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Canadian Air Force Transformation Demands Cultural Change

By/par

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Abstract

The end of the Cold War, the revolution in military affairs (RMA) and on-going transformation process in the US military are compelling the Canadian Air Force (CAF) to transform. Past transformations and their challenges have illustrated that culture, is an important part of the RMA. However within the CAF, aircraft technology is the natural focus of the present RMA debate. This paper asserts that the CAF's culture of "primacy of flying aircraft" will have to change for the CAF to transform. The new threat environment requires a focus on capabilities not on flying aircraft, and the RMA requires a culture that will permit trade-offs and synergies between old and new technologies. Changing the culture will require the demonstration of tangible results, through re-invigorated doctrine development and significant changes to the strategic organizational structure of the CAF.

> History tells us that strategic thinking requires courage and perseverance: courage because it demands departures from mainstream thinking and perseverance because it takes time for institutional mainstreams to move and join the "discovered" innovative courses of thought.[1]

Embracing Carl Builder's challenge, it is clear the Canadian Air Force (CAF) has a cultural problem.[2] Its existing culture of "primacy of flying aircraft" will have to change for the CAF to transform to meet the challenges of the new security and technological environments. The revolution in military affairs (RMA) and the end of the Cold War are compelling Canada and its allies to transform their militaries. As part of this transformation process, the CAF can only lead and control its culture. Thus to remain relevant in defending Canada the CAF must transform its culture.

This transformation agenda that originated in the US is starting to be expressed in various vision statements within the CAF and other CF elements. During a presentation at the Canadian Forces Staff College, the Chief of the Air Staff (CAS) Lieutenant General Penne presented his vision for transforming the air force, *Strategic Vectors.* The vision is to transform the air force from "a primarily static, platform-focused, post-Cold War 20th century to an air force-expeditionary network-enabled, capability-based, results-focused, 21st century aerospace force."[3] The presentation and the establishment of a vision for the air force were certainly welcome in light of published guidance of the Army's "Advancing with Purpose" and the Navy's "Leadmark." Within the CF, this transformation agenda was first articulated in *Shaping the Future of the Canadian*

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[1] Scot Robertson, "Into The Sun ? Reflections on Canadian Airpower: Past, Present and Future," *Aerospace Power Forum 2003 Beyond One Hundred Years of Theory and Practice*; available from http://www.umanitoba.ca/centres/defence/aerospace%20power%20forum/forum%20papers.htm accessed 2 Feb 2004.

[2] Carl Builder is a well-known author on US military culture and author of *The Masks of War* and *The Icarus Syndrome*.

[3] Lieutenant General Penne, "Transforming Canada's Air Force" presentation to CSC 30, 7 January 2004.

Forces: A strategy for 2020, where it called for a "strategic re-orientation" of the CF. This theme was recently re-iterated in the *CDS Annual Report 2002-2003: A Time for Transformation*:

> If there was ever a time for a progressive, transformative agenda, that time is now. To do so, in my view, we must move forward aggressively and accelerate our efforts to transform the Canadian Forces.[4]

The former Minister of National Defence (MND), John McCallum, noted the requirement for transformation in the department's *2003-2004 Report on Plans and Priorities*:

> This [the transformation] will require significant new thinking. We will have to make difficult choices. These choices will have to be asymmetric … That means being guided by new fiscal, technological and strategic realities to make selective, strategic choices on what capabilities we will invest in, what new concepts and capabilities we will pursue or ignore, and what old capabilities we will maintain, reduce or eliminate.[5]

David Pratt, the new MND, is also continuing to support the effort to "transform the Canadian Forces into a 21st century force."[6]

CF Transformation is defined as a "process of strategic re-orientation in response to changed circumstances, designed to make substantial changes in the nation's armed forces to ensure their continued effectiveness and relevance."[7] After more than a decade of downsizing and countless re-engineering efforts, this latest buzzword for change could easily be dismissed as another business planning initiative to save cost and "doing more with less." However, this would be a mistake because the need for CAF transformation is more profound. This paper will assert that for the CAF to transform, its organizational culture must change. The strategic circumstances for CAF

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[4] General R.R. Henault, "Chief of the Defence Staff Annual Report 2002-2003," available at http://www.cds.forces.gc.ca/pubs/anrpt2003/message_e.asp accessed 4 January 2004.

[5] Department of National Defence, *2003-2004 Report on Plans and Priorities* (Ottawa: DND Canada, 2003), iii. Available at http://www.vcds.forces.gc.ca/dgsp/00native/rep-pub/ddm/rpp/rpp03-04/j-RPP03-04_e.asp accessed 8 January 2004.

[6] Defence Minister David Pratt Speech at 20th annual CDAI Seminar February 26, 2004. Available from http://www.forces.gc.ca/site/newsroom/view_news_e.asp?id=1312 accessed 10 April 2004.

transformation will be investigated and it will be shown why changing the organizational cultural, or simply culture in the context of this paper, is key to the transformation process. Relevant aspects of organizational culture and it relationship to technology will then be discussed before presenting the main challenge to CAF transformation, its "primacy of flying aircraft culture." How this culture must change to meet the new threat environment and adapt to new technologies will then be explored, along with implementation recommendations.

The focus on the CAF transformation and its cultural aspect is intentional for several reasons. The CAF has been behind the other elements in articulating a transformation vision. The delay in publishing the vision, *Strategic Vectors,* along with the fact that the *Aerospace Capability Framework* that detail how the vision will be implemented was published in advance, illustrate the difficulty the air force is having in articulating a transformation policy.[8] Aside from the *CDS's Annual Report* and the recent initiative by the CAS, transformation has not been a focus of discussion within the CAF at large. The first exposure and real debate of these ideas among air force officers occurs at Staff College. Finally, there has been a great deal published on the military transformation process; however, little attention on the CAF specifically. This lack of attention is especially acute in the subject of culture, or as Dr. Allan English has noted there has been "very little research" on cultural aspects of the CAF.[9] Hopefully, this paper will aid in stimulating the discussion and debate.

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[7] Department of National Defence, *2003-2004 Report on Plans and Priorities* (Ottawa: DND Canada, 2003), 15. Available at http://www.vcds.forces.gc.ca/dgsp/00native/rep-pub/ddm/rpp/rpp03-04/j-RPP03-04_e.asp accessed 8 January 2004.

[8] Department of National Defence, A-AG-007-000/AF-002 *Aerospace Capability Framework: A Guide to Transform and Develop Canada's Air Force*. (Ottawa: Chief of the Air Staff-Director General Air force development, 2004)

[9] Dr. Allan D. English, *Understanding Military Culture: A Canadian Perspective* (Department of National Defence, Defence and Civil Institute of Environmental Medicine: Toronto, 2001): 65.

TRANSFORMATION

This process of military transformation is not unique to Canada. Its principal allies (Australia, UK, US, and NATO) have also identified the requirement for their militaries to transform. The strategic circumstances that have changed are two that have historically influenced military organizations, threat and technology. In Canada's case interoperability with the US is also driving transformation.

An initial assessment of the transformation process would also suggest that the level of government funding, especially for the provision of expensive aerospace equipment, would be critical to transformation. This transformation could be seen as the great hope to solve decades of reduced funding that has manifested itself in the "rust-out" of the CAF and alleviate the CAS concern that the air force is "fragile."[10] Unfortunately in Canada's case, defence funding and security consideration have historically been subordinate to economical concerns, a sentiment captured by historian Desmond Morton.

> Canadian Defence Policy must satisfy four criteria. It must protect our security, preserve our sovereignty, respect sentiment and, above all, observe strict economy.[11]

This observation is not new; this approach to defence funding has been included in past Defence White Papers. As part of the 1970 Defence White Paper, Defence Minister Donald Macdonald asserted that "defence requirements" could in no way be considered an input into the defence budget. In his view, "There is no obvious level for defence expenditures in Canada."[12] This thinking has continued into the most recent White Paper where, "...fiscal considerations are a key

[10] Holly Bridges, "One on one with the Chief of the Air Staff," *Canadian Air Force News Room,* 4 March 2004 available at http://www.airforce.forces.ca/news/2004/03/04_e.asp accessed 10 April 2004.

[11] J.R. Colombo, *John Robert Colombo's Famous Lasting Words* (Toronto: Friesens, 2000), 153

[12] Major Jeff Tasserson, "Fact and invariants; the changing context of Canadian Defence Policy," *Canadian Military Journal* (Summer 2003): 27.

factor in formulating an appropriate and realistic defence policy."[13] In a Canadian context, the idea of funding to the CF being significantly increased is not realistic, the CF will have to do the best it can with what it gets. For CAF transformation, funding levels will remain relatively constant and not be significantly influenced by the security situation or the RMA. The relatively constant funding level, at best, will not influence the adaptation of new technology; it will just facilitate transformation within the existing funding envelope.

Threat

The predictable threat faced by Canada during the Cold War is gone. Although the threat of conflict and nuclear war was very real and dangerous, it was also relatively simplistic in hindsight. The bi-polar balance between the US-led NATO and the Soviet Union-led Warsaw Pact stabilized the global geo-political situation. Globally, nation states were relatively strong and aligned themselves with either side. The geo-political motivations of communist state governments were known, along with their military strategies and capabilities. As a result, the western militaries spent nearly 40 years establishing facilities, procuring equipment and refining doctrine and military organizations to counter the communist threat. For the CAF, this included forces based in Europe as a part of NATO to repel a Soviet land invasion, along with an array of radar warning sites, forward operating bases, and fighter aircraft within NORAD to repel Soviet intercontinental bombers coming over the pole. This strategy of "containment" started by the US President Truman in the 1950's was successful and one to which all western nations had grown accustomed. It is no surprise, that in the wake of the unexpected collapse of the Soviet Union and the accompanying dramatic change in the geo-political situation, the Western Alliance security policy was "incoherent

[13] Department of National Defence. *1994 Defence White Paper* (Ottawa: Canada Communication Group, 1994), Chapter two Domestic Considerations. Available from http://www.forces.gc.ca/site/Minister/eng/94wpaper/white_paper_94_e.html accessed on 8 April 2004.

and lacked direction."[14] With Russia joining the G-8 and the creation of the NATO-Russia Permanent Joint Council, the threat changed from being a symmetric threat between two poles to more asymmetric with one pole; namely, the "West" led by the US.[15] The sudden rise of ethical nationalism, failed and rogue states and non-state terrorism in the wake of the collapse of Soviet Union also complicated the new security environment.

The emergence of the "New World Order" in the 1990's with the US as the world's only super-power and the requirement for a peace dividend was not orderly or cheap. The end of the Cold War unleashed several ethnic conflicts from Yugoslavia to Rwanda. Several nations such as Somalia drifted into lawlessness, and other nations like Afghanistan openly supported terrorist organizations like al Qaida. This new security environment is unlike the Cold War; it is more diverse, complex, and unpredictable. Amidst all this change the CAF has increased its operational tempo to demonstrate the commitment of Canadians to international peace and security.[16]

Some may argue that with the end of the Cold War, Canada did not really need a military and could return to the isolationist attitude during the interwar period of the 1920's and 30's when the threat to Canada was characterized by Senator Raoul Dandurand as "living in a fireproof house, far from the sources of conflagration."[17] Our isolated location and close proximity to the only remaining superpower meant there was no immediate military threat to Canada, especially if the Soviet Union was gone. Unfortunately, the ambiguous nature of Canada's security environment noted in the 1994 White Paper on Defence was clarified in the shock of 11 September.

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[14] Micheal Mastanduno, "preserving the Unipolar Moment: Realist Theories and US Grand Strategies after the Cold War," *International Security* 21, no. 4 (Spring 1997), 51.

[15] NATO, *The Prague Summit and NATO's Transformation-A Reader's Guide* (Brussels: NATO Public Diplomacy Division, 2003)

[16] Dr. Thierry Gongora (D Air SP2-5, NDHQ), Presentation to Command and Staff Course (CSC) 30, Canadian Forces College, Toronto, "The Use of Air Power in Peace Support Operations" 6 February 2004.

[17] Major Jeff Tasserson, "Fact and invariants; the changing context of Canadian Defence Policy," *Canadian Military Journal* (Summer 2003): 22.

> It is impossible to predict what will emerge from the current period of transition, but it is clear that we can expect pockets of chaos and instability that will threaten international peace and security. In short, Canada faces an unpredictable and fragmented world, one in which conflict, repression and upheaval exist alongside peace, democracy and relative prosperity. [18]

The horrific events in New York and Washington brought home to Canadians the reality of this new uncertain and unpredictable security environment and the western societies' vulnerabilities to the asymmetric threat from the outside world. The disruptions at the Canada-US border, and the stranding of thousands of passengers in Atlantic Canada bound for the US, demonstrated the economic dependence and common values between Canadians and Americans, and clarified the post Cold War threat environment. The traditional Canadian perception of there being a low risk to a direct attack could be changing as Canadians start to perceive an indirect attack as a higher risk in this new security environment. Recently, The Canadian Council of Chief Executives warned the Prime Minister that if Canada:

> does not take bold steps to convince the U.S. it is serious about defence and North American security, Canada's economic relations with its largest trading partner could suffer. All of the progress Canada desires on the economic front depends on a critical invigoration of the North American defence alliance…. If we are going to do our duty to ourselves and to Canadian values, we have to show the world that we are no longer a free rider on American coattails and a toothless advocate of soft power, and instead are serious about being a true ally in the struggle for global peace and security.[19]

In the aftermath of 11 September this new threat environment was concisely articulated in the US National Strategy in 2002.

> With the collapse of the Soviet Union and the end of the Cold War, our security environment has undergone profound transformation….. New deadly challenges have emerged from rogue states and terrorists. However, the nature and motivations of these new adversaries, their determination to obtain destructive

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[18] Department of National Defence. *1994 Defence White Paper* (Ottawa: Canada Communication Group, 1994), Chapter one International Environment. Available from http://www.forces.gc.ca/site/Minister/eng/94wpaper/white_paper_94_e.html accessed on 8 April 2004.

[19] Mike Blanchfield, "Business Leaders Call for Beefed-up Military Must prove nation not riding U.S. coattails, CEOs say" *CanWest News Service*, April 6, 2004.

> powers hitherto available only to the world's strongest states, and the greater likelihood that they will use weapons of mass destruction against us, make today's security environment more complex and dangerous.[20]

The security environment the CAF has grown accustomed to during the Cold War has changed profoundly. Although the threat of a nuclear holocaust has decreased new and more unpredictable and complex threats have emerged. This change in threat, after 40 years of the Cold War, necessitates that the CAF transform to properly defend Canada.

US Interoperability

The close relationship between Canada and the US has at times been a source of great angst in Canada and a source of friction in how the two nations implement their values on the world stage. The overriding fact remains, Canada and the US maintain the world's longest undefended border and a close and enduring relationship in all aspects of human endeavor. In terms of security, this relationship was solidified over 65 years ago in the uncertain times leading up to World War II. Speaking at Queen's University in August 1938, American President Franklin Roosevelt pledged, "the people of the United States will not stand by if domination of Canada is threatened by any other Empire." Shortly after this speech Canadian Prime Minister Mackenzie King replied

> We, too have our obligations as good friendly neighbour, and one of them is to see that, at our own instance, our country is made as immune from attack or possible invasion as we can reasonably be expected to make it, and that should the occasion ever arise, enemy forces should not be able to pursue their way either by land, sea, or air to the United States from Canadian territory.[21]

The subsequent establishment of the Permanent Joint Board on Defence (PJBD) in 1940 and follow-on creation of the North American Aerospace Defence (NORAD) has linked Canadian defence policy to that of the US and highlighted the continuing dilemma facing Canadian defence policy. The US will protect North America alone if required; the implication is that Canada should

[20]Bush , George W., The National Security Strategy of the United Staes of America (Washington, DC: The White House, September 2002); available from http://www.whitehouse.gov/nsc/nss.html; accessed 23 October 2003.

increase its defence to alleviate the US concerns. This overriding fact of US defence policy driving Canadian defence has been re-enforced with the emergence of global terrorism.

Since the end of the post Cold-War it has become increasingly clear that inoperability with US military and US air forces (US Army, US Air Force, US Navy) has been critical. Coalitions of varying composition have characterized post-Cold War air campaigns, ranging from UN-based Operation Provide Comfort or NATO-based Operation Allies force to ad hoc "coalitions of the willing," as in Operation Enduring Freedom (OEF). Integral to the make-up of all these coalitions has been American leadership and a USAF-based "operating system" for air operations. The level of interoperability with the US is the main factor that determines if a nation has the option to contribute to the main effort to support world security. Recently, a "dual-tiered" structure of coalitions has emerged, with nation's able to integrate with the US on one level and other "flag-waving" participating nations on the other. This was the case in OEF where for reasons of interoperability the US declined to have allies such as Germany, France, Italy and Spain participate in the air offensive.[22] Since "Canada needs armed forces that are able to operate with the modern forces maintained by our allies and like-minded nations against a capable opponent – that is, they must able to fight alongside the best, against the best."[23] It must be ability to operate effectively alongside its main ally, the US.

The successful application of new technologies since the end of the Cold War, as demonstrated during the attacks on al Qaida and Taliban in Afghanistan and the removal of Saddam Hussein's regime, have confirmed the potential of RMA technologies and validated the US

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[21] James Eayrs, *In Defence of Canada*, Volume. 2 (Toronto: University of Toronto Press, 1959), 177–183.

[22] Center for Defense Information "Terrorism Project" available from http://www.cdi.org/terrorism/strategy.cfm accessed 3 February 2004.

[23] Department of National Defence. *1994 Defence White Paper* (Ottawa: Canada Communication Group, 1994), Chapter 3, Combat-Capable Forces. Available from http://www.forces.gc.ca/site/Minister/eng/94wpaper/white_paper_94_e.html accessed 8 April 2004.

transformation agenda.[24] Real transformation of the US military is on-going and supported by long reaching procurement decisions. The cancellations of the multi-billion dollar Crusader artillery program (2002) and the Comanche armed reconnaissance helicopter program (2004)[25] in favour of the Future Combat System[26] and Unmanned Aerial Vehicles (UAVs) are concrete examples that the transformation process is starting to take hold in the US military. Clearly, as the US improves its equipment, the CF and the CAF cannot match the magnitude and firepower of each weapon systems, the Canadian taxes payer would not permit it. But the magnitude of the transformation in the US military will require the CAF to transform in selected areas that it deems important to remain relevant and creditable domestically and internationally.

Within this transformation strategy there is also a clear linkage between transformation and importance of the relationship between the Canadian and US military. As noted earlier, Canada's defence policy has been strongly influenced by our southern neighbour, and this trend is continuing in the area of military transformation. As John McCallum noted in Parliament on May 29, 2003, "Since 1940, Canada has entered into a solemn covenant with the United States to jointly defend our shared continent."[27] Although there has been no formal defence policy review since 1994 that specifically articulates Canada's position with regards to military transformation and interoperability with the US, there have been several strategic level documents within the CF and the CAF along with numerous speeches by the CDS and the past and present MND on the

[24] Donald Rumsfeld, "Transforming the Military", *Foreign Affairs* 81, no.3 *(*May/June 2002): 8-9

[25] Washington Post, "Army scraps troubled copter plan" 24 February. Available from http://www.globalsecurity.org/org/news/2004/040224-comanche-scrapped.htm accessed 10 March.

[26] The Future Combat System will be a revolutionary system providing greater mobility while achieving an overall system weight approaching 40 tons (<50 tons desired). The FCS lethality goals include high probability of kill in extended direct fire ranges as well as long ranges (10Km+ desired) in non line-of-sight conditions.

[27] John McCallum, Minister of National Defence, 37th Parliament, 2nd session, Hansard no. 108, May 29, 2003, at 1100. Available from www.parl.gc.ca/37/2/parlbus/chambus/house/debates/108_2003-05-29/HAN108-E.htm accessed 10 December 2003.

requirement of interoperability with the US for transformation. *Shaping the future of the Canadian Forces: A Strategy for 2020* captures this requirement for interoperability.

> Our most important ally now and for the future is the United States where our strong relationship has long benefited both countries. We must plan to nurture this relationship by strengthening our inter-operability with the US Armed Forces, training together, sharing the burden for global sensing and telecommunications and pursuing collaborative ways to respond to emerging asymmetric threats to continental security.[28]

More recently, in February 2004, the CDS echoed this strategic level requirement.

> We want them to operate effectively, interoperate effectively with their allies and do things as safely as possible with the right force protection, the right equipment, the right training and obviously the right leadership. And if we don't do it, quite frankly, we will lose the ability to do what we do so well both here and abroad. [29]

Due to the Canada's enduring relationship, shared geography and economy with the US, and there is a requirement for the CF to remain interoperable with the US military during this transformation.

Revolution in Military Affairs

Even prior to 11 September, US defence policy was undergoing a significant restructuring to adapt from a predictable foe to asymmetric threats from states and non-state terrorist organizations. In addition to adjusting to the changing threat environment, this restructuring sought to transform the US military from an industrial era military structure to an information age structure by harnessing the new technologies. This dramatic change in the nature of warfare brought on by the innovative application of new technologies combined with dramatic changes in doctrine,

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[28] Department of National Defence, Shaping the Future of Canadian Defence: *Shaping the future of the Canadian Forces: A Strategy For 2020*, (Ottawa: Department of National Defence, 2000), 9. Available from www.vcds.dnd.ca/cds/strategy2k/intro_e.asp) accessed 10 December 2003.

[29] General R.R. Henault, Chief of the Defence Staff, Speech at 20th annual CDAI Seminar February 26, 2004 available from http://www.cds.forces.gc.ca/pubs/speeches/26-Feb-04_e.asp accessed 10 April 2004.

operational and organizational concepts is referred to as the Revolution in Military Affair (RMA).[30] The result fundamentally alters the character and conduct of military operations.

With the clear advantage the West has in terms of military technology why is there a requirement to change the status quo? What lessons can be learnt from past transformations? What will be the challenges to the RMA ?

Clearly no other nation could hope to defeat NATO or the US in a conventional conflict. However, advances in technologies and how they are employed are no longer the sole property of the stable nation state. Terrorists have been innovative in the use of modern technology to attack western societies' vulnerabilities; the concepts of hijacking airlines to use them as missiles or bombing commuter trains to change a nation's government are grave familiar examples. To counter this revolutionary new and deadly means of attack, NORAD invested heavily in equipment, doctrine, and new organizational concepts. What would happen if the potential adversaries obtained addition technologies related to WMD or advanced missile systems? Complicating the effort is the difficulty in stopping the proliferation and diffusion of potentially deadly technology. In terms of missile technology, nations such as North Korea with Taepo Dong II ICBM can threaten North America. In addition to the direct threat of WMD and intercontinental ballistic missiles, there is a threat through the vulnerability of the space-based communications, navigation, surveillance, and reconnaissance systems on which the economies and security of all advanced industrial states rest.[31] The proliferation of technologies and weapons with increased range and power will pose a significant threat to Canada and its allies. Therefore it is critical that the CAF

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[30] Sean M. Maloney & Scot Robertson, "The Revolution in Military affairs: Possible implications for Canada," *International Journal*, 54, no. 3 (Summer 1999).

[31] Shane Levesque, *Arms Control And Ballistic Missile Defence In The Post-Cold War Strategic Environment*, Second Annual Graduate Student Symposium- Implications for Canada 12-13 November 1999, (Toronto: Conference of Defence Association Institutes, 1999). Available from http://www.cda-cdai.ca/symposia/1999/Levesque99.htm accessed on 2 February 2004.

adapt to this new strategic circumstance of the spreading of technology with a RMA to counter improvements in technology by potential enemies.

There are several historical examples of RMAs. Authors like Tofelger have postulated there have been three such revolutions: Stone Age to Agrarian age; Agrarian age to Industrial age; and the present one, from Industrial age to Information age. Others, like Krepinevish, have suggested that there have been several revolutions, including a number of twentieth century examples with the introduction of the tank, the aircraft carrier, and the airplane.[32] In the early 1970's, Soviet anxiety related to development of more advanced military technologies in the US, such as precision weapons during the later stages of the Vietnam War, increased the emphasis on RMA thinking by the Soviet General Staff.[33] They asserted that in addition to increased in precision of guided munitions (PGM) there would be great advancements in the areas of surveillance and targeting along with parallel developments in command and control systems. Together they formed what the Soviets termed a "reconnaissance-strike complex" that could attack a variety of targets at extended ranges. The Soviets postulated that PGM technology combined with information technology, especially in the areas of surveillance and targeting information, will bring the "military art to the point where quality is becoming far more important than quantity."[34]

What we learn from past and on-going RMAs is that transition will take place over an extended period of time. The term “revolution” implies a rapid change; however, as Andrew Marshall and others have observed that “revolution” in terms of the RMA implies the magnitude of

[32] Elinor C. Sloane, *The Revolution in Military Affairs* (Montreal: McGill-Queen’s University Press, 2002) 4-8
[33] Andrew F. Krepinevish, Jr., *The Military-Technical Revolution: A Preliminary Assessment* (Washington, DC: Center for Strategic and Budgetary Assessments, 2002), 5
[34] Ibid, 6.

change that has evolved from old to new methods of warfare.[35] In Tofelger's concept of RMA the transition took several decades. Similarly, the changes from WW I trench warfare in 1918 to the mobile mechanized warfare of WW II in 1939 that included wide scale use of tanks, aircraft carriers and aircraft along with the shift on organizational concepts and doctrine, evolved over several years. The present RMA arguably started with the invention of the transistor in the 1960's with the benefits of the RMA being demonstrated during the 1991 Gulf War.

Challenges to a RMA arise from several sources outside technology, namely the leaders and people think in the organization. The short-term tenure of military leadership and the importance of weighing short-term immediate needs against the more abstract longer-term needs is a difficult task, especially with pressing political concerns and in the case of CAF, the condition of an aging aircraft fleet. The recent MND Advisory Committee on Administrative Efficiency highlighted this point on CF leadership.

> The relatively high rates of "churn" among senior management leave the CF with many General or Flag Officers (and senior non-commissioned members) who have too little time at the strategic level before retirement to develop the depth and breadth of experience required to contribute fully to institutional leadership at the most senior levels.[36]

And, of course, most military organizations are extremely conservative because senior commanders hate to make mistakes when the price is the lives of their personnel, which is perfectly understandable especially in the operation of aging equipment.[37] However, innovation, or change, also comes into conflict with this military/civilian bureaucracy. Bureaucracies, by their very nature, are not supposed to innovate, but centrally control processes and reduce risk, thus

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[35] Elinor C. Sloane, *The Revolution in Military Affairs* (Montreal: McGill-Queen's University Press, 2002) 32 and Andrew F. Krepinevish, Jr., *The Military-Technical Revolution: A Preliminary Assessment* (Washington, DC: Center for Strategic and Budgetary Assessments, 2002): 3.

[36] Minister of National Defence's Advisory Committee on Administrative Efficiency, 21 August 2003 available from http://www.forces.gc.ca/site/Focus/AE/report/EXsumm_e.htm accessed on 10 April 2004.

increasing the certainty of the outcome.[38] This organizational rigidity can have a direct impact on the lack of experimenting with new technologies and organizational concepts required for transformation. Again, the MND Advisory Committee on Administrative Efficiency observed this human dimension of resisting change within the CF. "There is a cultural aversion to programmatic risk and, as a result, resistance to all but the most incremental change"[39] In reviewing past transformations the institutionalizing of change within the military may be a solution,[40] while others argue it will "guarantee its death."[41] Changing the core mission the CAF has grown comfortable with will be a contentious issue. Finally, the lack of tangible threat perceived by senior leaders and the officer corps could remove the motivation to change. In past successful RMAs, leaders "have always thought in terms of fighting wars against actual rather than hypothetical opponents, with actual capabilities, in pursuit of actual strategic and political objectives."[42] From a CAF perspective, this transformation will be more challenging because it will be done during a time of peace. In reviewing the speed and various challenges of transformation, it is apparent that its not just technological dependent but is a human activity. How an organization resists or adapts technology depends on how the organization thinks, or its culture.

Today, the US is the leader in attempting to harness the RMA first identified by the Soviets to protect against the new asymmetric vulnerabilities and to sustain its strategic position that

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[37] Desmond Morton, "What to Tell The Minister", A Paper Prepared for the Minister of National Defence, McGill Institute for the Study of Canada, (Ottawa: Government of Canada, 25 March 1997), 8-9.

[38] Barry Watts and Williamson Murray, "Millitary Innovation in Peacetime" in *Military Innovation in the Interwar Period*, ed. Williamson Murray and Allan R. Millett (Cambridge: Cambridge University Press, 1996): 415.

[39] Minister of National Defence's Advisory Committee on Administrative Efficiency, 21 August 2003 available from http://www.forces.gc.ca/site/Focus/AE/report/EXsumm_e.htm accessed on 10 April 2004.

[40] Dr. Scot Robertson, "Experimentation and Innovation in the CF," *Canadian Military Journal* (Summer 2000).

[41] Williamson Murray, "Innovation: Past and Future " in *Military Innovation in the Interwar Period*, ed. Williamson Murray and Allan R. Millett (Cambridge: Cambridge University Press, 1996): 326.

[42] MacGregor Knox and Williamson Murray, "The Future Behind Us," *The Dynamics of Military Revolution*, ed. MacGregor Knox and Williamson Murray, (New York: Cambridge University Press, 2001): 192.

secures peace and stability in the world.[43] It is a prominent aspect of US National Security Policy and the 2001 Quadrennial Review.[44] The US President promoted this concept of RMA during his 2000 election campaign, where he called on the United States to

> modernize some existing weapon systems and equipment necessary for current tasks. But our relative peace allows us to do this selectively. The real goal is to move beyond marginal improvements—to replace existing programs with new technologies and strategies: to skip a generation of technology . . . . I intend to force new thinking and hard choices. "skipping a generation of technology"[45]

One of the key observations by the United States' main architect of the RMA, US Secretary of Defense Donald Rumsfeld's, highlights that RMA is more than just technology.

> We must transform not only the capabilities [technology] at our disposal, but also way we think, the way we train, the way we exercise and the way we fight. We must transform not only our armed force, but also the department that serves them by encouraging a culture of creativity and prudent risk-taking.[46]

Rumsfeld comment on the RMA is perceptive. It recognizes that technology is not the only element of the RMA, but includes culture, or the way we think. This point also parallels the definition of the RMA noted earlier that requires "dramatic changes in doctrine, operational and organizational concepts," and the challenges in past RMAs. Thus, in addition to changes in technology, the present RMA also requires changes in the way of thinking about how the military uses technology, or a change in military culture.

The introduction of the information technology that began in the 1970's has the potential to render old military technologies irrelevant, or a revolution in military affairs. In addition to the advances in the level of technology, it has also become more diffuse and potentially more available

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[43]US Department of Defence , *Transformation planning Guidance* (Washington, DC: US Department of Defense, April 2003); 3. Available from http://www.oft.osd.mil; accessed 10 January 2004.

[44] Bush , George W., The National Security Strategy of the United Staes of America (Washington, DC: The White House, September 2002); available from http://www.whitehouse.gov/nsc/nss.html; accessed 23 October 2003.

[45]George W. Bush, Speech on Defense Policy, The Citadel, Charleston, SC, September 23, 1999.

[46] US Department of Defence , *Transformation planning Guidance* (Washington, DC: US Department of Defense, April 2003); 1. Available from http://www.oft.osd.mil; accessed 10 January 2004.

to adversaries. For the CAF to remain relevant it must adapt new technologies to remain ahead of potential adversaries. But technology in itself is not the complete answer; changing military culture is also a critical aspect of RMA.

In reviewing the several driving factors behind transformation, it is clear that the CAF must adapt to the new threat and RMA while remaining interoperable with the US military. This challenge for change is compounded by the enduring fiscal restraint on the military and the fact the most of the CAF equipment is presently near the end of its usable life. The CAF must react to the security, technological and within the given fiscal environment to maximize the defence of Canada. For CAF, the concept of culture and its relationship to technology are especially important, because culture is one aspect of the transformation process that the CAF can lead and control. The concept of culture and its relationship to technology will be explored in the next two sections.

ORGANIZATIONAL CULTURE

> Military culture may be the most important factor not only in military effectiveness, but also in the process involved in military innovation, which is essential to preparing military organizations for the next war[47]

To understand what aspects of air force culture must change for transformation, the concept of culture and the factors that influence it must be examined. A familiar aspect of CAF culture, namely flight safety, will be used to illustrate the concepts.

The term "organizational culture" has been debated at length by academics in several fields of social sciences over the last century. Edgar Schein defines organizational culture as "a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to *be* considered valid and, therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."[48] Diana C. Pheysey notes it as "a programmed way of seeing *events or situations* derived from beliefs and values."[49] Finally, Ralph Kilman describes culture as "the set of important assumptions, often unstated that members of a community hold in common."[50] Common to all definitions is the requirement for a set of underlining assumptions that the organization considers valid and dictate how members think, believe and act.

Internally to the organization, culture provides a sense of unity to its members and increases their commitment through improved unity of command and morale; it provides a way for members to interpret what is occurring within an organization. The link to morale, how members think about issues is a very powerful concept, especially because members may rarely think about the

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[47] Williamson. Murray, "Does Military Culture matter," *Orbis* 45, no. 1 (Winter 1999): 27.
[48] Edgar H. Schien, *Organizational Culture and Leadership* (San Francisco: Jossy-Bass Inc., 1992), 12.
[49] Diana C. Pheysey, *Organizational Cultures, types and Transformations* (London: Routledge, 1993), 3.
[50] Kilmann, Ralph H. et al., *Gaining Control of the Corporate Culture* (San Francisco: Jossey-Bass Publishing, 1986), 267-268.

underlying assumption. Yet culture influences how a member performs and reacts to potential change. Externally, culture also re-inforces the values of the organization and acts as a mechanism to shape thinking and performance. As one US military study noted "culture is the bedrock of military effectiveness."[51] These basic underlying assumptions, the elements of espoused values and artifacts form the three different layers of organizational culture, and are key to establishing a foundation for understanding organizational culture.[52]

Layers of Organizational Culture

Basic assumptions are often taken for granted and are consistent across an organization. They are normally not written down, but are beliefs that are strongly held by the entire group and are the basis for an organization's actions. In short, they are what a member thinks when they look in the mirror and reflect on what is important to themselves and the CAF. These assumptions have been proven to work over time and are normally not confronted or debated within the organization. As a result, they are often difficult to change. When these basic assumptions are challenged or questioned, it creates a great deal of anxiety and defensiveness that may result in distorting and denying what is affecting the organization.[53] From a CAF perspective, the basic assumption of "Flight Safety First" is a positive aspect that all can understand and readily perceive. Air force personnel are innately cautious when dealing with aircraft maintenance and operations; failure to do so can have immediate results in terms of aircrew lives. Based on this cultural assumption the RCAF, and later the CAF, developed a culture of flight safety that has all the elements of organizational cultural.

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[51] Ulmer, *American Military Culture* (Washington, DC: Center for Strategic & International Studies): xv.
[52] Edgar H. Schien, *Organizational Culture and Leadership* (San Francisco: Jossy-Bass Inc., 1992): 17.
[53] Colonel Glenn W. Nordick, "Exploring the Psychological Contract of the Canadian Forces," (masters thesis, US Army War College Carlisle Barracks, Pennsylvania, 1999), 10. Colonel Nordick's exploration of the psychological contract of the CF asserts a detailed list of basic assumptions unique to the CF.

Espoused values reflect organizational values that “ought to be” as opposed to what “is” that basic assumptions articulate. Values are often documented in oaths, or policy guidance; in the case of the military policy includes doctrine, organizational structure, and authorities. The value of eliminating the accidental loss of aviation resources, or flight safety, is espoused at all levels of command. Squadron and wing commanding officers chair quarterly flight safety meetings in which there are active discussions and reflections on past incidents and accidents. At the operational level, representatives from the Directorate of Flight Safety tour all the operational bases to further the educational process and espouse the value of “Flight Safety First.” In fact, flying operations are reduced, if possible, to ensure maximum attendance. At the strategic level this flight safety cultural assumption is espoused in the air force's airworthiness program that manages risks in the engineering and the operation of aircraft. Collectively, these formal expressions of values define the foundation of the organization. They can also be the means by which the leadership integrates change, or transforms, the basic assumptions of the organization. Military transformation strategy publications like Vision 2020 and the future *Strategic Vectors* are examples of espoused values.

Artifacts are the most outwardly recognizable symbols of organizational cultures and things one senses when one encounters an unfamiliar culture. Two key artifacts of flight safety easily apparent to any visitor to an air force squadron are the numerous copies of *Flight Comment* magazine and the pride associated with wearing the Directorate of Flight Safety badge by aircrew and ground crew. *Flight Comment* is arguably the most widely read and respect military publication within the air force. There is good reason for this interest, one that may surprise many army and navy personnel. Air force personnel from all occupations and communities routinely write detailed and critical articles on issues related to aviation safety. Embedded within the magazine are the quarterly "Professionalism" and "Good Show" awards that describe how members

rectified flight safety problems. These awards are highly respected within the air force and a source of great pride for the recipients. The Flight Safety badge is also a coveted artifact that air force personnel receive upon completing the Flight Safety Program course. Competition for this professional development course is very high with only the best and most promising personnel attending. The congruence of artifacts, espoused values and the basic assumption of a flight safety culture ensure that the goals of the flight safety program are achieved and the air force maintains its performance related flight safety.

Culture and Leadership

> Culture is a means by which leaders shape and influence the organization's future.[54]

Throughout history the importance of leadership and its relationship to the military is undeniable; however, the importance of culture is more elusive. Leadership is generally viewed as the art of influencing a group to achieve a goal or mission. Within a large organization, the strategic level of leadership influences culture. The leadership of today's air force can draw several lessons from studying leadership at the operational level due to the complexities and scope of the organizations.[55] Leadership at the operational and strategic levels is more complex than tactical leadership, as it is focused on influencing an organization and its culture rather than individuals.[56] As a new behavior and a way of doing things are seen to be advanced, adopted, and validated they become the norm for how an organization perceives and thinks about future challenges. However, there are no quick fixes, because culture is a pattern of assumptions that are developed over time

[54] Major Gregory C. Gardner, "Generalship in war: The Principles of operational Command," (School of Advanced Military Studies US Army Command and General Staff College, Fort Leavenworth, Kansas, 1987), 40.

[55] Within a military organization there are three levels Strategic, Operational and Tactical. The Strategic level translates political leadership goals in to strategic military objectives. While the Operational level, in turn, creates the operational plan (operational art) to link strategic military objective to the tactical level. The tactical level applies military power (kinetic or non-kinetic) to achieve tactical objectives.

where consistency of long-term leadership is key. Leaders in an organization must understand the underlying assumptions and values and recognize that culture is a key entity, like leadership, that must be understood and cultivated. The recent focus of the CAS on culture as part of the proposed transformation agenda is a welcome boost to raising the profile of organizational culture in the air force.

Organizational culture, within the military and especially in the context of the CAF has not been rigorously studied, even though it is directly linked to leadership. Schien in *Organizational Culture and Leadership* observed, "leadership and culture are two sides of the same coin."[57] He asserts that if a leader successfully influences the adoption of a set of assumptions and values by an organization it will establish the culture for later generations and determine what leadership traits are acceptable. If the environment changes to the point where the underlying values and assumptions of the organization are no longer valid, leadership is required to influence the organization towards a new set of values and assumptions. Therefore, to fully grasp this inflection point and its importance to an organization, leaders must understand the concept of culture to the same depth as the level as leadership.

CAF organizational culture, like leadership, is a powerful yet critical intangible entity that is often taken for granted because of the routine nature of reinforcing assumptions and values. The linkage between leadership and culture means leaders within the air force must understand the importance of culture to allow them to ultimately accomplish the air force's mission, especially in this period of transformation.

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[56] Major Gregory C. Gardner, "Generalship in war: The Principles of operational Command," (School of Advanced Military Studies US Army Command and General Staff College, Fort Leavenworth, Kansas, 1987), 10.

[57] Edgar H. Schien, *Organizational Culture and Leadership* (San Francisco: Jossy-Bass Inc., 1992): 1.

CULTURE VERSUS TECHNOLOGY

The call by McCallum and Rumsfeld for a new way of military thinking, or culture, during this transformation process has also been recently echoed by the CDS.

> First, we must transform the way we perceive and think. While the pressure to transform is being driven largely by new technologies, transformation itself is not only about technology. It is about changing human, organizational and war fighting behavior[58]

During his presentation at the Canadian Force College, Lieutenant-General Penne went further and asserted that changes to the air force's structure, *culture* and operations will be required to transform.[59] Among the air officers in attendance, linking culture to air force transformation raised several intriguing questions, especially since most viewed the transformation process as being linked only to new technology. The reasons why the CAF officers and the public naturally focus on technology and why culture is just as important will be explored.

There is natural tendency of the air force to focus on the technological aspects of transformation. This inclination is due to the technology focus of the transformation debate, the CAF's focus on aircraft for its existence, and the CAF close relationship to the aerospace industry. Generally, military journals and trade magazines have concentrated upon the theme of new technologies that are essential to military transformation and their impact on the future battlefield. This has been reinforced by the focus on what type of equipment can defeat the new threat, which in turn has focused the transformation debate on the capabilities such as precision strike, battlespace awareness, force projection, and jointness.[60] This focus on technology and equipment comes naturally to military personnel and especially to air force personnel, for their existence is based

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[58] General R.R. Henault, "Chief of the Defence Staff Annual Report 2002-2003," available at http://www.cds.forces.gc.ca/pubs/anrpt2003/message_e.asp accessed 4 January 2004.

[59] Lieutenant General Penne, "Transforming Canada's Air Force" presentation to CSC 30, 7 January 2004.

[60] Elinor C. Sloane, *The Revolution in Military Affairs* (Montreal: McGill-Queen's University Press, 2002) 4-8.

upon one of the greatest technology marvels of mankind, the airplane. As the well-known author of *The Icarus Syndrome*, Carl Builders, noted about USAF culture:

> The air force could be said to worship at the altar of technology. The airplane was the instrument that gave birth to independent air forces; and the airplane has, from its inception, been an expression of the miracles of technology[61]

The CAF's natural tendency to focus on aircraft technology is reinforced throughout a member's career. When an individual thinks about joining the CAF the retention and recruiting policies immediately initiate the technological focus. For the air force, being a pilot, engineer or technician of aircraft is the main draw, compared to the "Army Life" or "Navy Life."[62] After joining, army personnel become soldiers and navy personnel become sailors; however CAF personnel remain focused on the aircraft as pilots, engineers, or technicians. The lack of broader institutional focus within the CAF is compounded by the lack of a term linking all air force personnel. The term "air men" is no longer relevant, and to be honest, CAF personnel primarily view themselves in term of their occupations. Recent occupational reorganization and "alternative services delivery" initiatives have reinforced the linkage to platforms and to private industry and facilitating an easier retirement of CAF personnel to the private sector. These close linkages and "transferability" of occupational skills are the main sources of the present retention problem facing the CAF.[63] In the RMA debate, it is understandable that aircraft technology takes the forefront; how to maintain and fly aircraft is reinforced through a CAF members career.

Technology is also tangible; it is easily seen, measured and appreciated even by non-military observers. The appeal of technology is illustrated by the tens of thousands of Canadians who attend air shows, especially when compared to the low level of public debate related to CF

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[61] Carl Builder, *The Masks of War* (Baltimore, Johns Hopkins University Press, 1989): 19.
[62] http://www.forces.gc.ca/site/home_e.asp accessed at 3 march 2004,

manning levels and force structure. Furthermore, one only has to recall the media fascination with precision-guided munitions in the 1991 Gulf War and subsequent conflicts, with a resulting public attraction, to illustrate the interest in technology. Recent debates on the lack of funding for the CF and the CAF have specifically focused on equipment. The decade-long Sea King helicopter saga is probably the best example of the public debate on military equipment. Frequently during this type of debate, military and political leaders argue that the CF is more or less combat-capable based upon the introduction of new or improved military equipment with out considering the broader aspects of CAF. In 2001 General Baril and MND Eggleton asserted to SCONDVA that the CAF was *more* combat capable in 2001 because CF-18s dropped precision guided munitions (PGMs) in Kosovo in 1999, whereas during the 1991 Gulf War they had only dropped unguided bombs.[64,65] Aside from puzzling most CAF officers,[66] the argument that the acquisition of nine PGM pods compensated for the decline of Canada's air force capability during ten years of funding cutbacks, personnel shortages, reduced flying hours and reduced logistic procurement highlights the focus on equipment at the highest level.[67] The procurement of new technology has always drawn public attention due to the expenditure of public funds. Dramatically changing the technology used by the military will elicit scrutiny from politicians and other groups who may want to advocate other government priorities, industrial or regional benefits, or national security requirements. Regardless

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[63] Department of National Defence, A-AG-007-000/AF-002 *Aerospace Capability Framework: A Guide to Transform and Develop Canada's Air Force*. (Ottawa: Chief of the Air Staff-Director General Air force development, 2004): 47.

[64] "Speaking Notes for General J.M.G. Baril, CDS, For an Appearance Before SCONDVA in Ottawa, 3 May 2001" accessed at http://www.vcds.forces.ca/cds/speeches_pdf/030501.pdf on 11 Feb 2002.

[65] "SCONDVA Transcript: State of Readiness of the CF (04 15h30 Oct 01)" Available from http://dgpa-dgap.mil.ca/DGPA/Transcr/2001Oct/01100407.htm accessed 21 Mar 2001.

[66] Maj M.R. Robert, "Canada's Air Force 2001: More Combat Capable After Ten Years of Austerity?" Toronto: Canada Force College Command and Staff Course Paper 2002), 2.

[67] The CF purchased nine NITE Hawk PGM targeting pods in 1998. An additional three have since been purchased for spare parts and maintenance.

of the type of debate, the centre of the discussion has always been the type of equipment or aircraft for the CAF.

This focus on technology is not without critics. Several noted historians on military affairs, such as Williamson Murray, argue that technology has "rarely been more than an enabler of revolution in military affairs in the past, and there is no reason to believe that things will be different in the future."[68] Often the crucial factor distinguishing military organizations in making a successful transition to new military capability is not a technological advantage, but how the vision of emerging technologies and military systems can best be applied through new military doctrine. The most prominent example is the victory of German forces over the French, British, Dutch, and Belgian armies in May-June 1940. Both the Allies and the Germans possessed similar technologies related to mechanized armour and aircraft, and the means to communicate among platforms. However, it was the way the Germans organized and developed new operational concepts related to these technologies, compared to the allies, that led to the success of the Blitzkrieg. The Allies failure to modify their organizations and operating concepts for new technologies led to their initial defeat in WW II it was due to their lack of ability to change their culture. For military organizations in the interwar period, or the CAF today, culture is key to the adaptation of technology.

Innovation is a crapshoot[69]

US Navy Admiral William Owens was not trying to dismiss innovation but to highlight that in the context of changing technology and the uncertain threat environment, planning change is inherently difficult, especially from a Cold War perspective. Because of this uncertainty and a

[68] Williamson Murray, "Thinking about Innovation", *National War College Review*, (Spring 2001), 119. Available from www.nwc.navy.mil/press/review/2001/Spring/art9-sp1.htm accessed 2 Feb 04.

multitude of influencing factors, transformation, like military operational art, is more art than science. Analyses of past military transformations reveal they comprise both scientific and artistic components. Emerging technologies make new military systems possible. Once they mature, commanders can then use them to overcome existing military problems and technological barriers. To exploit these new technologies, commanders must use their skill in applying operational art to develop new operational concepts. To take full advantage, military organizations replace old concepts, organizational structures and technologies with new organizations to execute these dramatically different operational concepts new technologies,[70] similar to the concept of present RMA. Historically, commanders have had to possess the scientific ability, or technological savvy, plus the artistic ability to innovate new ways of thinking, or culture. The same is true for CAF leaders in the present day RMA.

This linkage between organizational culture and technology has also been capture by the USAF Transformation Strategy.

> Transformation is more than new hardware. Equally important, if less glamorous, are the organizational concepts that capitalize on the technological advances and allow the US military to truly transform…. To ensure its ongoing transformation, the Air Force must also modify its *culture* and airmen development to be conducive to transformation and then adapt its organization to institutionalize this new culture.

Similarly, a noted scholar of organizational culture Edgar Schein observed that the concept of culture permits an understanding of "how new technologies influence and are influenced by organizations, because human responses to technology are often critical to the integration of

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[69] Bruce H. McClintock "Vision, Culture, Assessment Transformation Trinity," *Joint force Quarterly*, (Autumn 2000): 27.

[70] Andrew F. Krepinevish, Jr., *The Military-Technical Revolution: A Preliminary Assessment* (Washington, DC: Center for Strategic and Budgetary Assessments, 2002): 3.

technology into an organization."[71] Like the Blitzkrieg illustrated, technological change in itself does not ensure success in military transforming.[72] Cultural change can be more nebulous to understand and appreciate than technological innovation, but of equal importance. In past military transformations, cultural change has been critical and this truth will likely hold in the present military transformation. Due to the natural tendency of the air force to focus on aircraft technology, it is incumbent upon air force personnel to challenge their natural inclinations and focus on culture aspects of transformation.

[71] Dr. Allan English, *Understanding Military Culture: A Canadian Perspective*. (Toronto: Defence and Civil Institute of Environmental Medicine, 2001): 12.

[72] The adaptation of the US Marine Corp to Amphibious operations in the 1930 is other example.

ESTABLISHED CAF CULTURE

> To understand the distinct and enduring personalities [culture] of the Army, Navy, and Air Force is to understand much that has happened and much that will happen in ... military and national security arenas.[73]

Understanding CAF culture is key to understanding how the air force will transform; it is the only aspect of the transformation process that the CAF can lead and control. The underlying cultural assumption that has been developed and reinforced by CAF leadership and the organization over 80-plus years has been the "primacy of flying aircraft."

Since leadership is key to shaping the culture of an organization and culture also shapes leadership, investigating the CAF leadership can illuminate its culture. Unlike the army and navy, the risks of flying and fighting are borne by a small percentage of the air force, namely aircrew. As a result of this increased risk, they have assumed leadership roles in the culture. In the Canadian military this trend started during the inter-war period when new the Canadian Air Service reduced all other occupations to maintain a small nucleus of pilots. This trend was solidified after WW II, but expanded to include aircrew in general, especially in the maritime patrol and helicopter communities where navigators form the majority of the officer corps.[74] This trend continues today where by only aircrew lead flying formation, namely as commanding officers of flying squadrons. Since CAF leadership are aircrew and they derive their strength and creditable from flying aircraft, this leadership will then reinforce, or espouse, the importance of flying. The culture's basic assumption will be molded to assert that preserving aircraft operations, equates to preserving the air force. To go against the culture that permitted them to assume leadership positions would take a tremendous amount of courage and fortitude to change internally. However, the requirement of the transformation will, as Krepinevich noted, challenge the established CAF culture.

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[73]Carl H. Builder, *The Masks of War* (Baltimore: John Hopkins Press, 1989): 3.

> The success of past victories is seductive especially if it does not challenge existing services cultures. This revolution is likely to place even greater emphasis on unmanned aerial vehicles and less on manned cockpits, threatening the prevailing culture of the air force.[75]

If the development of CAF culture is any indication of the future trends it appears that it may not be well positioned to innovate its culture for transformation. This is not to say that air force personnel have not been inventive or heroic at the tactical level. The air force during World War II, Korean and numerous operations since has overcome huge obstacles and has been a source of great pride for Canada. Over the years, the resourcefulness of engineering, maintenance and operational personnel in keeping aircraft airworthy and operational beyond their expected life has been nothing short of a small miracle and reflects their devotion to the air force and the nation.[76] One only has to look at the present age of the Sea King, Hercules, Buffalo, Tutor aircraft fleets compared to the age of the groundcrew and aircrew to understand the level of effort. However, the hypothesis remains, Canada's air force since its inception has been focused at the tactical level with primacy of flying aircraft as its focus. This historic cultural box has been created by several external and internal factors and to transform it will require tremendous vision and leadership.

Even prior to the establishment of the RCAF on 1 April 1924, the blueprint for establishing its culture was being drafted. During WW I, thousands of Canadian volunteered to fly with Royal Flying Corp (RFC) to the point where a quarter of the RFC was Canadian.[77,78] A portion were no doubt motivated by service to the commonwealth mother nation but the real motivation was to fly.

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[74] Ibid, 23.

[75] Andrew F. Krepinevich, Jr., "Why No Transformation," *Joint Force Quarterl* (Autumn/Winter 1990-2000): 97.

[76] To extend the life of the various aircraft fleets the air force has switched from a “safe-design life” to “safe by inspection” for engineering and maintenace. For example the Tutor fleet, used by the Snowbirds, has been extended until 2025, and the Sea King flet has been extended to 2012.

[77] Canada did have a small aviation unit, the Canadian Aviation Corp, consisting of two officers and one mechanic from September 1914 until May 1915.

The aircraft was a recent innovation that defied the bounds of earth and enthralled the public and young men wanting to fly. The quickest way to learn to fly was by joining the RFC, and Canada was a fertile ground for recruiting. This trend of aircrew migration is not unique to Canada. In the early 1940's American "want-a-be aircrew" joined the RCAF when the US did not have the aircraft and was not yet at war.[79] In both cases, loyalty was important, but flying came first. Another interesting observation from WW I is that even though Canada made a significant contribution to RFC, it did not hold any significant operational or strategic level positions within the RFC, nor did it develop any important air power theorists after the war equivalent to Billy Mitchell. The central lesson for Canada was the heroic exploits of Bishop, Collishaw, Barker and others in flying combat missions.[80, 81] The unborn Canadian air force was very much focused at the tactical level during WW I with the main cultural lesson learnt being the importance of flying aircraft.

The establishment of the RCAF on 1 April 1924 was not a grand step of innovation. It was more a force structure exercise and a product of shared culture between Canadian and the British aviators during World War I. It is not surprising that Canada would form its own independent air force after the formation of the RAF in April 1918. Canadian Army Major-General James MacBrien of the General Staff advocated this change in 1923.

> [Canada needs] an organization is based upon that of the Royal Air Force, so that should war again come to the empire any unit might be sent by Canada would be similarly organized and trained to those in the other parts of Empire[82]

From the beginning the force of Canada's air force would be at the tactical level of providing squadrons and aircraft to a larger Empire effort.

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[78]LCol Sylvain Lepage, et al. "Air power Theory," *Air Power at the Turn of the Millennium,* (Toronto, Canadian Institute of Strategic Studies, 1999), 129.

[79]Carl H. Builder, *The Masks of War* (Baltimore: John Hopkins Press, 1989): 23

[80]Canada, Department of National Defence, "Air force History WW I" available at http://www.airforce.forces.ca/hist/ww_1_e.htm accessed 12 December 2003.

[81] More importantly Canada lost over 1500 aircrew during WW II.

During the early years the RCAF embraced both civilian and military roles, and indeed this focus was congruent with the political vision of the RCAF as "machines (that) could be used for civilian purpose-surveying, anti-smuggling etc and the matter of military expenses could be therefore *be* disguised."[83] During the interwar period the RCAF focused on "the conduct of any flying operations required by other branches of Government services."[84] This focus on any type of flying was based on budgetary reality and the desire of what the air force liked doing, flying aircraft.[85]

During World War II the RCAF expanded into the fourth largest air power in the world with over 250,000 personnel in 80 operational squadrons conducting every possible air force role from the British Commonwealth Training Plan to strategic bombing. The fifty fold increase in the size of the air force along with the dramatic increase in the size, speed, and range of aircraft was nothing short of extraordinary.[86] But once again the Canada's air force was focused on the mission of flying aircraft at the tactical level. Canada willingly accepted every role assigned without questioning the overall vision or strategy. This was typified by the lack of debate regarding the strategic bombing campaign as compared to the US Army Air Force. As in WW I, the RCAF plugged into the RAF with aircrew and aircraft to the point where 60 percent of RCAF aircrew were flying in RAF units. The policy of *"Canadianization"* eventually changed the situation towards the end of the war with the establishment of 6 Bomber Group. However, its commander, Air Vice-

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[82] W.A.B. Douglas, *The Creation of a National Air Force* (Toronto: University of Toronto Press, 1986): 57-61

[83] N. Hilmer and J. Granatstein, *Empire to Umpire* (Toronto: Copp Clark Longman Ltd., 1994): 98

[84] Dirk Paquette, "Organizational change and Canada's Air Force," (masters thesis, University of Manitoba, 2001), 52.

[85] Ibid 55A.

[86] Canada, Department of National Defence, "Air force History WW I" accessed at http://www.airforce.forces.ca/hist/ww_1_e.htm on 12 December 2003

Marshell C.M. McEwen, reinforced this tactical level flying culture by his focused on increasing the flying skills and experience to improve morale rather than operational level planning.[87]

The start of the Cold War saw the RCAF become more closely aligned with USAF through NATO and NORAD expansions. However, the RCAF diverted from air power theory of strategic bombing to the more practical nature of mission-centric roles devolved from government. The *1959 White Paper on Defence* started the process of defining the RCAF mission based on equipment available rather than air power theory.[88] This change in the 1950's is arguably the root of Scot Robertson's observation in 2003:

> Force development over the past decades has operated in a manner that can be reduced to a crude and simplistic, but perhaps accurate adage - we want what we want because we have what we have.[89]

The late 1950's also saw the zenith of the post-war air force of 49,000 personnel and 2000 aircraft. As the static nature of the Cold War continued and national leadership desired to exert more control over the military and the RCAF, and later the CAF, its missions became more and more driven by political and budgetary concerns than the concept of air power.

With the advent of missile technology and the Vietnam War the CAF's most influential military ally, the USAF, was also becoming more focused on the debate about what type of equipment an air force required. This developed due to the ascension of the tactical fighter community over the strategic bomber community to the leadership of the USAF, combined with the challenge to its manned flight culture from space technology. The aircraft flying fraternity was

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[87] Dirk Paquette, "Organizational change and Canada's Air Force," (masters thesis, University of Manitoba, 2001), 70.

[88] LCol Sylvain Lepage, et al. "Air power Theory," *Air Power at the Turn of the Millennium,* (Toronto, Canadian Institute of Strategic Studies, 1999), 130.

[89] Scot Robertson, "Into The Sun ? Reflections on Canadian Airpower: Past, Present and Future," *Aerospace Power Forum 2003 Beyond One Hundred Years of Theory and Practice*; available from http://www.umanitoba.ca/centres/defence/aerospace%20power%20forum/forum%20papers.htm accessed 12 December 2003.

very quick to make the distinction between "real men who wore wings and flew jets and those in the emerging missile and space world."[90] This contempt of air force members in the space environment was typified by the terms of "techies, and "space cadets" used by aviators.[91] As the US air force, navy and army developed missile technology, the air force could no longer ignore the efficacy of missile and space systems. Faced with the navy and army developing their own separate systems at the air force's expense, the air force was compelled to absorb the space mission. By the 1980's the USAF internal divisions revolved more and more around technologies, namely platforms, with the main division being between the developing space cultural and the existing aircraft flying cultural.[92] The increased importance of space in the Operation Desert Storm brought these platform divisions to the fore. In *The Icarus Syndrome* Carl Builder asserted that like the character in Greek mythology the USAF "first exploited and later neglected the importance of the idea [air power theory] that gave the institution cohesion, purpose and energy."[93] He argued that due to the love of flight the USAF culture had evolved to be technological focused and platform-specific. If the USAF was platform focused, then the CAF after unification with the increased scope of maritime and tactical aviation resources was certainly aircraft-focused. Like the USAF, the CAF at the end of the Cold War had established a culture of the primacy of flying aircraft with innovation being accomplished within the narrow sub-cultures based on aircraft types.

At the end of the Cold-War the CAF had several firmly established sub-cultures or communities defined by the type of aircraft flown: fighters, maritime helicopter, maritime patrol, transport (search and rescue), tactical aviation, and training. Each community, aside from training,

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[90] Benjamin S. Lambeth, *Transformation of American air power* (Cornell University Press: Ithaca, New York) 2000, 234.

[91] Ibid.

[92] James M. Smith, *USAF Culture and Cohesion: Building an Air and Space Force for the 21st Century* (USAF Academy, CO, USAF Institute for National Security Studies, 1998): 12.

[93] Carl Builder, *The Icarus Syndrome* (Santa Monica, California: RAND, 1994): 36.

could exist on it own. One may suggest that this differentiated perspective of the air force culture was enviable given Canada's geography and the history of unification. However, even on large air force wings, with several different types of aircraft and squadrons, there were cultural differences between organizations due to the fact that they executed completely different tasks and roles and rarely if ever flew together. The various members were still very professional and collegial but their first priority would always be their own community. Another contributing factor has been the tactical focus of the air force and the wide scope of roles that the CAF performs. This has been exemplified by the efforts of the various communities to be interoperable in terms of equipment and doctrine with other CF and US cultures rather than an integrated CAF culture.

a. fighter community through NORAD with the USAF;

b. maritime helicopter community with the Canadian Navy;

c. maritime patrol community with US Navy and Canadian Navy; and

d. tactical aviation community with the Canadian Army.

The transport community provides support to all elements CF and CAF, while the training community supported the entire CAF. In reviewing the effort to be interoperable with other CF elements and air forces within the various US military services, the diverse scope of the CAF is apparent, especially when compared to the USAF. Understanding the divisions between these different solitudes is key to understanding CAF culture and they have and will influence the future air force.

In the post-Cold War environment the increased operational tempo and budgetary pressures have further entrenched the platform solitudes. Operation Friction (1991), Operation Allied Force (1999), and Operation Apollo (2002) and numerous UN missions all confirm CAF's ability to plug tactical level forces into larger US-led coalitions or UN missions supporting the Canadian Army.

Interestingly, Operation Deliverance in Somalia was the exception where there were several communities (maritime helicopter, tactical aviation, and transport) working together in an overseas operation. During the same period the CAF's budget was reduced by 38 percent to fight the national debt and the air force leadership was focused on maintaining "core-combat capabilities," or forces that contributed directly to combat operations, namely the CF-18, CC-130, CH-124, CP-140, and CH-146 aircraft. Given the established culture in the post cold war environment it is understandable that the CAF's leadership approached the required cut-backs based on preservation of platforms or as Douglas Bland has observed "Sometimes, cultural responses may become so dogmatic that problems will be manipulated to fit the culture's preferred expectations and solutions."[94] This effort to preserve a community's number of aircraft and flying hours was exemplified by where and how the cutbacks occurred. Firstly, since the end of the Cold-War until 2002 the number of aircraft and number of squadrons[95] in the "core-fleets" remained constant while the CAF operating budget, number of personnel, and yearly flying rate (YFR) were all drastically reduced.[96,97] Secondly, the steady yearly reduction of the YFR per fleet also highlights how there was no broad strategic vision for change in the new fiscal and security environment. Instead of drastically decreasing one community over another, the percentage of the YFR that a major fleet was allocated compared to the other major fleet communities has remained relatively constant.[98] The budget reduction combined with the strength of the aircraft subcultures place the CAF

[94] Douglas Bland, *Chiefs of Defence* (Toronto: Brown Book Company, 1995): 5

[95] In September 1991 the Government announced the closure of the Canadian Forces Europe, including the 444 and 439 Squadrons. Both were subsequently re-established as Combat Support Squadrons.

[96] Chief of the Air Staff, *Planning Guidance 2003*, Table 2-1.

[97] Department of National Defence, A-AG-007-000/AF-002 *Aerospace Capability Framework: A Guide to Transform and Develop Canada's Air Force*. (Ottawa: Chief of the Air Staff-Director General Air force development, 2004): Annex A.

[98] Directorate of Technical Airworthiness Yearly flying Rate Data (1992-2001)

leadership in a tenable position and resulted in the concept of "shaving the ice." Where cut-backs were incremental and accomplished equally between the communities.

The positive aspects of morale and identification of these sub-cultures can not be over looked, however these "positive advantages can contribute to misalignment at the strategic level."[99] Even the government may, have perceived the protective nature of the communities when it specifically downsized the fighter fleet by 25 percent in the 1994 White Paper. They may have reasoned that there was a risk that the air force would have cut other fleets, such as the fleets that support the army or navy, to preserve the dominant community culture in the CAF, the fighter community.[100]

The annual cutbacks of the CF during each subsequent federal budget in the 1990's combined with CAF culture resistance to preserve "primacy of flying aircraft" meant that the erosion of the CAF was unavoidable. Eventually reductions around the edges of the main culture in form of people, parts, and equipment life reached a point where the CAF leadership had to make the bold decision to drastically cut the number of aircraft to fund improvements. The 1999 *Shaping the Future of the Canadian Forces: A Strategy for 2020* was a significant step that saw the reduction of CF-188 and CP-140 fleets to permit their incremental modernization. At first this significant effort maybe seen as a good midterm solution. But this reduction also illustrates how CAF culture manifests itself it terms of swap quantity for quality. An US aerospace executive noted this retreat from quantity to quality and postulated the "air force will find itself limited to only one very costly

[99] Lieutenant-General Penne, "Strategic Thinking in Defence," *Canadian Military Journal* (Autumn 2001), 21.

[100] Steve James, "Joint Air: Unwanted Role, Air Force's Future !" Aerospace Forum 2003 Centre for Defence and Security Studies University of Manitoba. Available from http://www.umanitoba.ca/centres/defence/aerospace%20power%20forum/forum%20papers.htm. The fighter community does not hold the degree of influence it once did, in fact, if one looks at the Air Force's most senior officers today, tactical or army aviation dominates their backgrounds a condition unimaginable just a decade ago.

airplane sometime in the 21st century."[101] The proposed Joint Strike Fighter will hopefully avoid this fate. But, having a culture based solely on the best aircraft technology instead of the broader concept of airpower maybe putting the cart before the horse. Much of the air force's leadership, and indeed most of the careers of many of its members, has been characterized by the basic assumption of the "primacy of flying aircraft" defending the various communities from cut-backs without an over arching vision outside of protecting aircraft operations.

> *The air force's relatively "Immature Strategic culture is seen as an artifact, with little to tell us about the present, and even less to say about the future."*[102]

Since its inception the CAF main culture entity has the primacy of flying aircraft. The CAF culture artifact has been the aircraft. The numerous aircraft mounted on pedestals at the entrance to any CAF Wing makes it crystal clear that the aircraft is the central artifact. The principal espoused value of the CAF is has been the importance of aircraft flying operations. From its official web site to the recent Aerospace Capability Framework document that espouses aircraft modernization as transformation, the primacy of flying operations is undiminished.[103] The fact that any official aerospace doctrine has not been updated since 1994 reinforces the point that the CAF has not looked beyond aircraft operations for its purpose and is comfortable with the basic assumption that flying aircraft define the purpose of the CAF, rather than any broader concept of air power.[104]

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[101] Carl Builder, *The Icarus Syndrome* (Santa Monica, California: RAND, 1994): 162.

[102] Scot Robertson, *Into The Sun ? Reflections on Canadian Airpower: Past, Present and Future, 2* ,accessed 2 Feb 2003 at http://www.umanitoba.ca/centres/defence/aerospace%20power%20forum/forum%20papers.htm

[103] Andrew F. Krepinevish, Jr., "The Military-Technical Revolution: A Preliminary Assessment", Washington, DC: Center for Strategic and Budgetary Assessments, 2002, 15

[104] The Aerospace doctrine (B-GA-400 series) of publications has not been update since 1994.

CAF CULTURE AND TRANSFORMATION

In this era of transformation, the established culture of the CAF must change; the new security environment and technology demand it. The CAF cannot control the threat or technology, however it can adapt its culture to remain relevant in defending Canada.

During the Cold War the threat was known and the capabilities of the enemy were known, and specific types of platforms could be weighed against the enemy's platforms. The new threat environment is more like fighting a shadow, in which the "where," "when," "how," and "who" will attack are unknown. Defending against a more diverse, complex, and unpredictable security environment will be a more challenging task both domestically and internationally and require the CAF to bring capabilities of air power to a broader government effort both domestically and internationally. The CDS captured the change in the domestic requirement in a recent speech to the Canadian Defence Industry.

> Transformation means changes in the roles and responsibilities of the Canadian Forces and how we do business because with the issues of domestic security …. The Canadian Forces will need to reinforce its ability to support government and certainly to respond not in a first responder context but to respond to domestic emergencies.[105]

Internationally the PM articulated the government's new security policy as:

> This '3-D' approach – the integration of *diplomacy, defence and development* – will serve as the model for Canada's involvement in international crises in the future[106]

In this new environment of unknown enemy platforms, comparing a particular aircraft platform against a terrorist with a box cutter or rifle is irrelevant and not effective. Knowing a nation's vulnerabilities and having the capability to defend, adapt quickly to uncertainty, and then

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[105] General R.R. Henault, Chief of the Defence Staff, Speech at 20th annual CDAI Seminar February 26, 2004 available from http://www.cds.forces.gc.ca/pubs/speeches/26-Feb-04_e.asp accessed 10 April 2004.

[106] Address by Prime Minister Paul Martin at CFB Gagetown, April 14, 2004 CFB Gagetown, New Brunswick.

accomplish a specific effect will be key. US Secretary of Defence notes this capabilities-based approach as "one focused less on who might threaten us, or where, and more on how we might be threatened and what is needed to deter and defend against such threats."[107] The requirement to focus on the capabilities of the CAF to deter and defend potential enemies will place more importance on the capability, or the effect of a particular weapons system rather than the type of platform employed. The CAF's basic assumption of the supremacy of aircraft flying operations that has evolved over 80 years is a barrier to the capability culture required for the new threat.

The fielding of new transformational technologies of precision strike, battlespace awareness, force projection, and jointness are unfortunately in conflict with the prevailing CAF culture.[108] More specifically, the key emerging aerospace technologies of space and unmanned aerial vehicles (UAVs) are in conflict with CAF culture. Budgetary pressure may have been part of the reason for this lack of interest; however, given the basic assumption and espoused values of the air force, space and UAVs have not been a serious part of the vision.

Space is the ultimate high ground for surveillance, navigation, weather, and communication and is a natural extension of air power instead of the army or navy. The air forces of Canada's key allies have space as an integral part of their mission. The US Space Commission Report highlights cohesion problem within the USAF but establishes space operations as an integral part of the air force due to the potential for take-off between aircraft and space systems.[109] In fact the USAF transformation vision states it is "an air and space force moving towards becoming a space and air

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[107] Donald Rumsfeld, "Transforming the Military", *Foreign Affairs* 81, no.3 (May/June 2002): 10

[108] The air force did take away the importance of precision-guided munitions from Operation Friction in the Persian Gulf and prepared the CF-18 aircraft for the Operation Allied Force in Kosovo. However, this was directly in line with preserving the primacy of flying aircraft.

[109] John A. Tirpak, "The Space Commission Reports," *Air Force* 84, no. 3 (March 2001) Available at http://www.afa.org/magazine/march2001/0301space.asp accessed 31 March 04.

force."[110] The RAF have space as a central focus of it doctrine and vision,[111] however in the CF, the lead for space is the Directorate of Space Development under the DCDS, who is the CF chief operator and not a force generator. Furthermore, with the unpredictable security environment and increased operational tempo with normally between 3,000-4,000 CF personnel deployed, the DCDS focus is primarily on international and continental operations, not space technology.[112] The air force, through NORAD, has used space assets for some time and will be the principal element dealing with the emerging Ballistic Missiles Defence plan in the US. The CF involvement in space is an expanding area that needs a champion to advocate capabilities and the joint "consensus-driven" structure of NDHQ is not it. [113] The CAF must take the more difficult path of changing its culture to adjust to space technology rather than the more comfortable route of slicing off space to the joint environment.

The air force's lack of transformational thinking on space is mirrored in the area of UAVs. The CAF has not embraced the transformational capabilities of UAVs and has let others take the lead the in the technology, namely the army. The recent deployment of the Sperwer UAV to Afghanistan that was initial driven by the by the army and the subsequent loss of all four aircraft, are indicative that CAF culture that did not embrace the transformation potential. The CAF's initial stumble has been reduce with the recent progress in developing UAV airworthiness and operations policies for UAVs. [114] But how much of this rapid progress would have been made if the army did

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[110] US Department of the Air Force, *Global Engagement: A Vision for the 21st Century Air Force*, (Washington, DC, 1997):7.

[111] United Kingdom, Royal Air Force Doctrine, APA 1-2-1, available from http://www.raf.mod.uk/downloads/ap3000.html accessed 3 March 2004.

[112] Deputy Chief of the Defence Staff web site. Available from http://www.forces.gc.ca/dcds/default_e.asp accessed 14 April 2004.

[113] Richard J. Young, "Space and the Canadian Air Force: An Attitudinal Challenge," *Space in the 21st Century: Air Symposium 2000,* ed. LCol Dennis Margueratt and Dr. Allan English (Toronto: Canadian Forces College), 114.

[114] Colonel Cottingham A3 Combat Support 1 CAD, telephone conversation with author, 6 April 2004.

not foresee the benefits of UAVs in terms of a RMA technology ? This lack of forward thinking on UAVs may also be another symptom of the CAF cultural focus that Owen Cote of the MIT's Security Studies Program noted with the USAF's development of UAV technology. He reasoned UAV development may have been slower because "UAV's also threatened the air force culture."[115]

These transformational technologies have the ability to improve the CAF. Canada's geography and expansive coastline along with the new security environment means space and UAV technologies have a potential to improve Canada's marine and land surveillance capabilities. A layered system of space, UAV, and reduced manned platforms is an area the air force must investigate rigorously. However, to effectively integrate this ISR capability the air force has to change its culture and take the lead for aerospace surveillance. In addition to surveillance, other areas such as strategic strike also require a bold vision. The on-going US Operation Enduring Freedom has illustrated that Unmanned Combat Aerial Vehicles (UCAV) can conduct offensive counter air-surface (OCA) operations, with reduced risk to personnel. The November 2002 Predator UCAV attack against an al Qaida leader in Yeman with Hellfire missiles, and similar attacks in Afghanistan, are concrete illustrations of the potential. Having the army, navy and now the joint environment developing individual stovepipes will not permit synergy, trade-off and expertise to be developed between manned and unmanned aerospace system.

Present CAF culture is incompatible to the new threat or technological environment. It must change from the primacy of flying aircraft to one based on capabilities where the effect of the weapon system is more important than the platform carrying the weapon system.

[115] Adam Hebert, "New Horizons for combat UAVs," *Air Force Magazine* 86 no. 12 (December 2003)

CHANGING CAF CULTURE

A vision is only an academic exercise if people don't buy in.[116]

As former CAS Lieutenant-General A.M. DeQuetteville noted the vision is not enough to change an organization. A review of past transformations by noted authors Watts and Murray, [117] McClintock,[118] and Smith[119] recognize the importance of vision, influencing culture, and evaluating.[120] To change CAF culture it is essential that leadership establish a vision, or espoused values, then change the basic cultural assumption of the CAF, the primacy of aircraft flying operations. To do so is not easy or quickly accomplished. CAF leadership must articulate what the organization presently believes in and espouse what the CAF should have as its basic assumptions in the future. This effort has started with the CAS vision, or espoused values, of moving from "a primarily static, platform-focused, post-Cold War 20th century to an air force-expeditionary network-enabled, capability-based, results-focused, 21st century aerospace force," with the details forthcoming in *Strategic Vectors* later this year. In addition to espousing a certain set of values, or a vision, the CAF has to validate them through tangible experience and teach them as the correct way to solve internal and external problems. Only then can the basic assumptions change to reflect

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Available at www.afa.org/magazine/dec2003/1203uav.asp accessed 6 February 2004.

[116]Standing Committee on National Defence and Veterans Affairs, *Evidence of the Committee Meeting 19 – 17 April 1997,* (House of Commons:Committees Directorate, 1997) Available at http://www.parl.gc.ca/committees352/defa/evidence/19_97-04-17/defa19_blk101.html access 12 December 2003. Within the air force Flight Plan 97 was an effort to link the espoused values of the organization with the Basic values assumptions of the organization. Lieutenant-General A.M. DeQuetteville noted this linkage when he asserted that "we began by defining our core values of excellence, professionalism, and teamwork, and from those … a vision is only an academic exercise if people don't buy in and aren't personally equipped to participate.

[117] Barry Watts and Williamson Murray, "Millitary Innovation in Peacetime," in *Military Innovation in the Interwar Period* ed. by Williamson Murray and Allan R. Millett (Cambridge: Cambridge University Press, 1996), 410 notes innovation as a process of thinking, designing and testing was the fundamental tenet of military innovation in peacetime innovation, especially for joint weapon system.

[118] Bruce H. McClintock "Vision, Culture, Assessment Transformation Trinty," *Joint force Quarterly*, (Autumn 2000) notes "Peacetime transformation depends on three factors a coherent and congruent vision, a culture to convert that vision into competing concepts of operation, ad a candid assessment of these concepts."

[119] James M. Smith, *USAF Culture and Cohesion: Building an Air and Space Force for the 21st Century* (USAF Academy, CO, USAF Institute for National Security Studies, 1998): 49.

the new vision. A vision is important; however, it must be validated prior to becoming part of CAF culture. The effort of the present air force's leadership to produce an achievable vision is a good start, but more will be required from the next level of leadership and the officer corps at large to convert the vision into concrete decisions about new military equipment, operational concepts, doctrines, and organizational arrangements to fit to the new reality. Failure of CAF officers to validated and reinforce the vision with the establishment of a new basic assumption will allow old basic assumptions and thinking to remain unchanged. As past transformations have illustrated, changing the deep-rooted basic assumption of CAF culture will be a time-consuming and difficult endeavor and is even more daunting given the lack of strategic thought in terms of air power.

Doctrine

Doctrine reflects culture. Reinvigorating and changing CAF doctrine is a critical step in validating a new vision for the CAF and a means to change CAF culture. In comparing aerospace doctrine there is a direct link to organizational culture.

> The fundamental principles, theories, and proven practices that provide broad and enduring guidance for the application of aerospace power.[121]
>
> Doctrine represents the apex of our thinking about the best ways to use air power.[122]
>
> *Doctrine is* the beliefs or ideas, both written and unwritten, about air power.[123]

It could be argued that doctrine could suppress discussion and turn in to "dogma."[124] However, within the CAF there is no discussion to suppress. From a cultural perspective doctrine provides a

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[120] Bruce H. McClintock, "Vision, Culture, Assessment Transformation Trinty," *Joint Force Quarterly*, (Autumn 2000) 52.

[121] Canadian Force College, "Aerospace Doctrine," *Air Symposium, 1999* (Canadian Force College: Toronto, 2000), 3.

[122] Ibid.

[123] Dr. Allan English, *The Evolution of Canada's Air Power or How We can Learn from History* (Presented to the Air Command Air Power Conference, Winnipeg, July 1997): 2.

[124] A term used to describe doctrine when it is used as set of rules instead of guidance.

means to express, thrash-out, and change the CAF culture and guides how the CAF can solve future problems.[125] Unfortunately, "doctrine traditionally has been an area in which the air forces of the world have been most weak."[126] In the case of the CAF this assertion rings especially true. The lack of CAF doctrine was specifically noted in the *CDS 2001-2002 Annual Report.* "The Air Force has established three priority areas for *improvement*. They include the development of new doctrine to enable more effective command and control at the strategic level."[127] For lack of doctrine to be explicit noted in the CDS annual report is a blunt message to the air force to establish doctrine. The lack of doctrine can be directly related to the CAF cultural challenge. In fact, many present day air force officers have not been exposed to the concept of air power or doctrine until Staff College, the CAS initiative of an air warfare centre may change observation in the future but it will not be easy. The general mindset regarding doctrine can be summarized as "we don't need doctrine, we need aircraft!"[128] This is especially troubling because doctrine and air power theory "can provide the foundation and framework for the organization, training, development, employment and sustainment of aerospace forces in support of national or multinational defence objectives."[129] The "father" of the USAF, General Henry "Hap" Arnold in November 1945 summarized the importance of doctrine in terms of future procurement.

> National safety would be endangered by an air force whose doctrines and techniques are tied solely to the equipment and processes of the moment. Present equipment is but a step in progress, and any air force which does not keep its

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[125] Recall Edgar Schein defines organizational cultures as "a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to *be* considered valid and, therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.

[126] Richard P. Hallion, *Strike from the Sky: The History of Battlefield Air Attack, 1911-1945* (Washington, Smithsonian Institution Press, 1989) 329 available at http://www.au.af.mil/au/aul/bibs/apty/apy3bib.htm accessed 2 Feb 2003.

[127] Department of National Defence, A-JS-015-000/AF003 *2001-2002 Annual Report of the CDS-At the Cross Roads* (Ottawa: DGPA Creative Services, 2002): 16.

[128] This is a general theme that has been expressed by several air force officers when introduced to doctrine.

[129] Canadian Force College, "Aerospace Doctrine," *Air Symposium, 1999* (Canadian Force College: Toronto, 2000), 3.

> doctrines ahead of its equipment, and its vision far into the future, can only delude the nation into a false sense of security.

Reviewing CAF publication related to doctrine reveals that the existing doctrine has not been amended since 1994.[130] Lieutenant-General A.M. DeQuetteville's effort to re-ignite air force doctrine with *Out of the Sun* in 1997,[131] as an unofficial version, was an admiral efforts that was not picked up by the air force officer corps. A recent navy effort in creating its doctrine "blew out some cobwebs" and forced the navy to think.[132] Given the lack of doctrinal thinking in the air force, a similar exercise could be arduous but ultimately beneficially as the first step in establishing a new culture that matches the new security environment and on-going RMA.

Change Organization Structure

In addition to thinking and developing doctrine there must be tangible demonstration of the leadership's intent that the culture must change, or CAF personnel will not consider it valid**.** Past transformations have illustrated the requirement for organization changes to reflect the new culture. To take full advantage of new technologies military organizations must adapt new organizations to execute these dramatically different operational concepts with new technologies.[133] The RCAF change in the flight safety aspect of its culture illustrates how this culture change can occur. In the post-World War II environment and in the build-up to the Cold War the RCAF had a culture of "press onward regardless," along with the loss of aircraft and personnel to match.[134] Leadership realized this accident rate could not continue and set about to change a basic cultural assumption. Leadership initiated the process by espousing the value of flight safety first and the concept of "treat

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[130] The Aerospace doctrine B-GA-400 series of publications has not been update since 1994.

[131] Lieutenant-General A.M. DeQuetteville, *Out of the Sun* (Winnipeg:Craig Kelman, 1997)

[132] Dr. Paul Mitchell, "The Revolution in Military affairs and the Canadian air force," in *Air Power at the turn of the Millennium* ed. By David Rudd et al (Toronto: Canadian Institute of Strategic Studies, 1999): 43.

[133] Andrew F. Krepinevish, Jr., "The Military-Technical Revolution: A Preliminary Assessment", Washington, DC: Center for Strategic and Budgetary Assessments, 2002, 3

the disease not the symptoms." It followed this vision by establishing an organization that separated the collection of flight safety evidence from disciplinary actions and increased the number of personnel dedicated to flight safety. Over time, air force personnel

> learnt to trust the system more than in the past and expected it to help them do the job better (and safer). They in turn were willing to come forward and report candidly even when they were deeply involved. No other Air Force has such a philosophy or privilege of information that established a spirit of trust, the benefits of which are still being realized in the CF.[135]

The RCAF transformed a basic cultural assumption of "press on regardless" to an assumption of "flight safety first" by first establishing a vision, then applying continuous and consistent leadership from all levels. To initially influence culture, the RCAF changed organizational establishments and priorities. This requirement for structural change during transformation has also recently being advocated by MND David Pratt.

> Without a fundamental transformation of national-level management framework and practices . . . the CF will not be able to transform itself rapidly enough to adapt to Canada's changing security environment.[136]

For the CAF today, this could be accomplished by having the strategic air staff restructured based on capabilities as opposed to platforms to better reflect the new security environment and technologies. These changes are not superficial or a working group to support the joint environment,[137] but a reorganization along capabilities lines, such as force application, surveillance, and others, instead of platforms. This concrete change parallels the called by the MND's Advisory Committee on Administrative Efficiency.

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[134] From 1953-57 the RCAF loss 476 aircraft and 405 people available from Directorate of Flight Safety http://www.airforce.forces.gc.ca/dfs/docs/AboutUs/a3_e.asp accessed 3 February 2004.

[135] Ibid.

[136] Stephen Throne, "Military bureaucracy needs `urgent' overhaul," *CNEWS,* 3 Feb 2004 available from http://cnews.canoe.ca/CNEWS/Canada/2004/02/03/334768-cp.html accessed 20 March 2004.

[137] Under the VCDS there are a series of joint planning groups and Boards, namely the The Capability Development Working Group (CDWG), Joint Capability Requirements Board (JCRB), and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Oversight Committee.

> The senior management team within Defence clearly recognized this in 1999 when, after developing Shaping the *Future of the Canadian Forces: A Strategy for 2020*, they set out an agenda to both sustain and change the institution. Notwithstanding these efforts, however, the Committee was struck during its review by how current defence management structures and processes have proven resistant to strategic-level, transformational change, thus greatly hindering implementation.[138]

The platform-specific details could be delegated to the project management, engineering staff and 1 CAD operation level personnel to coordinate specific platform details as required. It would place the concept of capabilities based planning at the forefront at the strategic level and permit more forward-based thinking, not just trade-offs between platforms and elements. Taking full advantage of new technologies across several platforms could be especially beneficially for the air force given the inherent capabilities of air power. Failure to transform the strategic structure of the organization, to reflect the vision, sends a strong message that the CAS of vision transforming "platform-focused *to a* capability-based aerospace force" is not valid.

CONCLUSION

Canada, like its allies, has embarked on a process of military transformation in response to the end of the Cold War and the Revolution in Military Affairs (RMA), brought on by the development of information technology. In addition to these global changes, the shared history, geography, and economy between Canada and the US necessitates that the CAF remain interoperable and transform concurrently with the US military. A review of the past RMAs revealed that they have a technological and cultural component, where culture embodies the thinking of how a military organizational uses new technology. The importance of culture for transformation and the RMA is more nebulous than technology for most observers, but especially for CAF personnel that have spent their entire careers focused on one of mankind's greatest

[138] Minister of National Defence's Advisory Committee on Administrative Efficiency, 21 August 2003 available from http://www.forces.gc.ca/site/Focus/AE/report/EXsumm_e.htm accessed on 10 April 2004.

inventions, the aircraft. For the CAF, culture is especially important because it is the one aspect of the transformation process that CAF can lead and control. It must react to the security and technological changes and operate within the given fiscal environment to maximize the defence of Canada.

Within the CAF, culture is often taken for granted. Yet it is a powerful and essential element that forms how CAF, and its leadership, resolves internal and external problems. With more than 80 years of history the CAF and it predecessors have firmly established the "primacy of flying aircraft" as the dominant culture.

Unfortunately, this culture is a barrier to transformation in the new security environment and the RMA. The new security environment requires the CAF to adapt technologies that can deter, defend against, and defeat unknown and unpredictable enemies rather than the known enemy during the Cold War. CAF must focus on the capability to protect vulnerabilities and impose the desired effect against an unknown enemy. For the CAF it will mean the payload of an aerospace platform will be more important than the platform employed, and thus the culture "primacy of flying aircraft" must change. The CAF's recent lack of initiative in unmanned aerospace systems clearly highlights the cultural barrier to developing new technologies. Without CAF leadership the synergy and trade-off between old and new technologies as part of transformation will not be possible.

Changing CAF culture is more than just expressing a vision. It requires prolonged leadership to influence the culture and change the way people think about aerospace power and the CAF. Lieutenant-General Penne's re-invigoration of CAF doctrine may be an excellent step to start the debate on CAF culture if it challenges the existing culture and starts to align CAF doctrine with the new security and technology environment. Changes in culture require tangible organizational changes. Changing the strategic organization in CAS to focus on capabilities instead of platforms

would start to align higher CAF thinking with the new security and technology environment. The CAF has weathered several difficult years with its collective head in the cockpit. It now needs to look beyond the cockpit and establish a tangible framework to start the innovation of air power in Canada.

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