct. Regardless of the enemy’s motivations, these operations all have in common requirements for a response characterized by restraint, perseverance and legitimacy. In order to fully realize the potential of aerospace forces to contribute to these mid-spectrum operations, doctrinal focus and operational processes must shift away from the analysis of systems<sup>25</sup> and targeting toward a more holistic approach focused on contributing to the achievement of lasting psychological effects.

The most efficient military strategies, the ones that lead to the clearest courses of action and most decisive victories, work to achieve short-term objectives, such as evicting an invader through the application of overwhelming force. Fundamentally, this has been the objective of air doctrine developed through most of the last century. However, in the case of stabilization operations, strategic objectives are likely to require

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<sup>23</sup>The U.S. Department of Defence defines Stability Operations as “broadly to include security, transition, counterinsurgency, peacemaking and the other operations needed to deal with irregular security challenges.” (United States Department of Defense, Defense Science Board, *Institutionalizing Stability Operations within DoD*, September 2005, 3; [http://www.acq.osd.mil/dsb/reports/2005-09-Stability\\_Final.pdf](http://www.acq.osd.mil/dsb/reports/2005-09-Stability_Final.pdf); Internet; accessed 14 February 2006; and, United States Department of Defense, Defense Science Board Summer Study Report on *Transition to and from Hostilities*, January 2004; [http://www.acq.osd.mil/dsb/reports/2005-01-DSB\\_SS\\_Transition\\_SupportingPapers.pdf](http://www.acq.osd.mil/dsb/reports/2005-01-DSB_SS_Transition_SupportingPapers.pdf); Internet; accessed 22 February 2006.)

<sup>24</sup>“Constabulary missions are different from fighting and winning wars. These missions are more policelike than warlike. They are reactive more than proactive. They typically cede the initiative to those who would violate the rules. The enemy is not persons or things but an act—a violation of rules. There can be no expectation of winning—any more than we can expect to win a war against crime. We can only hope to reduce violations to a more acceptable level. These are conditions for which neither our equipment nor our doctrine has been designed.” (Carl H. Builder, “Doctrinal Frontiers,” *Airpower Journal*, Vol. IX, No. 4 (Winter 1995): 11.)

<sup>25</sup>The ‘industrial web’ theory of World War II strategic bombing vintage and ‘Warden’s Rings’ (John A. Warden III, Colonel (USAF), *The Air Campaign* (New York: toExcel, 1998.)) are two approaches to air campaign planning that have been used to develop target lists, including infrastructure, individuals and populations, in order to undermine an enemy’s ‘centers of gravity’, such as the capacity or will to fight, or the enemy leader’s ability to exercise power in pursuit of opposing strategic objectives.

long-term changes of local attitudes and behaviour, unachievable through coercive means alone.<sup>26</sup> The advent of effects based approaches to operations offers the promise of methodologies for addressing this shortcoming.

Although the Canadian Air Force has identified EBO as its operational planning methodology for the future,<sup>27</sup> the formulation of EBO-based doctrine has yet to occur, perhaps because of a lack of understanding that EBO has more to offer the contemporary military than do existing analytical tools and methodologies. Approached not simply as ‘old wine in new bottles,’ EBO lends itself to identifying military strategies, tactics and means appropriate to all audiences throughout the spectrum of conflict.<sup>28</sup> As interpreted by Brigadier-General David Deptula, EBO is a mindset that focuses on “control” during coercive operations.<sup>29</sup> For the purposes of applying EBO methodologies to the full-spectrum of conflict, EBO thinking and processes should be characterized by a more holistic focus on psychological effects.<sup>30</sup> Affecting behaviour (human activity) is at the

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<sup>26</sup>Aerospace power doctrine based on coercion extends back at least as far as Giulio Douet and may have reached its zenith during the later half of World War II. The shape of conflict, strategic thinking and western civilization have evolved significantly since then.

<sup>27</sup>“To get results from the employment of aerospace capabilities, the Air Force will develop and promote *effects-based operations* [emphasis in original].” (Department of National Defence, A-GA-007-000/AF-004 *Strategic Vectors: The Air Force Transformation Vision* (Ottawa: DND Canada, 2004), 37.)

<sup>28</sup>A review of the literature available on EBO reveals a tendency for many to view any military strategy aimed at changing something – typically through selective targeting – as being ‘effects based.’ This would seem to sell short the potential change of perspective and mindset that EBO advocates.

<sup>29</sup>In his article *Effects-Based Operations: Change in the Nature of Warfare*, Brigadier-General Deptula provides a first hand account of how the EBO mindset influenced Gulf War air campaign planning to focus coalition efforts on achieving effects with minimum effort, rather than through destruction in detail. (David A. Deptula, Brigadier-General (USAF), *Effects-Based Operations: Change in the Nature of Warfare*, <http://www.aef.org/pub/psbook.pdf>; Internet; accessed 17 February 2006.)

<sup>30</sup>“psychological effects. The results of actions that influence emotions, motives, objective reasoning, and ultimately the behaviour of foreign governments, organizations, groups, and individuals.” (Edward C. Mann III, Colonel (Retired) (USAF), Gary Endersby, Lieutenant-Colonel (Retired) (USAF) and Thomas R. Searle, *Thinking Effects: Effects-Based Methodology for Joint Operations*, CADRE Paper 15 (Maxwell Air Force Base, AB: Air University Press, 2002), 98 (accredited to ACC EBO white paper).)

root of all military operations – whether the objective is to prevent, change or reinforce behaviour – and may call for coercive action, however, in the future it is just as likely that military operations will involve actions to persuade and support long-term neutral and supporting attitudes.<sup>31</sup>

Rather than targeting nodes within a system, or system-of-systems, “Effects based operations focus on the mind of man.”<sup>32</sup> Simply put, staff led by an EBO mindset and applying an effects based approach to operations must plan for how actions will be perceived and interpreted, developing courses of action and selecting means according to the situation and the audience. Consideration must first be given to the perceptions of those who will directly observe, or be affected physically or psychologically by an action or its results. The perceptions and interpretations of these first-person participants will depend in large part on individual past experiences, education, culture, biases and beliefs. Subsequent interaction with other members of a group – it having its own cultural or institutional biases – will then create feedback, possibly altering the psychological responses of everyone who has either direct or indirect knowledge of the action. Translation of these psychological responses into behaviours, or reactions, will then depend on an individual’s interpretation of events and their assessment of possible courses of action.

The debate, of course, is whether it is realistic to expect planners to be able to predict psychological effects with enough fidelity to actually influence them. Or are

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<sup>31</sup>“...an attitude is a person’s general evaluation of an object (where ‘object’ is understood in a broad sense, as encompassing person, events, products, policies, institutions, and so on). The notion of attitude as an evaluation judgment of (reaction to) an object is a common theme in definitions of attitude...” ((Daniel J. O’Keefe, *Persuasion: Theory & Research*, 2<sup>nd</sup> ed. (Thousand Oaks, CA: Sage Publications, 2002.), 6.)

<sup>32</sup>Edward A. Smith, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis and War* (Washington, DC: DOD Command and Control Research Series, 2002), xxxvi.



operational planning staffs more like amateur pool players who take a shot with only the vaguest idea of what the outcome will be and no credible chance of preparing the table for the following shot? Critics of EBO conclude that predicting, let alone planning, the outcome of complicated cognitive processes is too difficult to be credible. As described above, every individual has a completely unique perspective, exists within a complex system of other free thinking individuals, and can be assumed to have almost unlimited variations for their interpretation of stimuli; their outward behavioural reaction, if any, is equally flexible, creative and adaptable. Targeting the morale of the German industrial workforce is an example, often cited, of how EBO, poorly executed, could lead to wholly unintended and counter-productive responses,<sup>33</sup> although this case study may reveal more about a general lack of understanding of human response to coercive bombing campaigns than it does about a psychological, effects-based planning approach.<sup>34</sup>

Some analysts conclude that complex adaptive systems such as societies are too chaotic, too unpredictable, to allow military planners to target behaviours; they therefore focus their thinking about military strategy on the processes and linkages that bind such systems together.<sup>35</sup> In other words, they once again tend to focus on infrastructure (read

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<sup>33</sup>Despite the Allied attempt to break the will of German industrial workers, production actually increased throughout the Combined Bomber Offensive.

<sup>34</sup>“Indeed, when exposed to regular doses of bombing the native populations did exactly what the European populations would do during the Second World War – they adapted and carried on.” (James S. Corum, “The Air Campaign of the Present and Future – Using Airpower Against Insurgents and Terrorists,” *Air Campaigns in the New World Order*, ed. Allan D. English (Winnipeg: The University of Manitoba Centre for Defence and Security Studies, 2005), 30.)

<sup>35</sup>“An emergent behavior pattern on the part of complex system implies that reductionist analysis has limits. As an analyst attempts to deconstruct the system into smaller parts, the analysis usually focuses on the properties of the pieces, rather than the dynamics of the system. But by studying the parts instead of the system as a whole, global properties are lost. The blurring of emergent behaviour occurs because the global properties are functions of the interaction among the subsystems and their effects.” (Edward J. Felker, Lieutenant Colonel (USAF), *Airpower, Chaos and Infrastructure: Lords of the Rings*, (Maxwell,

‘targets’) of particular value to a culture or activity. A more flexible application of EBO requires that objectives be stated specifically in terms of desired behaviours to be observed. In order to reduce uncertainty, actions need to be taken as directly as possible to influence these behaviours – rather than defaulting to indirect enablers of behaviour (such as infrastructure) – and objectives must be stated with clear reference to the duration of the required behaviour.<sup>36</sup> The job of the operational planner is then to select the best method, in terms of means and sequencing, of achieving desired effects on those behaviours. The critical difference with this behaviourally focused approach to EBO and a simple coercive, targeting based application is that some situations require a more subtle, or even supportive, response than is possible to achieve with precision guided munitions. In today’s environment, “Having a strong capability to carry out direct combat operations is a good thing, but this approach wins battles, not wars.”<sup>37</sup>

To fully operationalize EBO, military planners will also be required to consider the indirect effects of actions and the objective of long-term attitude changes associated with a persuasive approach. It is here that an EBO mindset, focused on psychological effects, has its greatest potential for application in future conflicts, and it is here that it encounters its greatest challenges.

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AFB: Air War College, Air University, 1998), 14;  
<http://www.au.af.mil/au/awc/awcgate/maxwell/mp14.pdf>; Internet; accessed 14 February 2006.)

<sup>36</sup>Uncertainty, efficiency and force protection considerations may lead operational commanders to destroy things ‘once and for all’; however, these courses of action and their associated risks must be validated within the broader context of strategic political and military objectives.

<sup>37</sup>James S. Corum, “The Air Campaign of the Present and Future – Using Airpower Against Insurgents and Terrorists,” *Air Campaigns in the New World Order*, ed. Allan D. English (Winnipeg: The University of Manitoba Centre for Defence and Security Studies, 2005), 38.

For example, a common criticism of EBO is that it assumes that individuals are rational. Although individuals in senior government or military leadership positions are normally seen as rational actors from a western perspective,<sup>38</sup> the same assumption is not extended to members of the general population. But the commentary on rationality likely reveals more about our lack of understanding of others than it does about the practicality of EBO. Most decisions – even suicide bombings – are made rationally within the limits of an individual’s cultural and group perspectives, education, experiences and understanding: “While ideology, commitment to a cause, and willingness to accept great sacrifices may be contrary to Western decision-making models, such choices are not necessarily irrational.”<sup>39</sup> One of the keys to EBO is an effective, culturally sensitive, analytical intelligence capability that can aid planners in selecting and sequencing appropriate actions to achieve intended effects.

An additional criticism of EBO stems from the difficulties that arise from indirect and unintended effects: Rendering a power station inoperative may succeed in reducing civilian movement at night by disabling street lighting, but if the loss of the station results in the collapse of the entire power grid, the wide-ranging effects of the power loss on behaviours and attitudes will be nearly impossible to predict. Again, the response of the

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<sup>38</sup>“The [Office of Net Assessment of the U.S. Defense Department] seminar’s conclusion was that the decisionmakers [sic] in a confrontation would be rational. The working groups observed that attaining a leadership role, whether in a government or an organization, can be understood to demand a substantial degree of rational thinking and calculation, even though this rationality may not be the same rationality that a Western mind would pursue.” (Edward A. Smith, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis and War* (Washington, DC: DOD Command and Control Research Series, 2002), 187.) Then again, “Decision-makers have diplomatic, bureaucratic, and domestic political incentives to misrepresent their true perceptions in order to influence others’ perceptions and behavior, and their concern for their image in history.....” (Robert Jervis, *Perceptions and Misperceptions in International Politics* (Princeton, NJ: Princeton University Press, 1976), 262.)

<sup>39</sup>Richard Shultz, “Breaking the Will of the Enemy During the Vietnam War: The Operationalization ((sic)) of the Cost-Benefit Model of Counterinsurgency Warfare,” *Journal of Peace Research*, Vol. 15, No. 2 (1978): 114; <http://www.jstor.org>; Internet; accessed 15 February 2006.

operational planner should be to adapt to these realities and respond by containing actions wherever possible, particularly when positive psychological response of the general population is more critical than inhibiting combatant behaviour, such as during counter-insurgency operations. Actually planning indirect effects will be even more difficult because of the rapid increase in the number of variables; awareness of these realities, at the very least, can reduce the potential for unintended negative effects that could undermine the objective. While it is true that emergent behaviour can be unpredictable in any case, ‘selection and maintenance of the aim’ – in this context translated as ‘consistency and persistence’ – remains the most important principle guiding military actions. Ultimately, it is ‘consistency and persistence’ that will result in the changes of attitude required to support desired on-going behaviour.

As a result of the difficulties in applying EBO there seems to remain an enduring Air Force tendency – reinforced by current operational level air planning lexicon and processes – to simply destroy things so that they cannot contribute to an opponent’s course of action, regardless of the long-term implications of such destruction. This not only leaves us without a flexible methodology for planning restrained, persuasive courses of action during full-spectrum operations, it suggests that the expertise and tools currently available to support employment of EBO are not well known or accepted. It may be fortuitous that as the military’s need to subtly influence behaviour has emerged, so too have our understanding of, and ability to model, human behaviour.<sup>40</sup>

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<sup>40</sup> “[The U.S. Joint Warfare Analysis Center] JWAC uses social and physical science techniques and engineering expertise to assist warfighters in support of our national security.” (United States Joint Warfare Analysis Center; <http://www.jwac.mil/aboutUs.htm>; Internet; accessed 14 February 2006.)

Even though social psychologists cannot provide us with scientific certainty when planning or evaluating actions and their psychological effects, predicting human behaviour has always been at the root of the operational art. A positivist view would be that these specialists might offer a guiding set of heuristic “rules of thumb,” or tenets, which may be helpful in predicting behaviour and attitude changes. These tenets, such as “To be successful in deterrence and reassurance, we need to construct a history of previous actions against which our future actions can be assessed by the intended observers,”<sup>41</sup> will provide a basis for the planning and assessment of effects based operations. To accomplish this effort will require the involvement of not only social psychologists<sup>42</sup> and cultural experts, but also operational research and behavioural modeling specialists,<sup>43</sup> and military historians.

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<sup>41</sup>Edward A. Smith, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis and War* (Washington, DC: DOD Command and Control Research Series, 2002), 421.

<sup>42</sup>Existing social psychology theories, such as the “Elaboration Likelihood Model”, which postulates that “important variations in the nature of persuasion are a function of the likelihood that receivers will engage in elaboration (that is, thinking about) information relevant to the persuasive issue” ((Daniel J. O’Keefe, *Persuasion: Theory & Research*, 2<sup>nd</sup> ed. (Thousand Oaks, CA: Sage Publications, 2002.), 137.) and George Herbert Mead’s “Symbolic Interactionism” which reveals “the extent to which individuals, and their personal and social consciousness, *emerge* out of society” (R.P. Cuzzort and Edith W. King, *Social Thought into the Twenty-First Century*, 6<sup>th</sup> ed. (Fort Worth, TX: Harcourt, Inc., 2002), 320.) have applicability to persuasive and coercive military strategies.

<sup>43</sup>The following excerpt provides some insight into the power of modeling and simulation: “In order to simulate populations, 10,000 agents were assigned values for the variables in the model on the basis of frequency distributions, with mean value and standard deviation. Moreover, we constructed networks in the populations, whereby the agents belonged to groups that also had contact to other groups. In constructing networks, the number of contact persons an agent has, the size of the group, and the links among groups can all be varied. The variously constructed populations can now be investigated with regard to the persuasive effects of different types of information campaigns or action campaigns with multipliers. Information campaigns function by exerting an influence on a certain percentage of agents in the population through arguments of a certain quality and through peripheral cues. Multipliers make use of a flexible persuasion strategy, by using arguments or peripheral cues in dependency upon the processing intensity of the agents they must influence.” (Hans-Joachim Mosler, “Persuasion Processes in Populations: Agent-based Simulation Based on a Social Psychological Theory,” <http://ccss.ucla.edu/lake-arrowhead-2002/actual-abstracts.doc>; Internet; accessed 13 February 2006.)

To operationalize EBO will also require the military to adapt its methods of battle damage assessment to a more general concept of effects assessment. Current battle damage assessment is heavily biased toward quantifying items that can be counted, such as bridges dropped, or sorties flown by the opposing forces in a twenty-four hour period.<sup>44</sup> In order to influence the choice of courses of action, the EBO mindset will require measures of success to be stated in terms of behaviours to be observed. For example, the objective of halting all enemy movement along a particular route for a set period of time could be achieved by blowing up a bridge across an impassible river.<sup>45</sup> Blowing up the bridge might be a quick solution, but the structure would eventually have to be rebuilt and, in the meantime, the local civilian population may resent the extended loss of freedom of movement. A planner taking an EBO approach to achieving desired short and long-term psychological effects would be better to consider the problem first from the perspective of the commander's intent – for example, isolating an area of operations for a number of weeks – and translate the objective into a desired change of behavior, such as a decision by the local population not to use a particular road during the period of interest. To effect this change of behaviour the planner would then need to create a general perception that the road is impassible. A few alternative methods of accomplishing this objective might be a show of force, cratering the approaches to the

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<sup>44</sup>Coercive air power strategy “measures of combat efficiency are measures of how quickly or cheaply forces perform military missions. They do not gauge whether mission success will achieve political purposes.” (Robert A. Pape, *Coercive Air Power*, (Ithaca, NY: Cornell University Press, 1996), 7.)

<sup>45</sup>Properly stated military objectives should include four fundamental elements: an audience for actions to be taken (e.g. enemy, civilian, friendly forces), a behaviour, human activity or attitude of the audience (the subject of the intended effect; e.g. offensive action, decision making, communications, movement, acceptance), an effect (a verb; e.g. establish, prevent, enable, support, impede), and the period of time, or point at which, the required effect must be measurable. A prioritized list of such effects based objectives should substantiate all resulting military actions. (Note that destruction is not an effect, it is a method of achieving an effect.)

bridge, making the bridge deck temporarily impassable, or in the right circumstances, simply flooding a section of the road leading to the bridge. Similarly, the success of establishing an authoritative presence in an area of operations might be assessed through the number of insurgents killed, or equally through behavioural changes measured in terms of crime statistics, through human intelligence surveillance of activities in the area of interest, or through feedback from the population.<sup>46</sup> Not all of these assessment methods are common to military operations; however, having recognized them (and others) as part of the implementation requirements for EBO, the military can develop the associated expertise and leverage off of its integration with other government departments, non-governmental organizations and other militaries. In the end, applying EBO concepts depends as much on the ability to perceive the results of actions as it does on the ability to perform actions that will be sensed by a target audience.<sup>47</sup>

Institutionalizing an effects based approach to operations will ultimately require the military to meet the challenges of going faster for longer. At the operational and tactical levels the ability to observe behaviour within an area of operations through networked ISR capabilities, and to orient, decide and act appropriately in response to time-sensitive events will have to be implemented within an environment where restraint, persistence and consistency will be required to meet long-term strategic objectives. The

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<sup>46</sup>Changes of behaviour do not necessarily indicate a long-term change of underlying attitude or belief. For this reason, achieving a change of observable behaviour is a relatively easy short-term objective; EBO planners must consider courses of action that are consistent with persuading individuals to make desired long-term attitude changes.

<sup>47</sup>“the ability to anticipate the effect(s) an action will bring about and then measure to see if the anticipation was correct is critical to adaptation, and adaptation is critical to success.” (Edward C. Mann III, Colonel (Retired) (USAF), Gary Endersby, Lieutenant-Colonel (Retired) (USAF) and Thomas R. Searle, *Thinking Effects: Effects-Based Methodology for Joint Operations*, CADRE Paper 15 (Maxwell Air Force Base, AB: Air University Press, 2002), 53.)

lessons of the Gulf Wars and Vietnam will be equally applicable to preparing for these situations. Moreover, application of these lessons must capitalize on future technologies to expand the military's ability to respond rapidly and appropriately to future conflicts in terms of societal expectations.

The EBO approach described here is applicable to all services of the Canadian Forces across the full spectrum of operations. In particular, for the Air Force, EBO strategists will benefit from the available array of capabilities inherent with the traditional functions of aerospace power, including aerospace control, reconnaissance, airlift and supply, and medical evacuation.<sup>48</sup> What is missing, however, is the ability for aerospace power to directly link with the situation on the ground in non-lethal, non-destructive ways. In "The Rise and Fall of Air Power," Martin van Creveld goes so far as to assert that Air Forces comprised of fighters and bombers will be "hopelessly unsuited" and "a liability rather than an asset" to the low-intensity conflicts of the future.<sup>49</sup> This pessimistic prediction seems to be based on an unstated assumption that the inherent strengths of these platforms, including speed, reach, and persistence, cannot be combined with novel sensors and deliverables to shape the situation on the ground in ways other than the ones called for by historical approaches to aerospace power. In any event, without a variety of alternative means at their disposal, operational planners will have to continue to default to

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<sup>48</sup>Even the simple presence of aircraft overhead, including surveillance drones, has psychological effects, however, these effects must be properly understood: "...continuous pressure by small numbers of aircraft tended to build up a disregard for the threat which they constituted and towards the end of the campaign spasmodic but concentrated attacks were favoured to keep the terrorists in a constant state of apprehension." (Malcolm Postgate, *Operation Firedog – Air Support in The Malayan Emergency 1948-1960* (London: Ministry of Defence Air Historical Branch (RAF), 1992), 74.) Alternatively, the constant presence of airpower can lead to resentment and eventually hostility.

<sup>49</sup>"Such are its speed, range, and power that, in a world where almost all wars are fought not between states but within them, many if not most of [air power's] elements have become useless and obsolete." (Martin van Creveld, "The Rise and Fall of Air Power," *MHQ: The Quarterly Journal of Military History*, Vol. 8, No.3 (Spring 1996), 81.)



the use of existing kinetic weapons, or simply conclude that aerospace power is unable to contribute independently to the Joint Force Commander's scheme of maneuver on the surface, where "The aim is always to produce focused effects that put a premium, even in conflict situations, on the sanctity of human life."<sup>50</sup>

Lethal and destructive means will always have application in combat, and the effectiveness and efficiency of precision weapons will continue to improve, evolving into focused effects weapons with applicability to the behaviour-focused EBO mindset, but achieving desired psychological effects may equally demand a range of alternative means.<sup>51</sup>

In the past, the application of aerospace power against a target at [the tactical, or engagement] level was often associated solely with its physical destruction. In the future, it may be possible to accomplish objectives using physical means that aim to deceive, disrupt, deny, degrade or destroy a target. It may also be possible to achieve results against a target with non-destructive, but disruptive, means....<sup>52</sup>

The arena of non-destructive, limited effects and non-lethal means is one that holds great promise for the future. Examples of non-lethals include: restraining mechanisms (e.g. super adhesives, sticky foams,<sup>53</sup> ultra-thick liquids, super-slippery products,<sup>54</sup> fast-

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<sup>50</sup>Department of National Defence, *Canada's International Policy Statement, A Role of Pride and Influence in the World: Defence* (Ottawa: Government of Canada), 27.

<sup>51</sup>EBO is not specifically about "psyops" (psychological operations), although this is one specialty that focuses on the use of non-kinetic, non-lethal means to create changes of behaviour by disseminating simple messages in order to improve individual and group awareness of facts that will lead to perceptions and behaviours favourable to the mission. For an interesting historical analysis of psychological operations, refer to James S. Corum, "Airpower and Peace Enforcement," *Airpower Journal*, Vol X, No.4 (Winter 1996): 10-25.

<sup>52</sup>Department of National Defence, A-GA-007-000/AF-004 *Strategic Vectors: The Air Force Transformation Vision* (Ottawa: DND Canada, 2004), 37.

<sup>53</sup>"Sticky foam came to public attention on February 28, 1995 when U.S. Marines used it in Mogadishu, Somalia, to prevent armed intruders from impeding efforts to extricate United Nations forces from that country." (United States Air Force Institute for National Security Studies, "Non-Lethal Weapons: Terms and References," INSS Occasional Paper 15, ed. Robert J. Bunker, 1996; <http://www.usafa.af.mil/df/inss/OCP/ocp15.pdf>; Internet; accessed 17 February 2006.)

forming barrier foams), obscurants, malodorous agents and reactants (e.g. combustion inhibitors). Each of these means offers the potential for novel ways to exercise initiative or to respond to demanding conflict scenarios. Non-lethals “offer options in circumstances in which diplomacy is not enough and lethal force is too much.”<sup>55</sup> Equally importantly, the availability of non-lethals will provide options where even simple tactical errors and failures to resist provocation could inadvertently undermine passive support with strategic implications.

The topic of non-lethal means is also one associated with wide-ranging debate.<sup>56</sup> Ethical and legal thinking about non-lethals needs to be undertaken in order to fully exploit the potential to match current technology with contemporary conflict. Some classes of non-lethals may be quickly eliminated from a potential collection of means for not being consistent with international treaties or Canadian values, such as blinding weapons and most chemical agents,<sup>57</sup> however, others may be selected with confidence

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<sup>54</sup>“In the 1960s the term “Instant Banana Peel” was coined to describe the capability provided by Riotril. When applied to a hard surface and wetted down, this dry, relatively-inexpensive, non-toxic, non-corrosive white powder becomes ice slick. It becomes virtually impossible for an individual to move or stand up on a hard surface so treated. Tire-type vehicles are also unable to get traction. Riotril, if allowed to dry, can easily be peeled away or, because of its water-soluble nature, can also be hosed away with high-pressure streams.” (United States Air Force Institute for National Security Studies, “Non-Lethal Weapons: Terms and References,” INSS Occasional Paper 15, ed. Robert J. Bunker, 1996; <http://www.usafa.af.mil/df/inss/OCP/ocp15.pdf>; Internet; accessed 17 February 2006.)

<sup>55</sup>Dennis B. Herbert, “Non-Lethal Weaponary: From Tactical to Strategic Applications.” *JFQ: Joint Force Quarterly*, Issue 21 (Spring 1999): 88.

<sup>56</sup>Even the simple definition of non-lethal weapons is one that is open to discussion. According to the U.S. DoD, non-lethal weapons are “explicitly designed and primarily employed so as to incapacitate personnel or material while minimising fatalities, permanent injury to personnel, and undesired damage to property and the environment.” (United States Department of Defense, *Directive No. 3000.3, Policy for Non-Lethal Weapons*, 9 July 1996; [http://www.dtic.mil/whs/directives/corres/pdf/d30003\\_070996/d30003p.pdf](http://www.dtic.mil/whs/directives/corres/pdf/d30003_070996/d30003p.pdf); Internet; accessed 14 February 2006.)

<sup>57</sup>The use of chemical defoliants during the Vietnam War (Operation RANCH HAND) is a good example of a non-lethal weapon that has since been banned by international convention due to its indiscriminate effects.

using the *Jus in Bello* criteria of: humanity, discrimination, proportionality and military necessity.<sup>58</sup> In any case, forward thinking will be required to address the legal and ethical considerations relevant to non-lethals and their long-term implications, including the potential ethical obligation to use them in an escalation of force, and the ability to provide such systems, post-conflict, to newly constituted authorities.<sup>59</sup> Nevertheless, air deliverable non-lethal means should be expected to make important contributions to future applications of aerospace power and the time to begin planning for their adoption is now.

[Non-lethal] weapons can provide airpower with capabilities that will yield new supports to diplomacy, a credible deterrent below the level of massive conventional force projection, and an expanded ability to meet evolving mission needs....<sup>60</sup>

As suggested by the Air Force's Strategic Vectors for transformation, decisions must be made today to invest in the intellectual and R&D efforts to define the requirements for

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<sup>58</sup>Richard A. Falk refers to these same criteria as the 'four principles of customary international law', which 'provide guidelines for the interpretation of any belligerent conduct not specifically covered by valid treaty rule.' (Richard A. Falk, "Environmental Warfare and Ecocide," in *The Vietnam War and Internal Law The Concluding Phase*, American Society of International Law, Volume 4. ed. Richard A. Falk, 287-303 (Princeton, NJ: Princeton University Press, 1976), 289.)

<sup>59</sup>For an introduction to the ethical and legal issues associated with non-lethals, refer to: David P. Fidler, "The meaning of Moscow: 'Non-lethal' weapons and international law in the early 21<sup>st</sup> century," in *International Review of the Red Cross*. Vol. 87, No. 859 (September 2005); <http://www.icrc.org/Web/Eng/siteeng0.nsf/iwpList74/A930D5CE4F4CD311412570F90056F50B>; Internet; accessed 8 March 2006; and, International Committee of the Red Cross Advisory Service On International Humanitarian Law, "New Weapons." [http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/57JRHA/\\$FILE/New\\_Weapons.pdf?OpenElement](http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/57JRHA/$FILE/New_Weapons.pdf?OpenElement); Internet; accessed 3 October 2005. For suggested solutions to challenges associated with the employment of non-lethals, refer to: Lieutenant Colonel James C. Duncan (USMC), "A Primer on the Employment of Non-Lethal Weapons," *Naval Law Review*; <http://www.au.af.mil/au/awc/awcgate/law/nonlet2.pdf>; Internet; accessed 27 March 2006.

<sup>60</sup>Chris Morris, Janet Morris, and Thomas Baines, "Weapons of Mass Protection: Nonlethality, Information Warfare, and Airpower in the Age of Chaos," *Airpower Journal*, Vol. IX, No. 1 (Spring 1995): 16.

these systems and the platforms to deliver them.<sup>61</sup> The fact that non-lethal means are not already available to joint force commanders is likely a reflection of doctrine better suited to the last century than to this one.

Aerospace power currently faces the challenge of how to adapt a century of history and doctrinal thinking to a future in which stabilization operations in the urban settings of failed and failing states will continue to be a central aspect of full-spectrum operations. Doctrine that lends itself purely to the application of force will be increasingly impracticable in such situations, where ethical and political restraints limit the amount of time and effort consigned to achieving a military end state. In this environment, if aerospace power is to contribute to winning the peace rather than simply to winning wars, persuasion must become as common to the mindset of aerospace planners as are coercion and destructive force.

...an effective response involves a sophisticated military strategy that avoids one form of warfare applied indiscriminately in all sectors and instead adopts a flexible policy that coordinates a variety of countermeasures in different areas, depending on the nature of the threat.<sup>62</sup>

Foremost in the minds of aerospace power thinkers must be the expectation that the military end state, and the aftermath of the operations conducted to achieve it, must set the conditions for continuing diplomatic, informational, military and economic efforts to establish lasting peace.

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<sup>61</sup>Vector 1: Results-Focused Operational Capability; Vector 4: Transforming Aerospace Capabilities (Department of National Defence, A-GA-007-000/AF-004 *Strategic Vectors: The Air Force Transformation Vision* (Ottawa: DND Canada, 2004), 45, 48.)

<sup>62</sup>Bard E. O'Neill, *Insurgency & Terrorism: Inside Modern Revolutionary Warfare*, (Dulles, VA: Brassey's Inc., 1990), 131.

An effects based approach to operations, focused on achieving changes in short-term behaviours and long-term attitudes through the application of forward looking planning methods and the appropriate use of focused lethal and innovative non-lethal means, will be key to aerospace power contributing to the full-spectrum of future military operations. A credible capability to apply coercive force, along with the ability to provide supportive assistance and to be persuasive in circumstances where lethal force is not appropriate, will ensure that aerospace power is applicable to every facet of military operations. Founded on a persuasive mindset and enabled by psychologically-focused, EBO-based methods, aerospace power can combine its inherent speed, reach, responsiveness and precision with an evolving array of lethal and non-lethal means to reach its full potential as an instrument of national power for the new century.

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