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## Information archivée dans le Web

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On August 9, 2001, the U.S. Secretary of Defense Donald Rumsfeld, stated that “Possibly the single-most transforming thing in our forces will not be a weapons system, but a set of interconnections and a substantially enhanced capability because of that awareness.”<sup>1</sup> What Mr. Rumsfeld is speaking about in short, is network-centric warfare. The drawing together of information from a multitude of sources and the ability to share this information among friendly forces “...holds promise to improve operational tempo, situational awareness and command performance at all levels.”<sup>2</sup> But this technology based phenomenon is not cheap and for Canada therein lies the problem. Already suffering from rust-out and well behind its allies in network-centric initiatives the Canadian Forces has a serious problem. How, with all of the outdated equipment that the Canadian Forces has to replace and with the limited funding they receive, will the Forces position themselves to stay relevant to their allies in future coalitions? The answer for the Canadian Forces is to increase their network-centric warfare initiatives and focus them at the tactical level.

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<sup>1</sup> *Modeling and Simulation Integration*, <http://www.parl.gc.ca/InfocomDoc/37/1/NDVA/Studies/Reports/06-toc-e.htm> downloaded 1 Feb 04

<sup>2</sup> Defence Research and Development Canada, *Network Centric Warfare: Exploiting An Information Edge*. [http://www.crad.dnd.ca/publications/issues/issues14\\_e.asp](http://www.crad.dnd.ca/publications/issues/issues14_e.asp) – downloaded 5 Mar 04. 3 - 4

With the fall of the Soviet Union and the disbanding of the Warsaw Pact, today's security environment is quite different from what it was fifteen years ago. Major shifts in both the threat to our security and the technologies available to us and our potential adversaries have occurred.<sup>3</sup> "Based on these changes in both the threat and in available technology, DOD [The U.S. Department of Defence] states it must transform."<sup>4</sup> Subsequently, the United States has embarked on a huge effort, labeled "transformation," to dramatically shift from a force prepared to fight the Soviet Union to a force suitable for 21<sup>st</sup> century adversaries. But the United States is not the only country that is reacting to the new world order. The Czechs, Australians, Germans and Dutch have all done likewise by launching major transformation initiatives.<sup>5</sup>

A major aspect of the transformed fighting force will be the melding of new technologies which will allow forces to access and share incredible amounts of information through the networking of several systems. This facet of transformation is termed Network (or Net) Centric Warfare (NCW).

What this suggests is that in future conflicts, any nation wanting to contribute and effectively fight alongside the United States will have to have forces capable of accessing the "Net" in order to share in the information flow. Forces without the capabilities to join the net will be unable to either contribute to, or access the relevant information in a timely fashion, and will be marginalized as a result.

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<sup>3</sup> Judy G. Chizek, *Report For Congress: Military Transformation: Intelligence, Surveillance and Reconnaissance*, January 17 2003. <http://www.fas.org/irp/crs/RL31425.pdf> downloaded 20 April 03, 5

<sup>4</sup> *Ibid.*, 7

<sup>5</sup> General Raymond Henault, Chief of the Defence Staff *ANNUAL REPORT 2002-2003*, [http://www.cds.forces.gc.ca/pubs/anrpt2003/message\\_e.asp](http://www.cds.forces.gc.ca/pubs/anrpt2003/message_e.asp)

For Canada and the Canadian Forces (CF), the implications are potentially enormous. Historically, Canada has prided itself as being an active contributor to world stability and peace. Those roles for Canada could be diminished or even disappear if the CF cannot provide a meaningful contribution in a coalition with other allied forces. Will the CF join in the transformation movement?

According to General Raymond Henault, current Chief of Defence Staff (CDS), "...for Canada, the question is not whether to transform the Canadian Forces, it is how best to achieve the required transformation."<sup>6</sup> Accordingly, this paper will argue that to stay relevant, the Canadian Forces must maximize its effectiveness in future coalitions by increasing its Net-Centric Warfare initiatives and concentrating them at the tactical level. Although many of the points raised in this paper will be true for all branches of the Canadian Forces, because of the papers scope, the examples and arguments put forth will be primarily from an air force perspective.

This paper will begin by describing Net-Centric Warfare to provide a basic understanding and give a better appreciation for the capabilities that it provides to a fighting force. To establish the CF's current capabilities, the NCW description will be followed by a discussion on the CF's present state and will include a review of past operations conducted by Canadian air force units in the 1991 Gulf War and in Kosovo. The recent American experience in Afghanistan will then be presented to illustrate both the impact that Net-Centric Warfare can have on operations as well as to give insight to

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<sup>6</sup> Ibid.

the progress the Americans have already achieved in the area of NCW. The paper will then address why the CF must increase its NCW initiatives and concentrate them at the tactical level. Finally, this paper will reinforce the main deductions presented, reinforcing that the CF must maximize its effectiveness in future coalitions by increasing its NCW initiatives and concentrating them at the tactical level.

Net-Centric Warfare refers to "...the linking of platforms (e.g. tanks, ships and aircraft) into a common shared awareness network in order to obtain information superiority and enhance decision-making."<sup>7</sup> In past conflicts, troops had to be in close proximity to each other in order to mass firepower. This was primarily due to communications limitations and the inability of commanders to efficiently move their forces over the battlefield. "As a result, a geographically dispersed force was relatively weak, and was unable to quickly respond to or mount a concentrated attack. Locational constraints also paced a force's ability to move rapidly while maintaining cohesion and logistics support."<sup>8</sup> Advances in technology have changed all of that.<sup>9</sup> Now, the networking of several units together allows for near real-time information sharing and gathering. When properly networked together, these systems enable warfighters "to create and exploit a common situational awareness, increase our speed of command, and

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<sup>7</sup> Perry et al., *Measures of Effectiveness for the information-Age Navy: The effects of Network-Centric Operations on Combat Outcomes* (Santa Monica: Rand, 2002), xiv  
[http://www.crad.dnd.ca/publications/issues/issues14\\_e.asp](http://www.crad.dnd.ca/publications/issues/issues14_e.asp) downloaded 19 Mar 04

<sup>8</sup> Alberts, David S., Garstka, John J. and Stein, Frederick P. *Network Centric Warfare: Developing and Leveraging Information Superiority*. Washington: DoD C4ISR Cooperative Research Program. 1999. 90

<sup>9</sup> *Ibid.*, 90.

get inside the enemy's OODA [observe, orient, decide, and act] loop.”<sup>10</sup> In effect, technology “... allows us to move from an approach based upon the massing of forces to one based upon the massing of effects.”<sup>11</sup> This significantly diminishes the risk to troops in the field by limiting their “battlespace footprint.”<sup>12</sup>

More specifically, net-centric warfare is really the integration of three technological revolutions: sensor technology; information technology; and advances in weapons technology.<sup>13</sup>

Sensor technology is twofold: one movement toward sensors able to achieve near-real-time surveillance over vast areas, and another toward smaller, cheaper, more numerous sensors that can be netted to detect, locate, identify, and track targets. Together, these trends can produce systems that will provide the quantity and quality of data needed to create a situational awareness that is “global in scope and precise in detail.”<sup>14</sup>

“The revolution in information technology will bring the geometric increase in computing power necessary to process, collate, and analyze this vast quantity of sensor

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<sup>10</sup> Edward A Smith, Jr. *NETWORK-CENTRIC WARFARE What's the Point*, NWC Review, Winter 2001 <http://www.nwc.navy.mil/press/Review/2001/winter/art4-w01.htm> –downloaded 12 Mar 04

<sup>11</sup> Alberts, David S., Garstka, John J. and Stein, Frederick *Network Centric Warfare: Developing and Leveraging Information Superiority*. Washington: DoD C4ISR Cooperative Research Program. 1999. 90

<sup>12</sup> *Ibid.* 90

<sup>13</sup> Edward A Smith, Jr. *NETWORK-CENTRIC WARFARE What's the Point*, NWC Review, Winter 2001 <http://www.nwc.navy.mil/press/Review/2001/winter/art4-w01.htm> –downloaded 12 Mar 04. 2

<sup>14</sup> Edward A Smith, Jr. *NETWORK-CENTRIC WARFARE What's the Point*, NWC Review, Winter 2001 <http://www.nwc.navy.mil/press/Review/2001/winter/art4-w01.htm> –downloaded 12 Mar 04. 2

data, and it will provide the means to distribute information to any recipient or ‘shooter’ anywhere in the world at near-real-time speeds.”<sup>15</sup>

Finally, “...the weapons revolution is a matter of increasing numbers of precise munitions by reducing costs. It, like the sensor revolution is twofold. Better streams of targeting data can permit a ‘dumbing down’ of expensive guidance packages, while new designs, electronics, ‘lean’ manufacturing, and mass production can decrease the cost for a given level of accuracy and capability.”<sup>16</sup>

“These revolutions and [the] change in how we think about war have come to be embodied in the idea of network-centric operations.”<sup>17</sup> But there is a trade-off. The main benefit that better intelligence, increased communications, and Precision Guided Munitions (PGMs) bring to the fight is speed. In order to achieve that speed, the battle has to be far more centralized. “In reality, tempo of operations is not solely a function of technology; it is also a function of the centralization of command. One can choose to trade centralized control for speed and scope of operations.”<sup>18</sup>

In summary, NCW is the exploitation of the advancing technologies in sensors, information, and weaponry and then combining their capabilities through the networking together of several units. The significance to the CF in recognizing that NCW is the integration of three technologies is that it may allow Canada a more gradual approach for

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<sup>15</sup> Ibid., 2

<sup>16</sup> Ibid., 2

<sup>17</sup> Ibid., 2

<sup>18</sup> Ibid., 2

transformation. For example, the CF could initially focus on upgrading the sensors on their tactical assets to better contribute to a coalition Intelligence, Surveillance and Reconnaissance (ISR) picture. It is also worth noting that while NCW allows modern warfighters to migrate from operations based on the massing of forces to effects-based campaigns through increased speed and accuracy, the price is more centralized command and execution.

The 1991 Gulf War marked the first time that “Canadian Forces have fought in combat operations as a coalition since the Korean War.”<sup>19</sup> It was also the first time in history that units from the air, ground and sea environments were linked so extensively together. However, a closer look at how the CF performed in both the 1991 Gulf conflict and more recently Kosovo plainly reveals the capability gap between the CF and other allies, most notably, the United States.

Shortly after the UN condemned the Iraqi invasion of Kuwait in August 1990, Canada likewise denounced Iraq's actions and was one of the first nations to commit to a U.S.-lead coalition. In addition to the destroyers Canada had immediately dispatched to help enforce the trade blockade against Iraq, Canadian CF-18s were also deployed to the region and were flying combat air patrols (CAPS) by October 13, 1990. Within two weeks of the commencement of the air war in early 1991, the CF-18s were tasked to provide air cover and attack ground targets as members of the air coalition forces. “The

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<sup>19</sup> [http://en.wikipedia.org/wiki/Gulf\\_War](http://en.wikipedia.org/wiki/Gulf_War) - downloaded 12 Mar 04



role of the Canadian army was limited to force protection of the Canadian troops operating out of Doha, Qatar.”<sup>20</sup>

While the Canadian Navy enjoyed a reasonable amount of success integrating with other coalition ships, “Canada’s Ships ultimately contributed to about 25 percent of all inspections undertaken by the 100-strong multinational fleet...,”<sup>21</sup> the Canadian air force did not fair as well.

The CF-18s were deficient in two major areas. In the first place, they were not equipped with the secure, frequency agile (Havequick) radios. As a result, they were unable to join the initial strike packages since they could not speak with the Airbourne Weapons and Control Systems, or any other members in the package, unless they were to communicate over unsecured radios. Therefore, during the early days of the war, they were given a defensive counter air (DCA) role over the waters of the Arabian Gulf which was outside of the immediate threat area. Secondly, the CF-18s lacked the capability to fire precision guided missiles (PGMs). Despite the fact that only 10 percent of munitions dropped during the 1991 Gulf War were PGMs, noting this limitation serves to point out that in 1991, the CF was already behind its allies in technology which contributed to the diminished role the CF-18s were given in the Gulf. Although it could be argued through statistics that the CF contributed significantly during the 1991 Gulf War, it must be stated that it was only after it was determined that the Iraqi counter-air threat was minimal that

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<sup>20</sup> Mark Zuehlke, *The Canadian Military Atlas, The Nations Battlefields from the French and Indian Wars to Kosovo*, Stoddart Publishing Co. Limited, Toronto 2001. 205

<sup>21</sup> *Ibid.*, 205

“...on February 20, [1991] the CF-18s were assigned ground-attack task using regular iron bombs and cluster bombs.”<sup>22</sup>

During the NATO-led Balkan air campaign in 1999, there were some noticeable differences in the role played by the CF compared to the 1991 Gulf War. In March of 1999, when NATO ordered air attacks to force Yugoslavia to comply with the peace agreement, once again Canadian CF-18s were involved. This time, unlike during the 1991 Gulf War, “...on 24 March 1999, just before midnight Adriatic time, four CF-18 Hornets launched from Aviano...”<sup>23</sup> carrying GBU-12s ([laser] guided bomb units). “Over the 78 days and nights, the six, then twelve, then eighteen Canadian CF-18s from Aviano flew a total of 678 combat sorties over nearly 2600 flying hours.”<sup>24</sup> Of the 532 bombs they delivered, nearly 361 were laser guided.<sup>25</sup> But perhaps more importantly and directly because of the CF-18s acquiring their limited PGM capability, they were front and centre of an American dominated campaign. “The limited Precision Guided Missile capability purchased for the CF-18 fleet as a result of the Gulf War is what allowed Task Force Aviano to be ‘on the first team’ with its valuable day/night capability to deliver laser-guided bombs.” But the PGMs were the only change made to the CF-18s since the 1991 Gulf War. In Kosovo, just as in the 1991 Gulf War, “Canada was the only nation not equipped with anti-jam radios. This meant that if the Canadians were to participate, the entire NATO air effort would have to use uni-frequency, jammable radios. Although

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<sup>22</sup> Ibid., 207

<sup>23</sup> LCol David Bashow, Colonel Dwight Davies, Colonel Ander Viens, LCol John Rotteau, Maj Norman Balfé, Maj Ray Stouffer, Capt James Pickett and Dr. Steve Harris, *Mission Ready: Canada’s Role in the Kosovo Air Campaign*. Spring 2000, Canadian Military Journal. 55

<sup>24</sup> Ibid., 55

<sup>25</sup> Ibid., 55

the enemy did not demonstrate any significant jamming capability, had they done so, in all probability Canada would have been told politely to go home.”<sup>26</sup>

In summary, the 1991 Gulf War demonstrated that because of significant technological deficiencies, the CF-18s were initially limited to second line DCA. This secondary role remained in effect until it was clear that the Iraqi’s posed no jamming threat and only then when the Americans consented to the use of unsecured radios for in-theatre operations. In Kosovo it was still much the same story. Although there were some great success stories, these were once again attributable more to enemy deficiencies rather than CF capabilities. What is important to note however, is that the limited PGM upgrade made to the CF-18s put Canadian fighters on the leading edge with many of the allies, albeit in a benign environment. This is important from a CF transformation perspective because it illustrates the impact even one NCW modification can make. The significance of this section is to demonstrate, that Canada is not only behind her allies in NCW initiatives but, also to illustrate the importance of it if Canada is to continue to fight along side her allies in a coalition. This section also serves to show that even one modification to an asset can make a difference in Net-Centric Warfare.

The examples of CF participation in the 1991 Gulf War and Kosovo are practical for providing insight into both the origins of NCW and the growing gap in capabilities between the CF and other allies. However, it does not give a clear indication of where NCW is today or where it might be heading. In order to properly address CF needs, the actual capability of NCW will now be discussed using the American efforts in

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<sup>26</sup> Ibid., 60

Afghanistan. The American actions in Afghanistan demonstrate the degree to which NCW allows the US forces to be so interoperable at the tactical level and emphasizes that Canada cannot approach NCW from solely a land, sea or air perspective.

In Afghanistan, "...the long-sought goal of networking weapons platforms with sensor platforms came to fruition in this austere environment where both the need and the advantages became apparent."<sup>27</sup> The reason for this was because "...U.S. Central Command had to employ ground forces in the form of special operations teams that would be tied into forces entering from sea platforms. All these forces needed to be networked with navel and air force platforms to deal with fleeting targets."<sup>28</sup>

But, the networking of the sensors and the shooters in real time was really only part of the requirement. The Joint Direct Attack Munitions (JDAMs) for example, were directed to their targets by global positioning system signals and UAVs were being linked to AC-130 gunships.<sup>29</sup> Furthermore, "...many of the weapons platforms needed to be updated on the fly. In the case of B-2 bombers flying from bases in Missouri, this required a capability to change mission tasking while the bombers were en route."<sup>30</sup> Finally, "...carrier-based aircraft also needed that capability to deal with the dynamic nature of their targets. These aircraft were flying the equivalent of a trip from the Gulf of Mexico to St. Louis, and they had to be able to network with the forces on the ground."<sup>31</sup>

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<sup>27</sup> Robert K. Ackerman, *Afghanistan Is Only the Tip of the Network-Centric Iceberg*  
<http://www.us.net/signal/Archive/April02/afghanistan-april.html> – downloaded 7 Mar 04

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

If, as Robert Ackerman suggests, that this "...is only the tip of the Network-Centric Iceberg" then the true potential of NCW is still before us. If this is indeed the case then the CF, despite currently lagging behind her allies in the area of NCW, still have time to increase their NCW initiatives by further transforming equipment and force structure. The issues of why it is important for Canada to both increase its Net-Centric Warfare initiatives and why the CF needs to concentrate them at the tactical level will now be addressed. In the course of doing so, several fundamental questions need to be addressed.

The first issue that will be discussed is the matter of whether or not Canada even needs to participate in global conflicts. Does Canada have a requirement to get involved in international conflicts and if so, does it have to be on the front lines in high intensity clashes? As pointed out in the 1994 White Paper, "...the world's population is growing rapidly, putting pressure on global political, financial and natural resources, as well as on the environment."<sup>32</sup> Additionally, regional conflict, famine and poverty have significantly increased the number of refugees and other people being displaced. These regional collapses stem from a breakdown of authority and are becoming a major source of instability.<sup>33</sup> The 1994 White Paper continues to point out that "...among the most difficult and immediate challenges to international security are civil wars fuelled by ethnic, religious and political extremism. That being said, Canada cannot escape the consequences of these conflicts, whether in the form of refugee flows, obstacles to trade,

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<sup>32</sup> 1994 White Paper on Defence, [http://www.forces.gc.ca/admpol/eng/doc/white\\_e.htm](http://www.forces.gc.ca/admpol/eng/doc/white_e.htm) - downloaded 7 Mar 04

<sup>33</sup> Ibid.

or damage to important principles.”<sup>34</sup> Furthermore, “the spread of advanced weapon technologies has emerged as another security challenge of the 1990s. The transfer of weapons of mass destruction and ballistic missile delivery capabilities to so-called ‘rogue’ regimes is of particular concern.”<sup>35</sup> Because of this, “...increasingly, armed forces are being called upon to ensure safe environments for the protection of refugees, the delivery of food and medical supplies, and the provision of essential services in countries where civil society has collapsed.”<sup>36</sup> As the White Paper surmises, “...the world is neither more peaceful nor more stable than in the past. Canada's defence policy must reflect the world as it is rather than the world as we would like it to be.”<sup>37</sup>

So certainly there is a need for stabilizing forces in the world and by all accounts, it is in Canada’s best interest to contribute, as many of the events mentioned above may directly or indirectly impact Canada. But it is also evident that Canada, like many nations is unable to achieve world stability single handedly. It is for this reason that Canada’s foreign policy is to assist in the maintaining of international peace and preventing violent conflict through a range of initiatives to include collective security and defence arrangements.<sup>38</sup> These collective security and defence arrangements include organizations such as the North American Aerospace Defence Command (NORAD) and the North Atlantic Treaty Organization (NATO). Therefore, if it is Canada’s Foreign Policy to contribute to world stability through collective arrangements then Canada has a responsibility to provide forces that can effectively contribute to these organizations by

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<sup>34</sup> Ibid.

<sup>35</sup> Ibid

<sup>36</sup> Ibid.

<sup>37</sup> Ibid.

<sup>38</sup> Department of Foreign Affairs, *Global Issues, Peace and Security*, [http://www.dfait-maeci.gc.ca/foreign\\_policy/global\\_issues-en.asp](http://www.dfait-maeci.gc.ca/foreign_policy/global_issues-en.asp) - downloaded 7 Mar 04

working within them. As the other members of organizations such as NORAD and NATO<sup>39</sup> migrate towards Net-Centric Forces and concepts, it is imperative that Canada do likewise or they simply won't have the capabilities to participate in such organizations in the future.

“As a nation that throughout its history has done much within the context of international alliances to defend freedom and democracy, Canada continues to have a vital interest in doing its part to ensure global security, especially since Canada's economic future depends on its ability to trade freely with other nations.”<sup>40</sup>

Having determined that it is Canada's best interest to participate in global security through collective defence and security arrangements, the next area that needs to be discussed is to what degree Canada should participate. If Canada's contribution to its collective defence partners and future coalitions were limited to a support role or even a niche role, then perhaps Canada's requirement to get involved in NCW initiatives might be rendered academic or at least reduced in magnitude. This type of argument raises the question of whether Canada needs to prepare and provide forces for full spectrum warfare. Perhaps a niche capability would be more appropriate for the Canadian Forces. In this way Canada could offer a coalition highly specialized equipment and effectively contribute that way.

There are those who will point out that it might be in Canada's best interest to focus on niche or limited armed forces capabilities. For example “... an Air Force

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<sup>39</sup> Lieutenant-General J.O. Michel Maisonneuve, *Institutionalizing Change in NATO*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X)

<sup>40</sup> 1994 White Paper on Defence, [http://www.forces.gc.ca/admpol/eng/doc/white\\_e.htm](http://www.forces.gc.ca/admpol/eng/doc/white_e.htm) - downloaded 7 Mar 04

concentrating on expeditionary Intelligence, Surveillance and Reconnaissance capabilities might reap greater dividends than if it tried to maintain a force with all the traditional capabilities.”<sup>41</sup> The problem with these types of arguments is that they fail to take into account that Canadian security concerns are two-dimensional and consist of an international aspect as well as a domestic responsibility. To that end, as Douglas Bland points out, “...people who suggest that Canada might develop ‘niche roles’ based on a small range of capabilities, or purposefully abandon one capability for another, discount the negative effects such a policy would have not only on foreign policy, but also on domestic security.”<sup>42</sup>

Douglas Bland further points out that it is important to maintain multi-faceted core capabilities as they provide governments with the most usable assets to support national security, defence and foreign policies.<sup>43</sup> “The evidence from the missions the CF have undertaken in the last ten years convincingly supports this conclusion.”<sup>44</sup>

Canada has stated that it will provide for its own security and contribute to global security through membership in collective arrangements and as a member of coalitions.<sup>45</sup> Therefore, if the other members of these organizations are migrating towards NCW, then Canada has an obligation to follow suit if it wishes to be able to participate and effectively contribute. The 1991 Gulf War and Kosovo examples provide

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<sup>41</sup> Paul T. Mitchell, *A Transformation Agenda for the Canadian Forces: Full Spectrum Influence*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 61

<sup>42</sup> Douglas L. Bland, *Finding National Defence Policy in 200*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 5

<sup>43</sup> *Ibid.*, 5

<sup>44</sup> *Ibid.*, 5

<sup>45</sup> Department of Foreign Affairs, *Global Issues, Peace and Security*, [http://www.dfait-maeci.gc.ca/foreign\\_policy/global\\_issues-en.asp](http://www.dfait-maeci.gc.ca/foreign_policy/global_issues-en.asp) - downloaded 7 Mar 04



acknowledgement that an intellectual and technological gap in warfighting concepts and capabilities between [Canada], the US and other NATO Alliance nations was and still is increasing.<sup>46</sup> NATO has realized that "...one way to reduce the gap and remain abreast of new developments within the US was to ensure that the transatlantic link remained strong. Only thus would NATO be able to provide forces to operate alongside or with the US, be it in high-intensity warfighting, counter-insurgency or peace operations."<sup>47</sup> For Canada, the same reasoning holds true. If Canada is to stay relevant to her allies as a contributor to global security, then it is important for Canada to increase its Net-Centric Warfare initiatives. The question of why the CF needs to concentrate them at the tactical level will now be addressed.

The answer is straightforward. "From the Boer War to Afghanistan, Canada's campaigns have fitted in alliance wars. So have Canada's armed forces."<sup>48</sup> Historically Canada has always been a force provider and that is not likely to change in the future. As the bulk of our contributions are made at the tactical level, concentrating NCW initiatives at that level only makes sense. As discussed earlier, the main benefit that better intelligence, increased communications, and PGMs bring to the fight is speed. In order to achieve that speed, the battle has to be far more centralized. "In reality, tempo of operations is not solely a function of technology; it is also a function of the centralization of command. One can choose to trade centralized control for speed and scope of

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<sup>46</sup> Lieutenant-General J.O. Michel Maisonneuve, *Institutionalizing Change in NATO*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 37

<sup>47</sup> Ibid, 37

<sup>48</sup> Desmond Morton, *Understanding Canadian Defence*, A Penguin/McGill Institute Book, 2003, 206

operations.”<sup>49</sup> The temptation therefore, for any organization would be to spend resources in order to expand NCW capabilities to higher levels of command i.e. either at the operational level or the strategic level. But for Canada, as a provider of forces at the tactical level, we really have no requirement to concentrate NCW initiatives at either the operational or strategic level save for those few requirements dictated through NORAD, NATO or national requirements. Therefore, the reasonable course of action would be to concentrate the NCW initiatives at the tactical level and after those requirements are satisfied then perhaps NCW initiatives could be expanded to other levels. For Canada, much like NATO, “...a ‘platform-oriented’ military culture must mutate into network-oriented systems, and there must be a progression from deconfliction of separate warfighting entities to the full integration of service capabilities.”<sup>50</sup> To accomplish this, NCW initiatives must be concentrated at the tactical level.

In conclusion, this paper has demonstrated that in today’s security environment Net-Centric warfare has emerged as the way ahead for the United States forces and for those who wish to fight along side the US and provide a meaningful contribution, they too will have to evolve.

Net-Centric Warfare offers incredible capabilities to current and future forces. By exploiting advancing technologies in sensors, information, and weaponry and then combining their capabilities through the networking together of several units, future

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<sup>49</sup> Edward A Smith, Jr. *NETWORK-CENTRIC WARFARE What’s the Point*, NWC Review, Winter 2001 <http://www.nwc.navy.mil/press/Review/2001/winter/art4-w01.htm> –downloaded 12 Mar 04. 2

<sup>50</sup> Lieutenant-General J.O. Michel Maisonneuve, *Institutionalizing Change in NATO*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 36

forces will operate with greater force, more precision, and at a faster rate than ever before. But where does Canada fit?

The 1991 Gulf War and Kosovo examples serve to show that Canada was and still is falling behind in NCW initiatives. Technological deficiencies could have severely restricted Canada's CF-18s during both of these campaigns. Only when it was clear that there was not a jamming threat would the Americans consent to the use of unsecured radios for in-theatre operations were the CF-18s allowed to fully participate. But the 1991 Gulf War and Kosovo air campaign were only glimpses into what NCW could offer.

The American campaign in Afghanistan illustrated the true potential of NCW "... where both the need and the advantages [of NCW] became apparent."<sup>51</sup> But the Afghanistan example also brought to light that current NCW capabilities are only the 'tip of the iceberg. For Canada this suggests that if was already behind, failing to increase their NCW initiatives will only exasperate the problem.

But for Canada, the importance of increasing its NCW initiative is more than keeping up with technology. If Canada wishes to ensure its way of life and defend its values through collective security arrangements with other nations then Canada will have to be relevant to those countries. To do so means being able to fight along side those forces as an asset, not a liability. "If Canadian Forces cannot exchange and process

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<sup>51</sup> Robert K. Ackerman, *Afghanistan Is Only the Tip of the Network-Centric Iceberg*  
<http://www.us.net/signal/Archive/April02/afghanistan-april.html> – downloaded 7 Mar 04

information in a timely and efficient fashion with other members of a coalition or alliance, then they will be ineffective and thus unable to contribute meaningfully to the effort.”<sup>52</sup> Therefore, to stay relevant, the Canadian Forces must maximize its effectiveness in future coalitions by increasing its Net-Centric Warfare initiatives. Furthermore, as force providers, the CF must concentrate these initiatives at the tactical level.

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<sup>52</sup> Sean Maloney as quoted by Paul T. Mitchell, *A Transformation Agenda for the Canadian Forces: Full Spectrum Influence*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 59

## Bibliography

Mark Zuehlke, *The Canadian Military Atlas, The Nations Battlefields from the French and Indian Wars to Kosovo*, Stoddart Publishing Co. Limited, Toronto 2001

What is the Joint Global Command & Control Systems (GCCS-J),  
<http://www.disa.mil/gccs/> - downloaded 6 March 2004

Sean Maloney as quoted by Paul T. Mitchell, *A Transformation Agenda for the Canadian Forces: Full Spectrum Influence*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X)

Edward A Smith, Jr. *NETWORK-CENTRIC WARFARE What's the Point*, NWC Review, Winter 2001 <http://www.nwc.navy.mil/press/Review/2001/winter/art4-w01.htm> – downloaded 12 Mar 04.

Lieutenant-General J.O. Michel Maisonneuve, *Institutionalizing Change in NATO*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X,

Robert K. Ackerman, *Afghanistan Is Only the Tip of the Network-Centric Iceberg*  
<http://www.us.net/signal/Archive/April02/afghanistan-april.html> – downloaded 7 Mar 04

Paul T. Mitchell, *A Transformation Agenda for the Canadian Forces: Full Spectrum Influence*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X, 61

Douglas L. Bland, *Finding National Defence Policy in 200*, Canadian Military Journal (Winter 2003-2004 ISSN 1492-465X,

Department of Foreign Affairs, *Global Issues, Peace and Security*, [http://www.dfait-maeci.gc.ca/foreign\\_policy/global\\_issues-en.asp](http://www.dfait-maeci.gc.ca/foreign_policy/global_issues-en.asp) - downloaded 7 Mar 04

Desmond Morton, *Understanding Canadian Defence*, A Penguin/McGill Institute Book, 2003

1994 White Paper on Defence, [http://www.forces.gc.ca/admpol/eng/doc/white\\_e.htm](http://www.forces.gc.ca/admpol/eng/doc/white_e.htm) - downloaded 7 Mar 04

LCol David Bashow, Colonel Dwight Davies, Colonel Ander Viens, LCol John Rotteau, Maj Norman Balfe, Maj Ray Stouffer, Capt James Pickett and Dr. Steve Harris, *Mission Ready: Canada's Role in the Kosovo Air Campaign*. Spring 2000, Canadian Military Journal

[http://en.wikipedia.org/wiki/Gulf\\_War](http://en.wikipedia.org/wiki/Gulf_War) - downloaded 12 Mar 04

Alberts, David S., Garstka, John J. and Stein, Frederick *Network Centric Warfare: Developing and Leveraging Information Superiority*. Washington: DoD C4ISR Cooperative Research Program. 1999

Perry et al., *Measures of Effectiveness for the information-Age Navy: The effects of Network-Centric Operations on Combat Outcomes* (Santa Monica: Rand, 2002), xiv  
[http://www.crad.dnd.ca/publications/issues/issues14\\_e.asp](http://www.crad.dnd.ca/publications/issues/issues14_e.asp) downloaded 19 Mar 04

General Raymond Henault, Chief of the Defence Staff *ANNUAL REPORT 2002-2003*,  
[http://www.cds.forces.gc.ca/pubs/anrpt2003/message\\_e.asp](http://www.cds.forces.gc.ca/pubs/anrpt2003/message_e.asp)

Judy G. Chizek, *Report For Congress: Military Transformation: Intelligence, Surveillance and Reconnaissance*, January 17 2003. <http://www.fas.org/irp/crs/RL31425.pdf>  
downloaded 20 April 03,