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CANADIAN FORCES TACTICAL AIR CONTROL SYSTEM: REVERSING THE "NOT-SO-GRACEFUL" DEGRADATION OF CANADA'S COUNTERLAND CAPABILITY

By /par

LCol D.S. Constable
Syndicate 6/Groupe d'études 6
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GLOSSARY OF TERMS

Note: Terms designated by the symbol "*" are unique terms proposed within this paper only and, as yet, are not accepted military terms.

1 Cdn Air Div	1 Canadian Air Division
3D+T	Defence, Diplomacy, Development and Trade
8 ACCS	8 Air Communication and Control Squadron
A/S	Air-to-Surface
AAA	Anti-aircraft Artillery
ACM	Airspace Control Means
ACP	Airspace Control Plan
ADCTS	Advanced Distributed Combat Training System
ADF	Australian Defence Force
AEC	Aerospace Controller
AEF	Air Expeditionary Force
AFDD	Air Force Doctrine Document
AI	Air Interdiction
ALO	Air Liaison Officer
ASOC	Air Support Operations Centre
ASRAAM	Advanced Short Range Air-to-Air Missile
ATO	Air Tasking Order
AUSCANUKUS	Australia, Canada, United Kingdom, United States of America
AVM	Air Vice Marshall
AWACS	Airborne Warning and Control System
BCD	Battlefield Coordination Detachment
BDA	Battle Damage Assessment
BOI	Board of Inquiry
C2	Command and Control
CAF	Canadian Air Force
CAOC	Combined Air Operations Centre
CAOC	Combined Air and Space Operations Center (USAF term)
C/JAOC	Combined/Joint Air Operations Centre
CANCOM	Canada Command
CANOSCOM	Canadian Operations Support Command
CANSOFCOM	Canadian Special Operations Forces Command
CAS	Chief of the Air Staff
CAS	Close Air Support
CATS	Contracted Air Training Service
CDS	Chief of the Defence Staff
CEFCOM	Canadian Expeditionary Forces Command
*CEOC	Combined Effects Operations Centre
CF	Canadian Forces
CFACC	Combined Forces Air Component Commander
CFE	Canadian Forces Europe
CFLCC	Combined Forces Land Component Commander

CJTF	Commander Joint Task Force
*CL	Counterland
Col	Colonel
CONOPS	Concept of Operations
CRC	Control and Reporting Center
CTC	Combat Training Centre
DMO	Distributed Mission Operations
DND	Department of National Defence
DPG	Defense Planning Guidance
DPD	Defence Planning Document
DPS	Defence Policy Statement
EBO	Effects-based Operations
ETAC	Enlisted Terminal Attack Controller
FAC	Forward Air Controller
FAC(A)	Forward Air Controller (Airborne)
FLIR	Forward Looking Infrared
FOO	Forward Observation Officer
FRP	Force Reduction Program
FSCC	Fire Support Coordination Centre
Gen	General (military officer rank)
GLO	Ground Liaison Officer
GOC	Government of Canada
GPS	Global Positioning System
HQ	Headquarters
IADS	Integrated Air Defense System
IPS	International Policy Statement
IR	Infrared
JCLWG	Joint Counterland Working Group
JDAM	Joint Direct Attack Munition
*JEOC	Joint Effects Operations Centre
JFACC	Joint Force Air Component Commander
JFLCC	Joint Force Land Component Commander
JGAT	Joint Guidance Apportionment Targeting
JIPTL	Joint Integrated Prioritised Target List
JIPTL	Joint Integrated Prioritized Target List
JOA	Joint Operational Architecture
*JPECS	Joint Precision Effects Control System
*JPEC	Joint Precision Effects Controller
JTF-2	Joint Task Force-2
LGB	Laser Guided Bomb
MAAP	Master Air Attack Plan (also MAP – Master Air Plan(UK))
MANPADS	Man Portable, Air Defence System
MOC	Military Occupation Code
MOD	Ministry of Defence (UK equivalent of DND)
NATO	North Atlantic Treaty Organisation
NCW	Net Centric Warfare

NVG	Night Vision Goggle
OAF	Operation Allied Force
OIF	Operation Iraqi Freedom
OOTW	Operations Other Than War
OPCON	Operational Control
OPCOM	Operational Command
PGM	Precision Guided Mmunition
PM	Prime Minister
PML	Preferred Manning Level
PPCLI	Princess Patricia's Canadian Light Infantry
QDR	Quadrennial Defense Review
RCAF	Royal Canadian Air Force
RMA	Revolution in Military Affairs
SA	Situational Awareness
SAM	Surface-to-Air Missile
SOF	Special Operations Forces
TAC	Terminal Attack Controller
TacEval	Tactical Evaluation
TacAvn	Tactical Aviation
TACP	Tactical Air Control Party
TACS	Tactical Air Control System
TACS Dets	TACS Detachments
TBW	Three Block War
Tech	technology
TTPs	Tactics, Techniques and Procedures
UAV	Unmanned (or Uninhabited) Aerial Vehicle
UCAV	Unmanned (or Uninhabited) Combat Aerial Vehicle
UK	United Kingdom
UN	United Nations
USA	United States of America
USAF	United States Air Force
WW	World War
YFR	Yearly Flying Rate

ABSTRACT

The Counterland (CL) function, especially Close Air Support (CAS), has re-emerged as one of the most critical functions required on current Canadian and Allied military operations. The Tactical Air Control System (TACS), whose origins can be traced to World War II, is the critical combat system that enables the successful accomplishment of the CL mission. In the Canadian Forces (CF), the TACS consists of a number of key components. Two of the most critical components are the TACS Detachments (Dets) and the Combined Air Operations Centre (CAOC). In the past, the only component of the CF TACS that was treated as a core combat capability was the CAS fighter capability. Within the air force, the personnel employed in the TACS Dets are trained as FACs and represent the critical link between the air force and the army for CAS-related training and operations. Without all of the air and land components of the TACS being well integrated and functioning properly, as directed by the CAOC, the TACS is ineffective and the CL function, especially CAS, most likely will fail. This paper argues that it is essential for the CAOC and the TACS Dets to be declared as core combat capabilities. Only then will the air force and army place sufficiently high priority on resourcing and training CF personnel in these critical combat capabilities. Only then will the CF begin to reverse the "not-so-graceful" degradation of Canada's CL capability, which has diminished dramatically over the past 15 years.

> A better approach [to supporting a ground counteroffensive] would emphasize light ground forces for the counteroffensive. The source could be the local threatened ally, other US allies, and/or US Army and Marines. All would depend on airpower as the source of heavy fire support for maneuver units. This dependence would mean extensive taskings for aerospace forces.[1]
>
> What does all this say about the battlefield of the future? More than ever before, it will demonstrate that warfare is truly a combined-arms operation. The air-land battlefield of the future will be intense, fluid, fast-moving, and deadly. … advances in technology [will not] compensate for or permit failures in command.[2]

INTRODUCTION

United States Air Force (USAF) Colonel (Col) Jeffery R. Barnett, who served in the CHECKMATE[3] planning cell during the 1991 Gulf War, "predicted" [4] that by 2010 advances in technology would enable an intense relationship to develop between aerospace and land forces in future wars. Similarly, Dr. Richard P. Hallion demonstrated that the significant impact of modern, advanced technology on the integration between aerospace and surface forces has been known and studied in depth in the United States of America (USA) academic, scientific and military communities for at least 15 years.

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[1]Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010*, Alabama: Air University Press, 1996, 102.

[2]Richard P. Hallion, *Strike from the Sky: The History of Battlefield Air Attack*, Washington: 1989, 272.

[3]Naval War College, "The Gulf War and Future War," http://www.nwc.navy.mil/CNCSCaseStudies/lectures/GlossaryGulfFuture.doc; Internet; accessed 15 March 2006. CHECKMATE is, "a warfighting-concepts office in the Air Staff, headed in 1990 by Col. John A. Warden, III, that developed the Instant Thunder strategic air campaign plan."

[4]Col Barnett makes some prescient "predictions" regarding the future of aerospace campaigns. It is important, however, to note that Col Barnett does not use the word "prediction." For example, in the introduction to his book, Col Barnett provides three noteworthy "caveats" to his foresighted writing. First, he highlights that he plans to show "… where fundamental changes in military operations have already occurred…". Second, he admits that "… any projection [of the future] will prove faulty… [and] … any vision of future war will be severely limited." Third, his book "… is designed to help military professionals recognize new opportunities mandated by changes that have already occurred in the technological and political environments." Col Barnett's desired end state, therefore, is to show "… the impact of foreseeable technological advances on military operations."

Advanced technology is causing a fundamental review of warfare *in toto*. For example, the 2003 Iraq War, known in the USA as OPERATION IRAQI FREEDOM (OIF), showed the strength of USA aerospace power by the USAF's execution of what, in 1996, Col Barnett called "parallel war":

> Parallel war requires large numbers of highly precise weapons directed against vital targets. While this concept has long been envisioned by strategists in theory, advances in technology are currently enabling its prosecution in reality. Aerospace forces will soon be able to engage hundreds of targets within the first hour of a conflict. They will deliver thousands of precision munitions within each 24-hour period. Enabled by advance information systems, these weapons will strike vital enemy targets. The sum of these capabilities drives more than an increase in military efficiency. … these capabilities drive a new concept – parallel war.[5]

Probably the most far-reaching effect of parallel war is its implication for land- and aerospace-forces requirements. The advent of precision weapons provides aerospace power with the ability to deliver overwhelming numbers of precision weapons simultaneously onto a multitude of targets across the entire surface battlespace. In an article entitled, *Precision Guided Munitions and the New Era of Warfare*, Dr. Hallion sums up one of the major effects of precision weaponry on modern warfare and, specifically, its impact on land forces as follows: "… the traditional notion of massing a large ground force to confront an opponent, particularly on a 'field of battle', is now rendered archaic."[6] With the significantly increased capability of aerospace power to use precision weapons to protect friendly forces from the threat of attack by heavy enemy forces, there is a much lower risk associated with decreasing the numbers and types of

[5]Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010*, Alabama: Air University Press, 1996, xxi.

[6]Richard P. Hallion, "Precision Guided Munitions and the New Era of Warfare," *Air Power History* 43, no. 3 (Fall 1996), 24.

friendly heavy forces. This implies, however, that the friendly force's Counterland (CL) function, with its Air Interdiction (AI) and Close Air Support (CAS) sub-functions, is extremely capable. One of the hallmarks of a nation's CL capability is its effective command and control (C2) of its CL forces. Timely C2 forms the backbone of an efficient Tactical Air Control System (TACS).[7] A TACS is crucial to the modern, effective, combat capability of any joint CL force. In fact, two of the key critical components of a modern TACS, the Combined Air Operations Centre (CAOC) and the TACS Detachments (Dets), should be thought of as core combat capabilities.

In short, advanced technology, especially precision weapons and advanced C2 systems, such as those that are network-enabled, has caused a profound transformation in the conduct of modern warfare. This transformation is allowing modern land forces to become lighter and more manoeuvrable. The lighter land forces are relying more and more heavily on aerospace capability to provide fire support. Precision munitions permit the aerospace forces conducting AI and CAS to be more effective than ever in shaping the surface battlespace. As Col Barnett pointed out in 1996 and as demonstrated in OIF, in order for a modern, capable military force to be successful, the interrelationship between the surface and aerospace forces is critical. In other words, for the defence forces of a Western-allied nation state[8] to achieve their operational and tactical objectives, it is critical that their different military services (land, maritime, aerospace)

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[7]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 49. Currently, in the USA, a TACS is known as a Theater Air Control System; in the CF and NATO, it is called a Tactical Air Control System; in the UK, it is known as the UK Air Surveillance and Control System (UK ASACS) (See: Royal Air Force, "The Equipment and Role of the United Kingdom Air Surveillance and Control System," http://www.raf.mod.uk/equipment/other.html; Internet; accessed 25 March 2006.) No references could be found to "TACS" in the Australia Defence Force (ADF) but the ADF possesses all of the necessary elements of a TACS.

[8]Such as Australia, Canada, the United Kingdom (UK) or the USA (also known as AUSCANUKUS).

become fully and comprehensively interrelated and interdependent; they must become truly joint.[9] Canada's allies, including Australia, the United Kingdom (UK) and the USA, are well ahead of Canada in the pursuit of a more synergistic relationship between their aerospace and land/maritime forces. One of the main areas that sets them apart from Canada is their development of a modern, combat-capable TACS, especially the CL C2 capabilities within their CAOCs.

The CL mission has revealed itself as a current and anticipated future critical requirement for the effective conduct of most military operations across the spectrum of conflict. Analysis reveals that the demise of Canada's TACS capability has rendered impotent the ability for Canada to provide effective C2 of its CL air power. Likewise, the CF's Forward Air Controller (FAC) capability has deteriorated almost to a non-existent level, seriously undermining the Canadian army's ability to call in air strikes for protection or, in many cases, for operational success. The lack of an effective TACS is a CF joint operational capability deficiency that must be addressed if the Canadian political and military leadership is serious about Canada retaining a CL capability.

The aim of this paper is to analyse the decline of Canada's CL capability, with particular emphasis on the CF TACS, arguing that the CAOC and TACS Dets represent

[9]NATO, AJP-01(B) *Allied Joint Doctrine* (Brussels: NATO Standardization Agency, 2002), Glossary-7. Definition of 'Joint': "Adjective used to describe activities, operations, organizations in which elements of at least two services participate." Furthermore: Joint Electronic Library, "Department of Defense Dictionary of Military and Associated Terms," http://www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf#search='military%20definition%3A%20joint'; Internet; accessed 25 March 2006.: The USA Department of Defense Joint Publication defines joint as "Connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate." These definitions appears to be wholly inadequate to achieve the desired effect of compelling the unique services to achieve the desired fusion of jointness proclaimed in both the USA Quadrennial Defense Review and the Canadian DPS.

core combat capabilities[10] and proposing a way ahead to reverse the severe degradation. This paper will focus on four main areas. First, Canada's CL capability, in particular the CF TACS, will be described vis-à-vis a generic, North Atlantic Treaty Organisation (NATO)-standard TACS in order to understand how Canada's existing TACS compares to the NATO and USA doctrinal operational elements required to conduct the CL function. Second, an operational requirements analysis will follow, which will focus on two main themes that provide the rationale for pursuing a modernised CF CL capability: strategic political- and military-guidance documents and the envisioned threat scenarios depicted within the strategic-guidance documents. Where applicable to the chapter, Canada's and its Allies' (Australia, UK, US) recent CAS experiences and doctrine will be highlighted. Third, a historical review of Canada's CL capability will be provided. Particular emphasis will be placed on the degradation of the CF's CL capability over the past 15 years, which has created a significant joint capability deficiency. Finally, this paper will recommend a way ahead for the CF to address this joint capability deficiency by transforming its existing, ineffective TACS into a modern, effective, combat-capable system, with an ability to conduct the doctrinal and envisioned roles of a modern TACS, aligned with the CF Transformation goals of the 2005 International Policy Statement (IPS)/Defence Policy Statement (DPS). Particular attention will be given to the CAOC and the TACS Dets personnel, their critical role and the need to provide them vital human resources and equipment.[11]

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[10]In other words, it is not only the fighter-bombers and the FACs that represent the core combat capability, but also the C2 capability.

[11]Chief of the Defence Staff, "CDS Planning Guidance - CF Transformation," http://www.cds.forces.gc.ca/cft-tfc/00native/cds-planning-guidance_e.pdf; Internet; accessed 2 April 2006. CF Transformation is the term used to describe the CF's drive to unify the three Services at the strategic, operational and tactical levels in their approach to conducting CF operations.

THE TACTICAL AIR CONTROL SYSTEM AND CANADA'S COUNTERLAND COMMAND AND CONTROL CAPABILITY

One of the most significant technological developments in the USAF and, by extension the rest of the USA military, has been in the area of C2. As the USAF Chief of Staff, General (Gen) J. Jumper, stated in 2002, modern C2 capabilities can be thought of as weapons systems in their own right due to their ability to maximise the power of aerospace forces, enabling effective, timely decisions by commanders:

> Perhaps the most critical technology enabler in advancing our war fighting capability is the evolution of the Combined Air and Space Operations Center (CAOC) as a weapons system. Gone are the days of the CAOC being an ad hoc "command and control center" comprised of stove-piped systems, manned by different functionals who were most likely working together for the first time. Today, the CAOC is the ultimate in force enablers and is being used at various levels in all theaters of operations.[12]

Information gathering, processing and sharing in order to raise the Situational Awareness (SA)[13] of the entire military force involved in an operation has been a major pursuit within the USA military.[14] However, a CAOC is only one of the critical components in

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[12]Military Aerospace Technology Online Edition, "Air Force Transformation: Interview with General John P. Jumper," http://www.military-aerospace-technology.com/article.cfm?DocID=327; Internet; accessed 19 March 2006.

[13]Naval Aviation Schools Command, "Situational Awareness (SA)," https://wwwnt.cnet.navy.mil/crm/crm/stand_mat/seven_skills/SA.asp; Internet; accessed 15 March 2006. The US Navy defines SA as "… the degree of accuracy by which one's perception of his current environment mirrors reality."

[14]RAND Corporation, Information Sharing Among Military Headquarters: The Effects on Decisionmaking, http://www.rand.org/pubs/monographs/2004/RAND_MG226.pdf#search='military%20information%20gathering%20processing%20sharing'; Internet; accessed 23 May 2006. Also see: United States Navy Index, FORCEnet: A Functional Concept for the 21st Century, http://www.chinfo.navy.mil/navpalib/policy/forcenet/forcenet21.pdf; Internet; accessed 23 May 2006.

the C2 of modern air forces. All of the components that comprise a TACS are necessary for the effective conduct of aerospace combat taskings. The NATO definition of a TACS is:

> The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions.[15]

Doctrinally, a TACS has evolved significantly from an intra-air-force C2 capability, to an inter-service C2 capability, to what it ultimately has become today: a high-technology (tech), intra-air-force, inter-Service, inter-agency C2 capability. In fact, the word "Tactical" in Tactical Air Control System is now very misleading because it implies that the C2 of CL forces is accomplished solely at the tactical level of operations. This is no longer the case: the effective execution of the modern military battle involves the fusing of information from multiple sources, both inter- and extra-military, and the ability to command, coordinate and control the desired military effects deemed necessary for mission success. Advanced technology also enables the achievement of the desired high level of integrated C2 of all forces involved in a Joint Operations Area (JOA) across all levels of operations – tactical, operational and strategic.

Counterland is defined in USAF Doctrine Document 1 (Air Force Basic Doctrine) (17 November 2003) as:

> … air and space operations against enemy land force capabilities to create effects that achieve JFC [Joint Force Commander] objectives. The main

[15]NATO On-line Library, "North Atlantic Treaty Organization NATO Standardization Agency (NSA) 2006 - NATO Glossary of Terms and Definitions (English and French) – AAP-6-2006," http://www.nato.int/docu/stanag/aap006/AAP-6-2006.pdf; Internet; accessed 25 March 2006.

> objectives of counterland operations are to dominate the surface environment and prevent the opponent from doing the same. Although historically associated with support to friendly surface forces, counterland operations may encompass the identical missions, either without the presence of friendly surface forces or with only small numbers of surface forces providing target cueing. … Counterland provides the JFC two discrete air operations for engaging enemy land forces: air interdiction (AI), in which air maneuver indirectly supports land maneuver or directly supports an air scheme of maneuver, and close air support (CAS), in which air maneuver directly supports land maneuver.[16]

Counterland is a relatively recent term adopted by the USA and some other Western-allied nations, including Canada, but as yet not incorporated in NATO doctrine or in the doctrine of all NATO allies.[17] The CL function is divided into two basic sub-functions, AI and CAS. Of these, CAS is the more complex mission due to the inherent requirement for close coordination of air and land forces in order to prevent fratricide.[18] Close air support is defined in the NATO Glossary of Terms and Definitions publication AAP-6(2006) as:

> Air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.[19]

In order to conduct the CAS mission effectively, the entire TACS must be engaged simultaneously in a highly coordinated, C2 orchestration involving aerospace, land and,

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[16]Air Force Doctrine Center, "Air Force Doctrine Document 1 – Air Force Basic Doctrine," https://www.doctrine.af.mil/Library/Doctrine/afdd1.pdf#search='usaf%20doctrine%20AFDD%201%20basic'; Internet; accessed 25 March 2006.

[17]Department of National Defence, B-GA-400-000/FP-000 (Draft) *Canadian Forces Aerospace Doctrine* (Ottawa: DND Canada, 2006), 24. It appears as though the CF will adopt the term "Counter-land" in its upcoming doctrine document expected to be released soon by the newly formed CF Aerospace Warfare Centre (CFAWC).

[18]Dictionary.Com, "Fratricide," http://dictionary.reference.com/search?q=fratricide; Internet; accessed 25 March 2006. Defined as "… fire that injures or kills and ally." (Synonymous with "friendly fire.")

[19]NATO On-line Library, "North Atlantic Treaty Organization NATO Standardization Agency (NSA) 2006 - NATO Glossary of Terms and Definitions (English and French) – AAP-6-2006," http://www.nato.int/docu/stanag/aap006/AAP-6-2006.pdf; Internet; accessed 25 March 2006.

often, maritime forces. In the definition of CAS, the words "detailed integration" apply not only to the forces that are engaging the enemy on the actual battlefield, but also to how well the coordination between the three Services can be accomplished at **all levels** of the operation. It is for this very reason that a TACS is a system; the whole is greater than the sum of its parts. One weakness in that system will affect the outcome on the battlefield and, when the weakness is sufficient, the consequences can be deadly for friendly forces.

Accepting the USA model that the modern CAOC is a weapons system in its own right and that the combat effectiveness of front-line combat air forces is reduced significantly without effective C2, then not only are the fighter-bombers a core combat capability but so are other components within the TACS, given their critical role in conducting the CL function. Re-stated, all of the components that comprise a TACS are necessary for the effective conduct of aerospace combat taskings. The most critical to the CF are the CAOC, the TACS Dets and the aerospace weapons-delivery platform(s). Currently, the main CF CL weapons-delivery platform is the CF-18, which is considered a CF core capability. In order for the CF's CL capability to mature, a fully functional CAOC and the TACS Dets should also be considered core capabilities.

Historically, doctrinally and by definition, the entire TACS has been and should be made up of a synergistic combination of a number of joint aerospace, land and maritime C2 and tactical elements. Currently, however, there exists in the CF no fully established TACS, at least not in a doctrinal sense or in the same sense as the TACS employed by many of Canada's closest allies, including the USA, the UK and Australia. For years, the CF has allowed the TACS to "gracefully degrade", becoming a mere shell

of its former, fully integrated system. Although many of the elements of a CF TACS exist, they do so mostly in isolation as a disparate set of poorly coordinated elements with no overarching C2 structure or sound CF doctrine.

Information obtained from a video entitled *Tactical Air Control System*, produced in 1988 by the Minister of Supply and Services Canada, B-GA- 430-000/FP-000 Tactical Fighter Operational Doctrine (1994)[20] and current USAF CL doctrine provides a baseline from which to judge the current CF TAC System. For each element of the System, a basic description of its function is provided.[21]

The basic components of the TACS are the CAOC[22], the Air Support Operations Centre (ASOC), the Tactical Air Control Party (TACP) and the FACs. Also included are dedicated communications (comms) dets, air liaison officers (ALOs), ground liaison officers (GLOs) and ground-attack aircraft and pilots. Table 2.1 shows the various CL doctrinal terms in 1988 and in 2006 for NATO and the listed Allies. The differences in the terms largely reflect the different Allies' CL experiences since 1989.

There exists within the CF a relatively unknown, under-valued, severely under-manned group of highly trained, technically competent and dedicated aerospace personnel who populate the CF TACS Dets. Currently, within the CF air force, other than the CF-18 fighter community, which conducts CAS training missions in order to train fighter pilots, the TACS Dets personnel are the only other aerospace element that trains for the CAS mission on a regular basis. In order to conduct CAS, which has re-emerged as one of the most comprehensive and vital aspects of modern military

[20]Department of National Defence, B-GA-430-000/FP-000 *Tactical Fighter Operational Doctrine* (Ottawa: Canada, 1994), 6-5.

[21]For an in-depth description of a TACS, refer to the 1988 Supply and Services Canada video or the USAF AFDD 2-1.3 Counterland doctrine document.

[22]The CAOC also is known as the Joint Air Operations Centre (JAOC) in a joint environment.

Table 2.1 – Different CF Allies' TACS Terms

	1988		2006	
	Function[23]	**Term / Acronym for FAC**[24]	**Function**	**Terms / acronyms for FAC**
CF	Offensive Air Support: AI, BAI, CAS, TAR	FAC FAC(A)	[25]Counterland: AI, CAS	FAC[26]
NATO	Offensive Air Support: AI, BAI, CAS, TAR	FAC FAC(A)	[27]Offensive Air Support: AI[28], CAS[29], TAR[30]	FAC[31]
USA	Offensive Air Support: AI, BAI, CAS, TAR	FAC FAC(A)	[32]Counterland: AI, CAS	• Terminal Attack Controller (TAC) • Enlisted TAC • Joint TAC • ALO • Special Operations TAC • FAC(A) • Combat Observation and Lasing Team (COLT) member • Killer Scout[33]
UK	Offensive Air Support: AI, BAI, CAS, TAR	FAC	[34]Anti-Surface Force Air Operations – Land/Air: AI, CAS	FAC[35]
Aus	Unknown	FAC	[36]Offensive Air Support – Land: CAS, BAI, FAC[37]	FAC

Sources: Various Allied Doctrine Manuals (see specified footnotes within Table 4.2).

[23]In 1988, all of the Allies used the NATO terms, which corresponded to the USA terms.

[24]In 1988, all of the Allies used the NATO terms, which corresponded to the USA terms.

[25]Department of National Defence, B-GA-400-000/FP-000 (Draft) *Canadian Forces Aerospace Doctrine* (Ottawa: DND Canada, 2006), 24.

[26]NATO On-line Library, "North Atlantic Treaty Organization NATO Standardization Agency (NSA) 2006 - NATO Glossary of Terms and Definitions (English and French) – AAP-6-2006," http://www.nato.int/docu/stanag/aap006/AAP-6-2006.pdf; Internet; accessed 25 March 2006.

[27]*Ibid*. (See "ground liaison officer.")

[28]*Ibid*.

[29]*Ibid*.

[30]*Ibid*. (See "reconnaissance exploitation report.")

[31]*Ibid*. The NATO definition of a FAC is accepted by all NATO allies: "A qualified individual who, from a forward position on the ground or in the air, directs the action of combat aircraft engaged in close air support of land forces."

[32] United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 3-4.

[33]Ibid., 53-54.

[34]Royal Air Force, "Joint Force Employment," http://www.raf.mod.uk/downloads/doctrine/07.pdf; Internet; accessed 20 March 2006.

[35]*Ibid*.

[36]Royal Australian Air Force, "Australian Aerospace Power Roles," http://www.raaf.gov.au/airpower/publications/doctrine/aap1000/highres/CP7.PDF; Internet; accessed 20 March 2006.

[37]*Ibid*. RAAF: "FAC is the link that ensures the [CAS] attack does not endanger friendly forces."

operations across the entire spectrum of war, the CF has provided a grand total of three air force personnel dedicated to the task.[38] There is a common misconception that the TACS Dets personnel are merely FACs who provide a very low amount of tactical-level service to the land forces during those very few moments when they *might* require CAS. In Canada, there is a significant misunderstanding of what the TACS is, what the TACS Dets personnel do and how the time has arrived for the CF to significantly increase the priority of the CL mission.

Currently, the TACS Dets are supposed to be manned by one captain from an air operations occupation at each of the four army Brigades located at Edmonton, Petawawa, Gagetown and Valcartier. Additionally, there is the provision for one major (currently filled by a captain) at the Army Combat Training Centre, Gagetown who acts as the *de facto* standards officer for the TACS Dets and the air force portion of FAC training. The actual manning at the TACS Dets as at April 2006 is three captains, as depicted in Table 2.2.

Due to their unique knowledge set as air force officers collocated with the army, the TACS Dets personnel also act as the G3 Air officers within their Brigades.[39] Currently, the TACS Dets are considered under the operational control of their army supervisors, usually the army G3 Operations, but remain under the operational command of 1 Canadian Air Division (1 Cdn Air Div).

[38]As will be shown, the preferred manning level (PML) for the TACS Dets is five personnel; currently, two positions are vacant.

[39]At a brigade, the G3 Air Officer acts as the air-power subject matter expert to the Brigade Commander.

Table 2.2 – CF air force FACs – Status as at April 2006[40]

Location	Number FACs
Edmonton	1 (Fighter Pilot; Deployed to Afghanistan)
Petawawa	Vacant
Valcartier	1 (TacAvn Helicopter Pilot)
Gagetown (FAC)	Vacant
Gagetown (Doctrine / Standards)	1 (major's position; filled by captain)
TOTAL	**3**

Basic AI planning is carried out by the C/JAOC[41] in accordance with the overall Joint Force Commander's concept of operations. In the C/JAOC, aerospace allocations are determined and passed down in accordance with perceived requirements and in response to requests from the army. The C/JAOC is the "engine" driving the entire TACS. Due to the power of the C/JAOC to plan, organise, direct and execute[42] aerospace

[40]Captain W. Edmond, *Hello & a Favour*, (Canadian Forces Base Gagetown: electronic mail dated 17 March 2006.)

[41]Air & Space Power Journal, "The Tale of the C/JFACC," http://www.airpower.maxwell.af.mil/airchronicles/apj/apj04/win04/fought.html; Internet; accessed 18 March 2006. As recently as 1 February 2006, the Commander 1 Cdn Air Div HQ, located in Winnipeg, has been designated as the Joint Force Air Component Commander (JFACC) for Canada Command (CANCOM). He also retains his responsibilities as the Commander Canadian NORAD Region (CANR) HQ. As Commander 1 Cdn Air Div HQ, he has joint responsibilities since air force, land and maritime air assets are under his command. Furthermore, as Commander CANR HQ, he has combined responsibilities for Canadian and USA personnel under his command within Canada. As a result of these responsibilities, he can be considered a Combined/Joint Force Air Component Commander (C/JFACC). In theory, then, the Winnipeg AOC can be considered a Combined/Joint Air Operations Centre (C/JAOC); such a terminology would be consistent with NATO and USA doctrine. (Also see: Air Force Publishing, "Operational Procedures – Air and Space Operations Center," http://www.e-publishing.af.mil/pubfiles/af/13/afi13-1aocv3/afi13-1aocv3.pdf, accessed 18 March 2006.) Often, though, when a commander is both a combined and a joint commander, the word "joint" is implied and removed and the terms "CFACC" and "CAOC" are used.

[42]The real-time capability of modern CAOCs provides them with a role to play in the execution of operations, linking the tactical with the operational and strategic levels. The operators coordinating the operations within the CAOC are no less critical to the success of a tactical mission than are the aircrews or FACs executing the mission. Advanced C2 technology has created the ability for a merging of the tactical, operational and strategic levels during the execution phase of combat.

forces to achieve aerospace weapons effects across the entire JOA[43], the C/JAOC has been designated as a weapons system by the USAF.[44] Figure 2.1 is a graphical representation of the relationship between the various air-land TACS entities in a doctrinal sense for a generic TACS, which, except for very slight changes to a few acronyms, is common to NATO, the UK and Australia.[45]

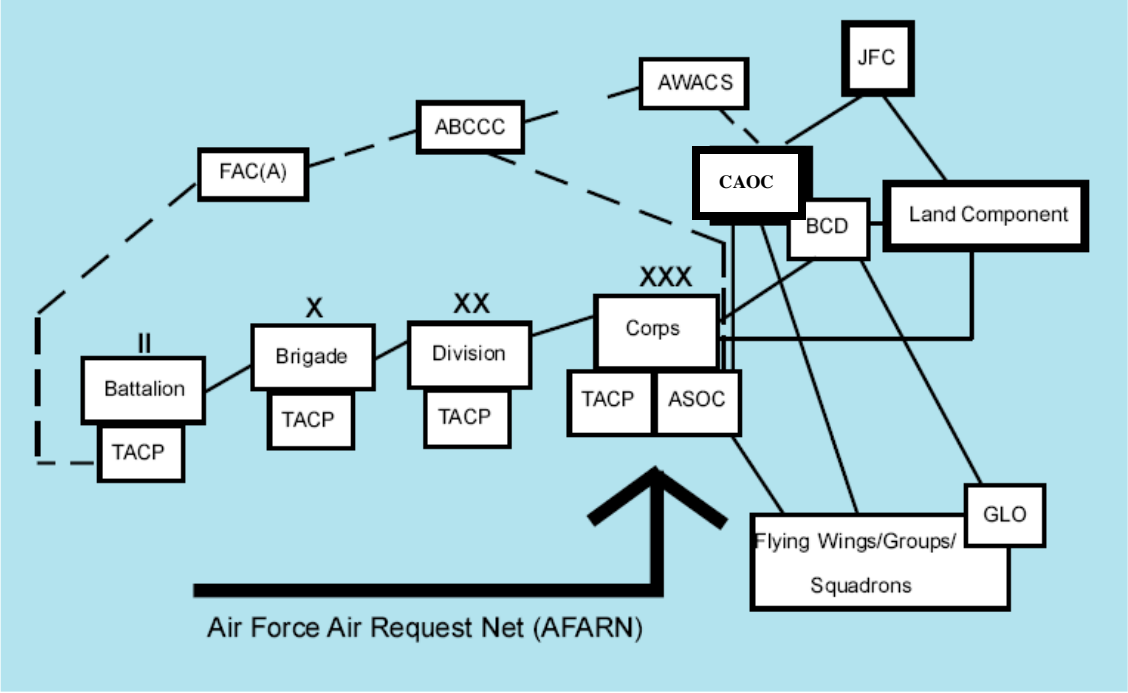

Figure 2.1 – Doctrinal Air-Land TACS Connectivity[46]

Source: DoD, *Air Force Doctrine Document 2-1.3 Counterland*, 50.

[43]DoD Dictionary of Military Terms, "Joint Operations Area," http://www.dtic.mil/doctrine/jel/doddict/data/j/02896.html; Internet; accessed 18 March 2006. JOA is defined as "… an area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which a joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission.

[44]Air Force Association, "Air Force Association Policy Forum," http://www.afa.org/Media/scripts/Roche_conf.asp; Internet; accessed 18 March 2006.

[45]In 1988, the CAOC was known as the Joint Command Operations Centre (JCOC). Except for minor changes, this is the same C2 structure that was developed in WW II and used extensively throughout Korea and Vietnam.

[46]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 50.

For comparison purposes, a graphical representation of the existing CF TACS is shown in Figure 2.2. This picture is deceiving, however, because it belies the fact that in the CF the aerospace representatives within the ASOC, TACP and FAC often are the same TACS Dets personnel. In reality, there should be separate personnel manning each of the different elements. The red "X" through the CAOC shows the lack of CL capability within the CF C/JAOC, as explained below.

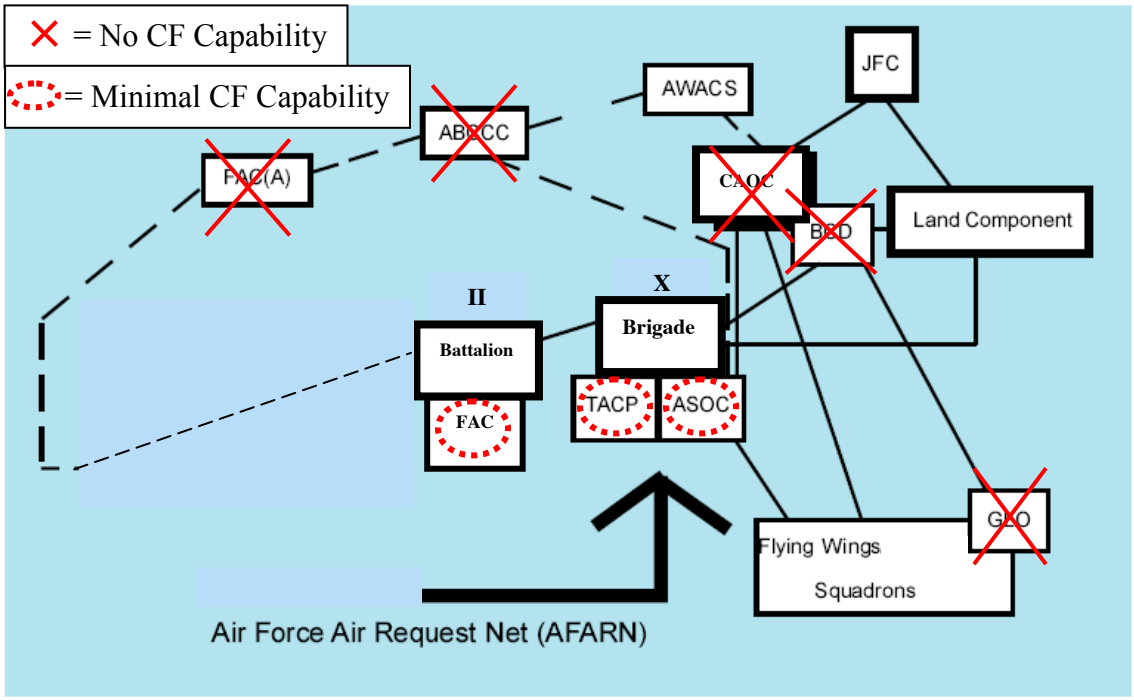

Figure 2.2 – Existing (2006) CF Air–Land TACS Connectivity[47]

Source: Adapted from: DoD, *Air Force Doctrine Document 2-1.3 Counterland*, 50.

In 2005, the Winnipeg CAOC underwent significant restructuring and considerable efforts have been made to modernise it in line with NATO and USA joint

[47] This figure is a modified, generic extract of a similar figure found in USAF Publication AFDD 2-1.3, Counterland, 27 August 1999, 50.

doctrine.[48] The major strength of the Winnipeg CAOC is its legacy NORAD capability that has existed for many years. Due to Canada's participation in NORAD, the overall system for planning, directing and controlling NORAD air-defence assets has been inherent in the CAOC. The C2 system for the NORAD mission resembles the C2 system required to conduct the CL mission, albeit with fundamental differences. The Winnipeg CAOC is extremely limited in its capability to function in the CL role because it lacks the required army liaison element and sufficient numbers of experienced fighter pilots and Aerospace Controllers (AEC) to plan and coordinate the CL mission. There is no provision whatsoever in the Winnipeg CAOC for the Joint Targeting Cycle[49], which includes the planning and execution of the Master Air Attack Plan (MAAP), the Joint Guidance Apportionment Targeting (JGAT) cell, the Joint Integrated Prioritised Target List (JIPTL), Battle Damage Assessment (BDA) or Combat Assessment capabilities.[50]

The lack of capability to conduct the Joint Targeting Cycle within the Winnipeg COAC is a significant shortcoming due to the inability for CF personnel to receive training in this critical combat capability. Unless Canadian air and land operators are able to execute the Joint Targeting Cycle at the operational level, the Canadian CL capability will never fully mature. Ideally, the CF should be able to generate a robust, indigenous capability to conduct the AI or preplanned CAS sub-functions of the CL mission, in accordance with doctrine and on a relatively full-time basis in order to receive the C2 training necessary to provide the desired CL effects on the modern battlefield.

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[48]In the absence of CF-specific doctrine, the main document used to guide the restructuring efforts was the USA joint pub 3-30 *Command and Control for Joint Air Operations*.

[49]Defense Technical Information Center, *Joint Publication 3-60: Doctrine for Targeting*, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_60.pdf; Internet; accessed 25 May 2006.

[50]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 89-98. All of these cells within the C/JAOC are critical to the successful execution of the CL mission. Most of them require fighter pilots for successful planning and execution of the C/JAOC operations.

Due to the current, critically low, fighter-pilot manning levels within the CF's fighter community, it is possible that it could take the CF five to ten years, and probably longer if attrition of experienced fighter pilots is not stemmed, in order to rebuild the required strength to support properly the CL mission. This is due to the length of time required to generate the necessary fighter expertise and number of fighter pilots with that expertise to man the CAOC JGAT and MAAP cells. Furthermore, there must be a commitment from the Canadian army to embrace the Joint Targeting Cycle and provide land-force personnel to the CAOC as part of the Battlefield Coordination Detachment (BCD), as described below.[51]

The ASOC is supposed to be manned by a mixture of fighter pilots, intelligence and air-defence specialists, and radio operators. The ASOC:

> … is the primary control agency of the TACS for the execution of aerospace power in direct support of ground operations. Normally aligned with the senior Army tactical level of command, the ASOC coordinates and directs aerospace support for land forces at corps level and below.[52]

Normally, an ASOC would have a fighter-pilot G3 Air rep to provide advice to the army brigade commander on air-related matters.[53] Recently, the CF has made attempts at operating an ASOC during army Brigade Training Events at Wainwright. [54]

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[51]*Ibid*, 41. This is not to say that the CF could not field a simplified CAOC for a "push CAS" or "on-call CAS" system. Even this capability, however, would be limited by the low numbers of experienced fighter pilots within the CF and the lack of commitment of land force operators to the CAOC. (Push CAS missions are scheduled to arrive at a specified contact point at a specified time, normally in a continuous flow, to provide constant CAS assets available to support the ground unit(s) identified as the main weight-of-effort. On-call CAS involves putting the aircraft on ground-based or airborne alert (often listed as GCAS or XCAS in the air tasking order) during a preplanned time period when the need for CAS is likely, but not guaranteed.

[52]Ibid, 51.

[53]In order to man an ASOC for a 24/7 operation, a minimum of three air subject matter experts would be required at each brigade ASOC.

[54]Captain W. Brown, (1 Cdn Air Div Winnipeg: electronic mail dated 1 May 2006.)

Unfortunately, because of a critical shortage of qualified air personnel, the TACS Dets reps also acted as the TACPs and, quite often, as the FACs. As a result, the realism of the exercise was deficient in terms of its CL content.

The BCD is the primary conduit between the CAOC and the ASOC, providing the current ground picture on friendly and enemy land forces, transmitting to the Joint Force Air Component Commander (JFACC) and Joint Force Land Component Commander (JFLCC) any requests for air support from the army and sending air-support approval and denial information from the JFC, JLCC and JFACC. The BCD:

> … is the senior Army liaison element to the TACS and is located in the AOC [CAOC]. The BCD processes the land component's air support requests, to include air interdiction target nominations and requests for preplanned close air support.[55]

Currently, there is no provision for a BCD within the Winnipeg CAOC.

The officers commanding the TACPs are assigned to the brigades and function as ALOs. They may also be assigned to a battalion for a special operation. A TACP also is integrated into the fire support coordination centre of the appropriate formation HQ. Airspace control is an important TACP function and permits ground and air operations with a minimum of mutual interference and restraint. The TACP capability within the CF is extremely fragile. As stated earlier, the TACS Dets personnel fill the G3 Air position within the ASOC and often act as the TACP and the FAC at the same time. This incredibly wide span of responsibilities limits the effectiveness of the air support capability provided to the army when conducting the CL mission.

[55] *Ibid*, 51. It is likely that a BCD has not been set up within a CF CAOC since the 1980s.

From an observation post, the FAC directs the action of aircraft engaged in CAS. The FAC function also can be performed by observation helicopter crews, Forward Observation Officers (FOOs), mobile fire controllers, airborne fighter aircrew and reconnaissance det commanders. The CF FAC capability is in somewhat better shape than the TACP capability but only because designated army personnel, such as FOOs, are able to qualify as FACs. As a result, the TACS Dets personnel have been able to train a certain number of army FACs. There are, however, many problems associated with gaining and maintaining the army FAC qualifications and currencies. This will be one of the main areas of discussion in the operational-requirements-analysis chapter of this paper.[56]

Land force GLOs are assigned to airfields and to some air force HQs. They advise and assist the squadron commander by passing on information obtained from tactical air units to the appropriate land-force formation. On matters concerning force operations, they portray the tactical ground situation to air personnel and assist with briefing and debriefing aircrews. Currently, there are no land force GLOs located at either of the two fighter wings within Canada.[57]

12 and 42 Radar Squadrons represent excellent, albeit aging, deployable assets that could be integrated effectively into a TACS. For example, 42 Radar Squadron was deployed to the Kananaskis area for the G-8 Summit in 2002 providing general air-

[56]The CF fighter force abandoned its initial attempts to generate a FAC(A) capability; declining experience levels and, even more limiting, decreased availability of sufficient YFR forced the CF to cease pursuing this initiative. The Tac Avn community has held informal discussions about the possibility of becoming involved in the FAC(A) role. In his capacity as A3 Fighter at 1 Cdn Air Div HQ, the author held informal discussions with A3 TacAvn in 2004/2005 about the Tac Avn community's desire to become involved in the FAC(A) role. To date, no serious considerations have been tabled regarding this capability, largely due to the prohibitive costs and other considerations associated with equipping the Griffon helicopters with the combat retrofit required to conduct the role.

[57]The two fighter wings are located at Cold Lake, Alberta and Bagotville, Quebec.

control services and acting as an effective Control and Reporting Centre that could provide emergency control in the event of a C2 failure from the Canadian Air Defence Sector (CADS) North Bay. These tactical radars currently are being modernised and will continue to represent a solid, deployable air-force asset for the CL mission as part of a TACS.

8 Air Communication and Control Squadron (8 ACCS) represents another significant air-force asset that could be used in the CL mission. 8 ACCS is:

> deployable as a self-supportable unit within six hours to provide tactical communications for command and control (C2), air traffic control, navigational aids, airfield facilities and information management systems in support of … national and international operational requirements… .[58]

8 ACCS is already playing a pivotal role within the CF in supporting its mandate. Extending 8 ACCS' mandate to provide C2 support to the CL mission should be seriously considered by the air force.

In summary, this chapter illustrates that the TACS is a system, whereby the whole is greater than the sum of its parts, and that all components of the system must exist in order for the CL mission to succeed. Today, Canada does not possess a doctrinally sound, fully integrated TACS, even though many of the elements of a TACS exist within the CF. Unfortunately, many of these elements are spread out across Canada at various geographic locations, are rarely exercised in a joint manner, and possess no common standards or doctrinal basis on which to train. In theory, all of the elements could be brought together to form an integrated TACS. In order for the CF's CL capability to mature, however, the CF must begin to embrace the modern reality that a fully functional

[58]Canada's Air Force, "8 Air Communication and Control Squadron," http://www.airforce.dnd.ca/8Wing/squadron/8accs_e.asp; Internet; accessed 20 March 2006.

CAOC and the TACS Dets are core combat capabilities. Unfortunately, there is a critical shortage of the key personnel, fighter pilots and AECs, required to conduct the CL mission. The level of service that the air force is providing to the army in the CL role is being seriously undermined by this shortfall. Furthermore, the army commitment to providing GLOs to air wings and a BCD is non-existent. These issues must be addressed forthwith if gains are to be made in the CF's seriously degraded CL combat capability.

THE CANADIAN COUNTERLAND EXPERIENCE: A HISTORICAL REVIEW

The Canadian military history of the current TACS Dets is embedded in the history of aviation and battlefield support using aviation assets. Throughout each subsequent major war involving air power in the CL role, there has been a continuously repeating, frustrating cycle of re-learning the same or similar CL lessons during each conflict. Designing, building, manning and sustaining an effective TACS is a complex, expensive undertaking that, inevitably, falls victim to fluctuations in political and military leadership and priorities, budget cuts, changes in technology, and the experiences of and parochial "competition" between the military Services. In times of tension and war, the factors that negatively affect the maintenance of a robust TACS capability are overcome due to the exigencies of national survival. In times of relative peace and the inevitable, ensuing budget reductions, the services are often forced to cut operational capabilities. There are examples in the CF's past whereby the senior military leadership within a Service has chosen to retain its Service-unique capabilities to the sacrifice of joint

arrangements in order to survive the budget cuts. Canada's TACS capability, which has suffered considerable neglect from both the army and the air force, is one such example.

Battlefield support has its roots as far back as 1908 when Orville Wright first demonstrated to the USA Army Signal Corps "… the value of the Wright Flyer for military reconnaissance in a series of test and demonstration flights at Ft. Myer, Virginia."[59] Prior to World War (WW) I, airplanes were being used in a CL capacity in Italy, in Libya, by the French in the Balkans and by both sides involved in hostilities in Mexico in 1913.[60]

The debate over whether the primary role of air power is to support the land forces in battle has its roots in WW I and this is a recurring theme throughout the history of the military use of air power which persists to the present day. During WW I, *ad hoc* measures taken at the start of the war were developed into organised, doctrinal tactics and practices.[61] The German forces, for example, "… assigned air liaison officers to work with German ground units and communicate back to air bases to keep air units informed of the ground situation, location of the front, targets, and the like."[62] As the lessons were learned by the pilots, so too were their attitudes formed on the use of air power. As the novelty of air attacks wore off, ground forces began to undertake successful surface-to-air countermeasures. When casualty rates began to soar, on the order of 30 to 35 percent, the debate began to form on whether trench-strafing missions were worth the losses:

> Fighter pilots preferred risking themselves in combat against the enemy's airplanes; one bitterly wrote that "with few exceptions," trench-strafing

[59]Hallion, Richard P., *Strike from the Sky: The History of Battlefield Air Attack 1911-1945*, Washington: 1989, 10.
[60]*Ibid*., 11-12.
[61]*Ibid*., 20-21, 40-41.
[62]*Ibid*., 39-40.

> missions constituted "a wasteful employment of highly trained pilots and expensive aeroplanes, "adding that "rather than face a single trench-strafing foray, I would much prefer to go through half a dozen dogfights with Albatroses."[63]

Despite the losses, however, CL missions were seen to be quite effective, notably, in the Middle East during the Palestine Campaign of 1918. In preparation for Gen Sir Edmund H.H. Allenby's planned offensive in Palestine in September 1918, aircraft of the Royal Air Force (RAF) and the Australian Flying Corps[64] flew what is now known as offensive counterair and AI missions against Turkish and German troops in what is now Israel and Jordan. Through a series of air-combat missions and attacks on airfields, Allenby's air forces decimated the German air strength throughout July and August, 1918. The achievement of air superiority set the stage for what was to come: the eventual complete routing of the 4th, 7th and 8th Turkish armies at Amman, Nablus and, most notably, at Wadi el Far'a, where the 7th Turkish Army was utterly decimated by air power.[65]

The Palestine experience was a kind of "awakening" of the value of air power and can be considered the origin of the establishment of what were to become known as the tenets of air power.[66] Air power in battle "came of age" in the Palestine Campaign; a classic early example of gaining and maintaining air superiority to provide the necessary permissive environment for the conduct of decisive CL operations. New doctrinal concepts emerged as airmen and soldiers alike developed and learned terms such as air superiority, CAS, battlefield air interdiction and AI. As Dr. David I. Hall points out:

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[63] *Ibid*., 21.

[64] The Canadian experience in WW I mirrors the experiences of the RAF as Canadian flyers were employed within the RAF.

[65] *Ibid*., 29-36.

[66] Adjectives and nouns, such as flexibility, versatility, persistence, priority, height, speed and reach, crept into both air force and army lexicon.

> Between 1914 and 1918, the Royal Flying Corps (RFC) and the Royal Naval Air Service (RNAS), followed by the RAF, had performed every major air power role and mission, the very roles and missions that are the core capabilities of modern air forces today.[67]

By the end of WW I, the RAF was the world's pre-eminent air power, numbering some 22,000 aircraft and almost 300,000 personnel.[68] At the same time, a significant rift had developed between the army and the air force concerning the best methods of employing air power:

> The Army viewed aircraft as auxiliary forces, similar to artillery and the new tanks, which were sub-allotted to army corps at the front, and placed under the direct control of each respective corps commander. Aircraft were used as 'flying artillery' to help the infantry advance. Army commanders, seeking the ultimate in close air support — to the exclusion of all other forms of combat aviation — employed as many aircraft as possible in a ground attack role at the forefront of their contact battle. … These practices became increasingly problematic for Britain's airmen. … They … deduced the benefits to be had from a system of centralized command and control. Employment of such a system would enable an air commander to concentrate all available aircraft at critical times and points in a battle and, most important, ensure a maximum effort 'in support of the decisive tasks'. The Army's preferred method — that of decentralized command — increasingly was regarded by many airmen as wasteful and inefficient; it also entailed dispersion of effort on inconsequential objectives.[69]

This fundamental topic of contention between the air force and the army on the use of air power, dating from at least as far back as 1918, lingers to the present day.

The Canadian Air Force (CAF) was formed by an Order-in-Council in 1920. On 1 April 1924, King George V granted the term "Royal" to be applied to the CAF and the

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[67]Canadian Military Journal, "Creating the 2nd Tactical Air Force RAF: Inter-Service and Anglo-Canadian Co-operation in the Second World War," http://www.journal.forces.gc.ca/engraph/Vol3/no4/pdf/39-45_e.pdf#search='history%20canadian%20forces%20tactical%20air%20control%20system'; Internet; accessed 13 March 2006.

[68]*Ibid*.

[69]*Ibid*.

RCAF was born, albeit as a directorate of the Canadian army.[70] From 1924 to 1932, the RCAF increased its capacity as both a military service and a provider of air support to civil authorities. 1937 to 1939 was a period of accelerated growth, including unprecedented infrastructure development, as newly formed squadrons prepared for war. Even though the RCAF obtained its first Chief of the Air Staff (CAS) in 1938, it remained an auxiliary air arm to the army and navy. On 1 September 1939, when Germany invaded Poland, the RCAF had a strength of 4,000 personnel (400 officers and 3,600 airmen) manning eight Regular Component and 12 Auxiliary Force Squadrons with a total of 270 aircraft of 20 assorted types.[71] The squadrons' roles were as follows:

> …[the] Regular squadrons [were] comprised of two general purpose, two general reconnaissance, one fighter, one bomber, one torpedo-bomber, and one army co-operation. The Auxiliary Force consisted of 12 squadrons including four fighter, four bomber, two army co-operation, and two coast artillery co-operation.[72]

Ironically, when war broke out, the RCAF resembled the type of air service desired by other Allies' army leadership. As Dr. Hall explains:

> Training, such as it was, was carried out by individual squadrons, and emphasized tactical procedures in air-to-air fighting, ground attack and torpedo runs. … As an interesting aside, the Canadian approach to army cooperation was exactly what the British Army wanted, and would have had, had its vision of air support rather than that of the RAF's been 'official' policy. In the autumn of 1939, the 1st Canadian Division sailed for England. With it went one army co-operation squadron, No. 110 Squadron, RCAF, equipped with Westland Lysanders.[73]

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[70]*Ibid*.
[71]*Ibid*.
[72]*Ibid*.
[73]Canadian Military Journal, "Creating the 2nd Tactical Air Force RAF: Inter-Service and Anglo-Canadian Co-operation in the Second World War," http://www.journal.forces.gc.ca/engraph/Vol3/no4/pdf/39-45_e.pdf#search='history%20canadian%20forces%20tactical%20air%20control%20system'; Internet; accessed 13 March 2006.

When the Canadian army and air leaders arrived in Britain, they were quickly embroiled in the lengthy and bitter debate that had been raging between the RAF and the British Army since the 1920s. The RAF CAS, Air Vice Marshall (AVM) Sir Hugh Trenchard had his Air Staff conduct extensive analysis of the use and misuse of air power. The Air Staff:

> … established a set of first principles of air warfare — offensive initiative, air superiority, concentration of force, and the need for centralized command and control — principles which served the RAF well in its development of theory and doctrine throughout the inter-war years and the Second World War.[74]

During the late 1920s and early 1930s, the RAF, the Royal Navy and the British Army could not agree on the best approach for the use of air power:

> Division and hostility were compounded further by deep cuts in defence expenditures and the lack of a common approach within the services to the planning and conduct of war at the strategic level.[75]

This acrimonious debate persisted until 1943. "As a general rule, the airmen tended to see a wider, strategic application of air power."[76] Their experiences in China and Spain taught them that air attacks in the close battle were ineffective and uneconomical. The Army, however, held the opposite view, believing that close support was critical. As it turned out, when more resources were provided to the air force for the accomplishment of its tasks, the results began to speak for themselves. Not only were strategic and operational targets attacked, but, when required, CAS aircraft supported ground assaults

[74] *Ibid*.
[75] *Ibid*.
[76] *Ibid*.

to great effect. The answer to ending the debate was nothing less than the ability for the air force to possess something that is almost impossible to have in peacetime – sufficient resources. Once sufficient resources were available, the ability of the air force to achieve air superiority was achieved. This, in turn, lead to the ability to support the land battle. As Dr. Hall describes:

> A severe lack of resources and technical problems with both aircraft and rudimentary communications systems also hindered the rapid development of a comprehensive, flexible and quick-to-react air support system.[77]

In joint experiments conducted in Northern Ireland, the concept of multi-role fighter-bombers was developed along with the identification of the need for a tactical air force, envisioned as "… an RAF formation that was equipped and trained to obtain air superiority by offensive air action and to attack battlefield targets in close cooperation with the ground forces."[78] Significantly, these experiments can be thought of as the origin of the modern TACS in Canadian aviation history:

> From 5 September to 28 October 1940, they directed a series of signals exercises and command and control trials that led to the formation of a rudimentary combined (army/air) battle headquarters equipped with direct communication links to forward troops and both forward and rear airfields. At the end of the year, the Army and the RAF celebrated three major achievements: the creation of a Combined Central Operations Room at GHQ Home Forces, the adoption of Close Support Bomber Controls … and, on 1 December, the formation of Army Cooperation Command. **Working within Army Cooperation Command, from 1941 to mid-1943, RCAF army cooperation squadrons and most RCAF fighter squadrons in the UK developed and refined their tactical procedures for close and direct support operations in a land battle.** [emphasis added][79]

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[77] *Ibid*.
[78] *Ibid*.
[79] *Ibid*.

As WW II progressed, tactically minded operators working at the operational level or below began to overcome the previous impediments to cooperation and left the continued squabbling to the strategic level, which went on virtually unabated back in England until as late as 1943. The further development of the air control system was exported to the other theatres of the war and the lessons learned were beginning to take root among the planners of OPERATION OVERLORD (D-Day):

> A parallel air support system was forged in the hard test of battle in North Africa during the spring and summer months of 1941. … a series of joint army-air conferences and exercises aimed at solving the air support problem [were initiated]. Air Support Controls (ASC) — an innovative joint command structure … to control combined land-air operations — was constructed and tested. In addition to command and control exercises, a number of air trials tested bomber and fighter aircraft in a variety of tasks to determine their optimum roles in ground support operations. **Out of these efforts emerged a new tactical air system, one that eventually proved effective in both attack and defence and against either pre-arranged or impromptu targets. The joint command and signals network was the nervous system of the new air support system and the fighter-bomber was its talons and teeth.**[emphasis added][80]

Despite this tactical-level progress, senior air leaders, such as AVM Arthur Tedder, were concerned that the cooperation and coordination between soldiers and airmen had to go further. He pushed very hard to get his army colleagues to accept the notion that, if the army wished to take full advantage of air power, "… it would, on occasion and under certain circumstances, have to adapt both the timing and the location of its operations on the ground."[81] Air Vice Marshall Tedder's view of the required levels of coordination went deeper:

[80] *Ibid*.
[81] *Ibid*.

> [Tedder] believed that a combined land and air plan, drafted by the two services working as equals, was required. Army and air commanders … must work together throughout all stages of drafting, planning and executing their operations. Unity of purpose would be their guide.[82]

In the end, after much more rancorous disagreement on both sides of the debate[83], the successes forged through experience in battle provided the overall combination of necessary elements to create the conditions for a successfully integrated operation.[84] Air Vice Marshall Tedder's concerns were alleviated when, for OPERATION OVERLORD, PM Churchill appointed a single air commander and all air assets reported to that commander as part of the new Air Expeditionary Force (AEF) Headquarters (HQ) under Fighter Command. The AEF was reformed as the 2nd Tactical Air Force on 1 June 1943. Most notably, after successful demonstrations of the efficacy of the single commander and the capabilities of the sophisticated C2 system, Field Marshal Montgomery publicly renounced the old War Office belief that army commanders should control their own supporting air forces.[85]

In summary, there are a number of major lessons learned by the Allies' experiences in the CL role during WW II. Centralized command of all air assets under an air commander is vital in order to allocate and apportion the finite air assets across the spectrum of the entire battlespace. Just as an airman should not be placed in charge of

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[82]*Ibid*.

[83]Including from Canadian Gen A.G.L. McNaughton, an advocate of army-controlled air forces.

[84]Canadian Military Journal, "Creating the 2nd Tactical Air Force RAF: Inter-Service and Anglo-Canadian Co-operation in the Second World War," http://www.journal.forces.gc.ca/engraph/Vol3/no4/pdf/39-45_e.pdf#search='history%20canadian%20forces%20tactical%20air%20control%20system'; Internet; accessed 13 March 2006.

[85]It is no coincidence that a description of the C2 system designed for OPERATION OVERLORD in 1944 sounds very familiar to the tried and true C2 methods in use by most of the modern, capable, Western-allied military forces that employ aerospace power today, Canada being one notable exception due to its lack of a fully integrated TACS.

army assets at the operational or tactical level, neither should a soldier be placed in charge of air assets at those levels of operations.[86] The CL mission is just one of many missions that must be accomplished with the existing resources of the air commander. Prior to conducting the CL mission, a strong measure of air superiority must be achieved in order to create the permissive environment to conduct successfully the CL mission. Successful conduct of the CL mission depends on a robust C2 system such as a fully integrated TACS. Finally, there are three vital elements necessary for effective army-air cooperation: goodwill (the willingness to cooperate); sound principles and tactics; and, reliable communications.[87]

During WW II, Canadian airmen participated in the conflict on equal terms with their Allied counterparts. Canadians were instrumental in developing some of the tactical and operational tactics, techniques and procedures (TTPs) that now are considered elementary doctrinal principles and organisational/C2 practices. Unfortunately, as has been the case throughout history, the lessons learned were not captured adequately to ensure that the lessons were not forgotten.

The history of the development of a Canadian TACS throughout the 45 years after WW II up to the employment of CF-18s in the 1991 Gulf War is reflected in the technological and organisational developments within the USA and NATO. However, historical analysis reveals that Canada's CL capability, especially its C2 and TACS capability, did not mature due to Canada's heavy reliance on those capabilities being supplied by its allies. During the Korean War, for example, Canada's air force contributed F-86 Sabres flying as air-to-air interceptors and as fighter-bombers, although

[86]This does not obviate the requirement for the assignment of operational control of air assets to an army or navy commander in specific circumstances, where warranted.

[87]*Ibid*. RAF historian, Sir Maurice Dean, identified these three vital elements.

their contribution to the CL mission was minimal relative to the air-to-air mission.[88] Rather than a unique Canadian TACS capability in the Korean War, the Canadian air forces supporting Canada's land forces on the ground and in the air were integrated into the United Nations (UN) TACS, provided mostly by the USA.

Throughout the 1950s and 1960s, the Canadian military enjoyed a prolonged state of relatively sufficient resources to permit the pursuit of sound military doctrinal practices. However, the relatively strong Canadian operational capability was somewhat of a chimera. The NATO system had its risks, which have only become evident recently with the lack of operational capability in key areas, including joint C2 and CL capability. These capability gaps were "indiscernible" when Canada was more heavily committed to NATO and CF personnel were stationed in Europe.

Much of the Canadian capability in the area of C2 was due to Canada's membership in NATO, which provided three main benefits: the synergy of working very closely with NATO allies, the collocated stationing of military air and land forces overseas, especially in Germany, and the requirement for both the Canadian air and land forces to maintain stringent NATO standards. These standards were met through regular, large-scale exercises involving multinational NATO forces and rigorous NATO Tactical Evaluations (TacEvals). These two key training mechanisms fostered the three vital elements necessary for effective army-air cooperation; goodwill (the willingness to cooperate), sound principles and tactics, and reliable communications. Under NATO, the

[88]Department of National Defence – Directorate of Heritage and History, "Canada's Army in Korea: The United Nations Operations, l950-53, and Their Aftermath," http://www.forces.ca/hr/dhh/downloads/Official_Histories/Korea1956_e.pdf; Internet; accessed 14 March 2006. This account of Canada's role in the Korean War was written in 1956 by the Historical Section, General Staff, Army Headquarters, Ottawa. Not all of the CL lessons of WW II had been completely lost: as this army report recorded "Air support was close, constant and invaluable."

national militaries were able to pool resources and accomplish tasks they normally would not have been able to do individually without a significantly higher commitment of resources. The large NATO exercises permitted each nations' air, sea and land forces to work closely together. Furthermore, as in Baden-Soellingen, Canadian army and air force units and personnel were often collocated on the same military base.[89]

The Cold-War, NATO reality of national forces located in close proximity helped solve the first element of successful conduct of the CL mission, goodwill/willingness to cooperate. The pressure on Canadian and other Allied commanders at all levels in the chain of command to achieve high grades on their units' NATO TacEvals was sufficient to motivate the senior military leadership to maintain the required levels of jointness and interoperability to accomplish their assigned missions. This created the establishment and maintenance of sound operational principles and tactics, which solved the second required element of successful army-air cooperation. Finally, rapid technological developments solved the third element: reliable communications. With these three elements solved, cooperation between the three CF Services was significantly higher than it has been since the withdrawal of the CF from Europe.

The Korean example of Canada making a relatively small contribution of specific operational capability that can integrate into, and be interoperable with, its allies is a theme that is repeated throughout the Cold War era. Indeed, interoperability was one of the guiding principles of the collective defence system. Interoperability provides increased effectiveness and efficiency. Forces in a coalition must be able to interact for mutual support and to avoid fratricide. Politically, however, collective defence and

[89]CFB Baden Remembered, "CF-18 Era: 1984-1993," http://www.badenremembered.com/history/cf-18era.htm; Internet; accessed 13 March 2006.

interoperability has a "sinister" offspring; not only do nations have the ability to enjoy the military defence benefits of collective protection, they also enjoy the shedding of responsibility to provide to their own militaries those resources required for operational capabilities that are perceived to be common to the collective whole. In other words, many of the nations participating in the NATO developed only those operational capabilities required to "plug and play" into the larger NATO battle. As a result, over the years as defence budgets were reduced, countries like Canada cut back in the areas deemed to be less critical to fighting a collective war, "safe" in the knowledge that, hopefully, some other nation (most likely the USA) would provide the "glue" to fuse together all of the various nations' "plug and play" forces that were offered up in time of need. Not unlike its allies, then, since the end of WW II up to its withdrawal of forces from Europe and, roughly, the 1991 Gulf War, Canada has been able to enjoy tremendous financial benefits by not having to develop some of the more critical operational capabilities, such as C2, required for a modern force to operate as an independent military force. One of the critical operational capabilities that Canada was able to let diminish without an immediate and obvious effect on operations was the TACS.

Another benefit of the NATO system during the Cold War was that a significant number of CF personnel served overseas and gained considerable experience in designated Canadian positions in key operational areas. As a result, the overall level of Canadian experience across a number of operational capabilities was high, even if actual capabilities were low. With the end of the Cold War and the withdrawal of the CF from Europe, not only would this type of experiential opportunity be lost but also experienced personnel were not retained by the CF. If the vision and impetus had been strong for

Canada to capture this experience and develop a Canadian-unique capability in some of the more critical areas, including C2 (and, therefore, TACS), Canada now would be enjoying a high level of indigenous, independent military capability in the CL role. Unfortunately, the Canada withdrew its forces from Europe primarily to save money. Continued budget cutbacks and force reductions in the CF forestalled any ability for the CF to retain its experienced personnel and build an effective TACS capability. In summary, after WW II to 1991, Canada became a nation unable to operate militarily to any great effect without significant assistance from its allies.

The Cold War ended in 1989 and the Western-allied nations scrambled to deal with the fallout. No sooner had plans been formulated for the drawdown of CFE, Canada committed CF-18s to the Gulf War 1, which exposed all of the "cracks" in the foundation of the operational capabilities that had been stripped away from the CF throughout the years. Despite the capabilities of the well-trained aircrew, it became painfully obvious that Canada's CF-18 had fallen so far behind in capability that it almost had become a liability to the effectiveness of the coalition force. With older, semi-active air-to-air missiles, an aging electronic-warfare suite, no modern, frequency-agile radios with which to communicate in a secure manner with other coalition forces and no capability to deliver precision-guided munitions (PGM), the Canadian CF-18s were barely able to be integrated into the coalition force and, even so, only in a "back-stop", air-to-air or a limited CL capacity.

Gulf War 1 also exposed C2 as another key area where the CF had fallen further and further behind the USA and other allies. Canadian airmen, among others, got their first glimpse of the significant numbers of personnel and vast amount of money,

technology and intellectual power the USAF had invested in its newest weapon system, the CAOC, the most critical C2 component of the TACS. In 1991, the American military sent a ripple of "shock and awe" through the military world by what it achieved in the opening days of the War. The USA's allies scrambled to catch up even to the latest lexicon of terms, such as the RMA[90], Manoeuvre Warfare, the OODA Loop[91], Effects-based Operations (EBO) and Net-centric Warfare (NCW). These could not be ignored as passing intellectual fads with humble practical applications. Likewise, the significant value of a high degree of service jointness was a major lesson learned given that the successes of the USA joint-forces arrangements stemming from the 1986 Goldwater-Nichols Act, which helped lead to the overwhelming successes of OPERATION DESERT STORM and numerous subsequent operations.[92]

In Canada, however, given the realities of a shrinking defence budget, the CF spent the better part of its few defence dollars on keeping its "pointy end" sharp, to the sacrifice of many of the supporting capabilities. Canadian commanders, forced to prioritise in the face of budget reductions, naturally sought to ensure that the front-line, combat capabilities received the bulk of the funding. Unfortunately, the CF significantly lagged behind other allied militaries, especially the USA, in realising the combat

[90]Canadian Military Journal, "Canada and the Revolution in Military Affairs: Current Response and Future Opportunities," http://www.journal.forces.gc.ca/engraph/Vol1/no3/pdf/7-14_e.pdf#search='revolution%20in%20military%20affairs'; Internet; accessed 15 March 2006. The RMA "… is defined as a major change in the nature of warfare brought about by advances in military technology which, combined with dramatic changes in military doctrine and organizational concepts, fundamentally alter the character and conduct of military operations."

[91]The "Observe-Orient-Decide-Act" Loop developed by Col John Boyd, USAF.

[92]Government of Canada Newsroom, "New Canadian Forces Operational Commands Take Charge of Domestic, Special and International Operations," http://news.gc.ca/cfmx/view/en/index.jsp?articleid=195039&; Internet; accessed 15 March 2006. There is little doubt that the current CF initiatives to restructure its C2 arrangements under Canada Command (CANCOM), Canadian Expeditionary Forces Command (CEFCOM), Canadian Special Operations Command (CANSOFCOM) and Canadian Operational Support Command (CANOSCOM) are the CDS' attempt to capitalise on the lessons learned from the Goldwater-Nichols Act as well as the successful execution of the Joint Task Force construct in USA-led coalition operations in Afghanistan.

capability of modern C2 systems and the requirement for increased joint arrangements and a modernised Canadian TACS. In other words, C2 and the TACS fell victim to a belief system that defined them as non-combat or support capabilities.

For an extremely short period of time during the early 1990s, the CF enjoyed the advantage of having air personnel who had brought home to Canada their experience from overseas. The TACS capability was kept from being completely abandoned by setting up what became known as TACS Dets. The concept was for fighter pilots to be posted to "detachments" located on army bases of the various army brigades. Ignoring one of the major lessons from WW II, that cooperation and an exchange and liaison of personnel is vital for success, no CL-oriented army personnel were identified for a posting to any air-force wing. The CAS role and the importance of the TACS was kept barely alive by rotating ex-NATO-experienced fighter pilots and other personnel through flying units such as 419 Squadron, which flew the CF-5 and retained a residual capability in photo reconnaissance and CAS. Many of the 419 Squadron pilots had NATO TACS experience. Unfortunately, this honeymoon period of experience was short lived. In 1994, a number of factors caused a dramatic change to the combat capability of the CF-18 fighter force and the TACS Dets, including the Force Reduction Program (FRP) [93] and increased hiring of pilots by the civilian airlines. Many of the FRP releases were experienced personnel who had served in Germany and they represented a significant loss of years of military service in NATO. The overall result of the withdrawal from Europe,

[93]Chief Review Services, "Director General Audit: Audit of Force Reduction Program," http://www.dnd.ca/crs/pdfs/frp_e.pdf#search='canadian%20forces%20force%20reduction%20program'; Internet; accessed 15 March 2006. At exactly the same time that Canada was deploying CF-18s to the Gulf War, the GOC made its decision to reduce the number of military personnel in the CF by means of a Force Reduction Program. The target number for release or early retirement under FRP kept changing but eventually, in the 1994 White Paper, it was set at a reduction of 28,800 personnel by 1999. From 1992 to 1997, the FRP netted almost 14,000 CF members; a drop of 16%.

the FRP and airline hiring caused significant losses of experienced fighter pilots. Along with these pilots' flying experience went a vast amount of experience in CL operations and the knowledge of the air side of the TACS.

Throughout the 1990s, five major, additional factors transpired to affect the further degradation of the already fragile TACS and CL capability in Canada. First, the decision to retire the CF-5s in 1995 more or less represented the severing of the final link between actively flying fighter pilots and their army counterparts. Pilots who operated the CF-5 spent considerably more time coordinating with their army counterparts when conducting their CL sorties than did CF-18 pilots. This stemmed from the role of the CF-5 as a training aircraft and the requirement to train new fighter pilots in the low-level strike role in preparation for their transition to the CF-18. When not training student fighter pilots, the CF-5 pilot instructors often conducted their own proficiency training by coordinating CAS exercises and training sorties with the army in Wainwright.

The second factor leading to the degradation of the CF CL capability centred on the significant adjustments that occurred in fighter-bomber tactics as a result of lessons learned from the 1991 Gulf War. In OPERATION DESERT STORM, modern technology had made such a dramatic impact that it was changing the TTPs of the air-land battle. New capabilities, such as forward-looking infrared (FLIR) pods, Night Vision Goggles, PGMs, Havequick frequency-hopping, jam-resistant radios, datalink and other high-tech devices, permitted the CL strike aircraft to conduct their missions with significant accuracy, in all weather, at any time of day or night, and from medium to high altitudes. With so few fighter pilots dedicated to the TACS Dets, the massive changes

occurring in the CF-18 strike TTPs were not coordinated well with the army and a CL communication gap developed between the two Services.

It was deemed highly likely that future, mid- to high-intensity conflicts would be executed in much the same manner as the first Gulf War, with the preponderance of air effort in the opening hours and days focused on eliminating the air-defence capability of the adversary, achieving air superiority early in the conflict and creating a lower-threat, more-permissive environment in which to conduct the CAS mission. With air superiority achieved, manned strike aircraft, such as the CF-18, would enjoy the freedom to operate relatively unopposed over the battlefield, just as they had done in Gulf War 1. The use of Gulf-War-style medium- to high-altitude TTPs and precision weapons was a significant change from the Cold-War TTPs of the low-altitude ingress, pop-up attacks using comparatively less-accurate weapons.[94] CF-18 pilots began training to conduct their missions from a much higher altitude, where the battlefield was divided into "kill boxes"[95] waiting to be called in on air strikes to support the land battle.[96] Unfortunately, these new TTPs were not well coordinated with the army in any kind of joint manner, thus widening the air-land, CL communication gap.

From the pilot's perspective, the low-threat, medium- to high-altitude CAS TTPs were more straight-forward compared to just a few years earlier when the high-threat, low-altitude TTPs prevailed. Realistic CL-procedures training for the fighter pilots could

[94]This is not to say that non-precision and low-altitude weapons delivery is no longer a valid and required weapons-delivery method. OIF and OEF continue to show that there are circumstances when CAS aircraft are required at low altitude delivering non-precision weapons such as rockets, cluster munitions, strafing,etc.

[95]Major J.V. Pumphrey, "The Doctrinal Morass of Integrating Joint Operations Beyond the Fire Support Coordination Line (FSCL)," (Toronto: Canadian Forces College Command and Staff Course New Horizons Paper, 2003), 14.

[96]Joby Warrick, "Attacking 'Killing Boxes' Proves Effective," *Air Force Times*, February 25, 1991, 4.

be accomplished either in the CF-18 simulator or in the airspace located close to their home bases without having to travel to the ranges used by the army. Additionally, medium- to high-altitude strike TTPs called for strike ordnance to be dropped from significantly higher altitudes than before using PGMs. This created its own set of problems due to the risk of fratricide of friendly troops in the event of a guidance failure of a PGM.[97]

The situation was complicated further by the fact that, often, the PGMs were dropped using laser-guidance signals from the aircraft's on-board targeting sensor. Laser-safety procedures had to be thoroughly standardised and controlled. Due to rapidly changing technology, low numbers of fighter pilots and operational and training commitments, little or no work had been done throughout the 1990s to address the concerns introduced by the technological and TTP changes brought about by precision weapons. Unfortunately, the fighter-pilot manning levels had dropped to below a critical mass to be able to conduct all of the work made necessary from all the changes.

The third factor leading to degradation of the TACS and the air-army relationship was the reduction in yearly flying rate (YFR) (flying hours) provided to the CF-18 squadrons. With significant reductions from approximately 28,800 hours of YFR in the early 1990s to 16,000 hours in 2003, squadron commanding officers were forced to

[97]A PGM that "goes dumb" (ie. doesn't guide), dropped from medium- to high-altitude has the risk of impacting very far from its intended target – this is known as the guidance-failure footprint. The ground guidance-failure footprint of a failed PGM is significantly large, depending on the altitude at which the weapon is released; none of the air-to-surface ranges operated by the army had been templated to operate the new, precision weapons. Furthermore, when templating analysis eventually was conducted on the various ranges, it showed that most of the army's ranges were too small to permit the conduct of live or inert (no explosives) weapons. (Even an inert bomb with no explosive charge can cause destructive damage.)

prioritise their flying hours.[98] Inevitably, the lower YFR, combined with reduced operations budgets at the wings and squadrons, caused fewer CAS training exercises to be conducted with the army. This is not to say that no CAS missions were conducted, but the number of sorties dedicated to CAS dropped substantially over the years, especially with the retirement of the CF-5. Not surprisingly, the army's capability to train its FACs was impacted at a time when the army was attempting to implement new TTPs based on its own evaluation of the lessons learned from the US Army experience in the Gulf War. The ability for soldiers to call in air strikes was (and is) seen as an increasingly vital skill on the modern battlefield.[99] The argument presented by the air force, however, was that the CF-18 was too expensive an operating platform to be used as a training aid for FACs. Forward Air Controller training was supposed to have been provided by a government contract, known as the Contracted Air Training Service (CATS), to a civilian, commercial company but the implementation of the CATS contract fell well behind schedule for a number of reasons that are beyond the scope of this paper.[100]

The fourth factor leading to degradation of the CF CL capability was the disbandment of Fighter Group HQ (FGHQ) in 1997 and the significant degradation of fighter-force oversight of FAC training. With the re-organization of the air force under

[98]The author is very familiar with these numbers, having worked in the position as A3 Fighter at 1 Cdn Air Div HQ.

[99]The notion of an increased requirement for units at a low tactical level to have a direct (themselves) or indirect (an embedded FAC) mechanism to call in air strikes was articulated to the author in a meeting held at CTC Gagetown in 2005. This is a result of the lessons learned on operations in Afghanistan. OPERATION ANACONDA is a good example for study, but doing so in depth is beyond the scope of this paper.

[100]One of the issues regarding a contracted FAC-training service is that civilian pilots are prohibited from dropping live or inert ordnance. Information that was passed to the author by army representatives at a meeting held at CTC Gagetown in 2005 showed that CF army authorities have identified such a lack of realism as a limiting factor in their training, arguing that the ability to see the effects of explosive ordnance in training significantly enhances the realism of the training.

1 Cdn Air Div HQ, the highest-ranking officer dedicated solely to fighter-force matters was down-graded from Major General to Lieutenant Colonel.[101] The FGHQ position of A3 Joint Operations was not emulated within 1 Cdn Air Div HQ resulting in a loss of focus on joint operations.[102] For a brief period of time in the late 1990s, FAC training was conducted at the Air Force Tactical Training Centre located at 4 Wing Cold Lake. This situation was short lived, however, due to too few fighter pilots to sustain the training commitment. FAC training reverted back to the army located at Gagetown.

The fifth factor leading to degradation of the TACS and the air-land relationship was the operational tempo of the fighter community throughout the 1990s and early 2000s combined with a significant reduction in the number of combat-ready fighter pilots. The Canadian fighter force has been extremely busy on operations for the past 15 years: the 1991 Gulf War; the provision of FACs to Bosnia during the 1990s; the Kosovo Campaign, OPERATION ALLIED FORCE (OAF), in 1999[103]; the domestic air sovereignty action under OPERATION NOBLE EAGLE carried out intensely for approximately 11 months after the 9/11 terrorist attacks; the protection of the Kananaskis G-8 Summit as part of OPERATION GRIZZLY in 2002; and the continuing, OPERATION NOBLE EAGLE air sovereignty presence within Canada, which has no declared end state. During this same period of time, the fighter force was reduced from

[101]The Comd FGHQ was dedicated solely to operational fighter capability. The Comd 1 Cdn Air Div HQ is dedicated to the entire operational capability of every aircraft fleet in the air force. Within 1 Cdn Air Div HQ, only A3 Fighter, a lieutenant colonel, is dedicated solely to fighter matters.

[102]Lieutenant Colonel S. Will, (4 Wing Cold Lake: electronic mail dated 17 May 2006.)

[103]Canada's Air Force, "CF-18 Hornet," http://www.airforce.forces.ca/equip/cf-18/intro_e.asp; Internet; accessed 15 March 2006.

eight to four squadrons and, since then, there approximately has been a 42 percent reduction in the number of combat-ready fighter pilots.[104]

From June 1998 to July 1999[105], Canadian CF-18s conducted OPERATION ECHO[106] as part of OAF, the NATO air campaign in response to the crisis in the Balkans. OPERATION ECHO proved once again that Canada's major contribution in international military operations was at the tactical level. The positive statistics associated with Canada's CL contribution to OAF mask some of the less-positive realities.[107] Between 1991 and 1999, little had changed for Canada's CL capability. The CF-18s were no further ahead technologically than they were in the first Gulf War: no modernised radar or mission computers, no jam-resistant, frequency-agile radios, few and extremely limited-capability FLIR pods, few PGMs, no NVG or datalink capability, and an aging electronic-warfare suite. Most significantly, few, if any, CF-18 pilots occupied positions in the OAF CAOC. This lack of representation in the CAOC, at the *operational* level of the conflict, is a significant failing, considering that most of the targeting and aircraft-tasking decisions are made therein. OPERATION ECHO once again proved that

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[104]The following is a basic calculation of the reduction in the number of fighter pilots from 1991 to 2006. In 1991, prior to the withdrawal from Canadian Forces Europe (CFE), Canada had the following eight fighter squadrons: 409, 421, 439 (in CFE); 410, 416, 425, 433 (in Canada). The PML for each squadron was approximately 24 pilots; 8 squadrons x 24 pilots = 192 total combat-ready fighter pilots in 1991. In 2006, there are four squadrons: 410 (20 pilots), 416 (15 pilots), 441 (15 pilots), 425 (30 pilots) = 20+15+15+30 = 80 total combat-ready fighter pilots. Reduction from 192 in 1991 to 80 in 2006 represents a 42% reduction. These numbers are relatively accurate but should be considered as a rough order of magnitude and are provided to demonstrate the dramatic reduction in numbers of fighter pilots in the past 15 years. The investigation into the actual numbers of pilots and all of the factors involved in the complex subject of pilot manning is beyond the scope of this paper.

[105]http://www.forces.gc.ca/site/newsroom/view_news_e.asp?id=744; Internet; accessed 22 April 2006.

[106]The Canadian Operation was known as OPERATION ECHO.

[107]http://www.forces.gc.ca/site/newsroom/view_news_e.asp?id=744; Internet; accessed 22 April 2006. When presented in a news-media format, the statistics associated with OPERATION ECHO are impressive: 18 CF-18s and approximately 300 pilots and support personnel in Aviano, Italy, 90 CF members in Geilenkirchen, Germany, associated with the NATO Airborne Early Warning Force aircraft that participated in OAF, 678 CF-18 sorties flown and 2600 combat-flying hours logged, active involvement in bombing missions, combat air patrols and the provision of CAS, and responsibility for 10 percent of all NATO strike missions. At the tactical level, this was an excellent contribution.

Canada's CL weakness lays just as much at the operational level of war as at the tactical level, given that many of the critical decisions affecting the tactical level are made at the operational-level CAOC.[108]

With a dramatic loss of experienced personnel over a relatively short period of time (1991-1998), combined with an extremely high operational tempo, it is not surprising that, by 2000, the CF TACS capability was no longer sustainable by the fighter community. In 2000, the fighter force declared that it was unable to man the TACS Dets fully and sought assistance from other air-force occupations to fill the positions located at each of the Brigades. The AEC occupation agreed to fill three of the positions.[109]

In summary, Canada's CL capability largely has mirrored the experience of Canada's allies and has been influenced heavily, both positively and negatively, by Canada's participation in NATO. The trend throughout the history of Western military aviation has been for the TACS capability to suffer a "see-saw" effect of significant emphasis during times of conflict and severe degradation during periods of relative peace. During the 1990s, as defence budgets decreased and difficult decisions were made by senior military leaders, the CF TACS was sacrificed and, now, Canada's CL capability can be characterised as severely operationally deficient. The historical perspective of Canada's CL capability provides the necessary background for an analysis of ways for the CF to resolve its CL capability deficiency.

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[108]GlobalSecurity.org, "The Operational Level: Vital Knowledge For Today's Officer," http://www.globalsecurity.org/military/library/report/1989/BCI.htm; Internet; accessed 22 April 2006.

[109]One position was filled with a fighter-pilot re-enrollee and one position remained vacant. It is widely speculated by many personnel within the air force that the 9/11, 2001 terrorist attacks against the USA prevented a CF pilot-shortage crisis due to its negative impact on airline-industry pilot hiring.

OPERATIONAL REQUIREMENT

FOR A CF COUNTERLAND CAPABILITY

Relevant to the whole question of the operational requirement for an increased CF CL capability is whether the CF should expend the effort and the funds to modernise its TACS. This chapter focuses on two main themes that provide the rationale for pursuing a modernised CF CL capability: strategic political- and military-guidance documents and current and envisioned threat scenarios. Canada's and Canada's Allies' (Australia, UK, US) doctrine and recent CAS experiences are germane and are included within the analysis.

The disturbing decline in the CF's CL capability should be of major concern to Canadian politicians and the senior military leadership of the CF, especially in light of a number of recent, significant, political-military-technological-threat developments. These include, but are not limited to, the 9/11 2001 terrorist attacks on the USA, the lessons learned during OPERATION ENDURING FREEDOM[110] and OIF, the ongoing involvement of CF land forces in OPERATION ARCHER in Afghanistan, the significant impact of advanced technology on the CL mission and the lack of CL-experienced personnel.

The recent election of a Conservative Government into Federal power in Canada has created somewhat of a vacuum in terms of strategic-guidance documents on which to base defence planning. The new Government of Canada (GOC) is conducting a review

[110]Department of National Defence/ Canadian Forces (DND/CF), "Backgrounder: Canadian Forces Operations in Afghanistan," http://www.forces.gc.ca/site/newsroom/view_news_e.asp?id=1703; Internet; accessed 22 April 2006. OPERATION ENDURING FREEDOM (OEF) is the US-led coalition effort in Afghanistan. Canada's contribution to OEF is OPERATION ARCHER.

of defence policy and plans, including a review of the capital acquisition programmes and the Strategic Defence Capabilities Investment Plan. However, it is generally accepted that in the interim period until the new GOC tables a Defence White Paper, a new International/Defence Policy Statement or some other defence-guidance document, the only strategic document that can be used to guide the expected combat capabilities and the associated force structure of the CF is the 2005 DPS. Within the 2005 DPS, there are three instances of GOC direction that support the argument to modernize the CF TACS: to maintain combat-capable forces, to develop the air-to-surface capability of the CF-18 and to develop joint, integrated, unified arrangements between the three Services.

The GOC's direction for the CF to maintain combat-capable forces is clearly articulated in the 2005 DPS:

> Indeed, given the changed context of domestic and continental security, the military may be asked to increase its support to other government departments and agencies to enhance the protection of Canadians, our territory, and our air and maritime approaches. In this environment, **Canada will continue to maintain modern, combat-capable maritime, land, air and special operations forces.** …. This is especially true with respect to failed and failing states. …. Robust, combat-capable military forces are indispensable if Canada wishes to fulfill these roles. While diplomacy remains the preferred tool in the pursuit of international peace and security, our country must possess the hard military assets necessary to achieve our foreign policy goals. This includes using lethal force when necessary. In fact, as the Afghan experience has shown, military power, diplomacy and development are intimately linked and complement one another.[111]

The DPS provides some guidance to the DND regarding the type of combat capability expected of the CF's aerospace forces:

[111]Department of National Defence/Canadian Forces (DND/CF), "Canada's International Policy Statement: A Role of Pride and Influence in the World – Defence," http://www.forces.gc.ca/site/reports/dps/pdf/dps_e.pdf, 19 March 2006.

> With respect to aerospace capabilities, the Canadian Forces will: complete the modernization [sp] of the CF-18 through the acquisition of a satellite-guided air-to-ground weapons capability **to reflect the increased focus on close support to ground forces** [emphasis added], while retaining its air-to-air capability at existing levels; ...[112]

The bold portion of the above DPS passage shows that the GOC expects the CF to increase its focus on close support to ground forces. There are many ways for the CF to provide close support to ground forces. However, there can be no doubt that, by embedding the bold portion of the above statement within the specific reference to direction for aerospace forces, and even more specifically within the reference to air-to-ground-weapons acquisition for the CF-18, the GOC has given clear direction for the CF to increase its focus on CAS. Even though the Canadian fighter force can provide CAS to non-Canadian forces, it is assumed that the GOC expects the CF fighter force to provide an "increased focus on close support" to *CF* ground forces as a priority.

There is no point in modernising the CF-18 with a "… satellite-guided air-to-ground weapons capability to reflect the increased focus on close support to ground forces …" unless there is a desire and capability to deliver those air-to-ground weapons in a CAS environment. In order to conduct the CAS mission, an effective TACS and a robust FAC capability are essential. In effect, the passage from the DPS is the GOC's direct task to the CF to acquire PGMs and to place a greater emphasis on CAS. Modernisation of the TACS and increasing the CF's FAC capability are implied GOC tasks. By deduction, should the CF choose not to modernise its TACS and increase its FAC capabilities, it will be ignoring the GOC's implied direction to do so.

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[112] *Ibid*.

One consistent theme of the 2005 DPS is its heavy emphasis on an expected level of inter-Service cooperation that exceeds traditional jointness. The DPS, for example, states:

> Transformation, however, is not just about technology and equipment modernization. It will require a fundamental change to the culture of our military to ensure **a fully integrated and unified approach to operations** [emphasis added].[113]

This theme also reflects beliefs amongst Canada's Allies. For example, in 1999, the USA military formed the United States Joint Forces Command[114], which "… assumed the role of primary conventional force provider. This landmark change assigned nearly all U.S. conventional forces to Joint Forces Command."[115] The UK is placing no less of an emphasis on jointness within its Ministry of Defence (MOD) as evidenced by their 2003 Defence White Paper:

> … the need to co-ordinate the activities of the three Services more closely by pooling their expertise to achieve maximum operational effectiveness, while at the same time eliminating the duplication of resources. This triservice 'Joint' approach was epitomised by the establishment of structures to support one, and if necessary two, Joint Rapid Reaction Forces (JRRFs) formed from across all three Services and due to be operational by 2001 …[116]

Nor is the Australian Defence Force (ADF) leaving any doubt about its plan for joint

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[113]Department of National Defence/Canadian Forces (DND/CF), "Canada's International Policy Statement: A Role of Pride and Influence in the World – Defence," http://www.forces.gc.ca/site/reports/dps/pdf/dps_e.pdf; Internet; accessed 19 March 2006.

[114]Wikipedia: The Free Encyclopedia, "United States Joint Forces Command," http://en.wikipedia.org/wiki/United_States_Joint_Forces_Command; Internet; accessed 19 March 2006.

[115]United States Joint Forces Command, "United States Joint Forces Command – About Us," http://www.jfcom.mil/about/about1.htm; Internet; accessed 19 March 2006.

[116]The United Kingdom Parliament, "Research Paper 04/71, 17 September 2004 – The Defence White Paper," http://www.parliament.uk/commons/lib/research/rp2004/rp04-071.pdf; Internet; accessed 19 March 2006.

capabilities:

> Jointness responds to the challenge of ensuring that all service elements operate together in ways that make a truly joint force. Jointness ensures that the ADF is able to deliver outcomes benefiting from the force multiplier effects of working together. In a joint force, the sum of the whole effort is much more than the capability of its parts working alone. To maintain this priority for the development of the ADF, capability decisions will continue to emphasise the importance of joint warfighting and of the ADF developing as a fully networked force. …. Working together, these capabilities produce a greater joint effect than the individual platforms operating without coordination. Consequently, the ADF can produce strategic effects out of proportion to its size. As these capabilities are introduced they will be integrated and connected within a joint operating concept to ensure that their inherent potential is maximised and that they build on the ADF's existing capacity for joint warfare and operations.[117]

Reflecting this Allied commitment, the GOC and the senior military leadership within the CF expect the CF to pursue jointness to a unified level and to place a greater emphasis on CAS. There can be no doubt disconnects between the army and the air force are significantly hampering the achievement of an indigenous CF CL capability. These disconnects are manifested in a poor joint C2 capability between the two Services and a lamentable deterioration of the TACS. In short, the wholesale neglect of the TACS within Canada must be reversed if the CF wishes to resurrect its CL capability and provide "… an increased focus on close support to ground forces …", as directed by the 2005 DPS.

In terms of current and envisioned threat scenarios, the tasks "to destroy", "to degrade" or "to disable" are current desired effects that likely will continue as a requirement in envisioned, future CF threat scenarios. It is just as likely that there will

[117]Australian Government: Department of Defence, "Australia's National Security – A Defence Update 2005," http://www.defence.gov.au/update2005/defence_update_2005.pdf; Internet; accessed 19 March 2006.

remain a desire for those effects to be achieved through kinetic means. The future delivery vehicle or mechanism for the desired kinetic effects may change; ordnance might be delivered from a UAV, a terrestrial/maritime platform, or space.[118] If, however, the effects are delivered from air or space and are required to be integrated closely with friendly land or maritime forces, the air force will require a FAC, or future FAC equivalent, in order to ensure a successful link between the aerospace delivery systems and the in-close-proximity land/maritime forces. The TACS and FAC requirement is a proven concept in historical and present conflicts. All that remains is to provide a convincing analysis of the usefulness of the TACS Dets in, for example, the so-called Three Block War (3BW) described in the 2005 DPS, and other most-likely threat scenarios.

Germane to any discussion of threat scenarios is whether the provision of aerospace-delivered ordnance is critical on today's and envisioned future battlefields and, more specifically, on operations in which CF personnel are involved, including the 3BW. Addressing these issues involves an analysis of whether air-delivered ordnance is required in high-, mid- and low-intensity conflicts.[119] Air-delivered ordnance was crucial

[118]As described by Dr. D. Hall, the "talons and teeth" (combat capability) of the CL mission are the strike-capable aircraft (whether manned or unmanned). For Canada, until a combat UAV or some other combat, air-power technology is proven as combat capable as the manned fighter-bomber, the CF-18 and its replacement should provide the air power "teeth" to CF land forces operating in areas such as Afghanistan. The shortage of TACS Dets personnel who provide the link between the land and air powers must be addressed just as urgently.

[119]The 1991 Gulf War and the 2003 Iraq War are considered examples of mid- to high-intensity conflict; a hypothetical future Korean War against an adversary capable of nuclear, biological and chemical warfare is an example of high-intensity conflict. Most analysts agree that the 2001 conflict against Afghanistan began as a mid-intensity conflict and very quickly became a low-intensity conflict. Typically, Operations Other Than War (OOTW) are considered low-intensity conflicts. (For mid- to high-intensity conflict, see: RAND Corporation, "Something Old, Something New Army Leader Development in a Dynamic Environment," http://www.rand.org/pubs/monographs/2006/RAND_MG281.pdf; Internet; accessed 19 March 2006; and for low-intensity conflict see: RAND Corporation, "Origins and Scope of Operations Other Than War," http://www.rand.org/pubs/monograph_reports/MR796/MR796.sec2.pdf; Internet; accessed 19 March 2006.)

to the success of Canada and its Allies in the mid- to high-intensity 1991 Gulf War against Iraq. Given the increased reliance of aircraft-delivered ordnance on the battlefield in Afghanistan since 2001 and Iraq since 2003, it is likely that there will be a continued requirement for air-delivered ordnance in mid- and high-intensity conflicts for the foreseeable future. Aircraft-delivered ordnance has been, and is expected to increase, in significance in low- to mid-intensity conflicts, including in the urban environment of the 3BW. The main reason for this is the precision capability of air-delivered weapons, which is described in a RAND Corporation article entitled *Beyond Close Air Support: Forging a New Air-Ground Partnership*, which deals with the subject of the changing face of the CL mission:

> When accomplished jointly, counterland operations by air forces are becoming ever more effective. Thanks to improved sensors and precision munitions, air attacks are now effective at night, during extreme weather conditions, and in close proximity to friendly forces. Moreover, the potential for fratricide is declining, thanks to improved communications and tracking of friendly ground forces through the Global Positioning System (GPS). …. Operations in both Afghanistan and Iraq have raised the visibility of operations against enemy ground forces (especially CAS) in the Army, the Air Force, the Department of Defense (DoD), and the joint community. The success of air power in providing day, night, adverse-weather, precision support for ground forces has convinced the Army leadership that it can make its forces more deployable and agile by reducing its own artillery support (and the tons of associated ammunition, vehicles, and fuel) and relying more heavily on air power.[120]

As stated in the Rand Corporation's article, this precision capability is more than just a technological improvement that is "… akin to observing that automobiles have become

[120]RAND Corporation, "Beyond Close Air Support: Forging a New Air-Ground Partnership," http://www.rand.org/pubs/monographs/2005/RAND_MG301.pdf; Internet; accessed 19 March 2006.

progressively more sophisticated and reliable over the years."[121] Rather, it is a massive leap forward in the air-land battle:

> First, the ability of air power to attack ground forces has increased faster than has the ability of the latter to survive in the face of air attack. Second, the ability of air power to destroy ground forces has increased more rapidly than has the ability of ground forces to kill other ground forces.[122]

As the Rand article states "These developments have caused a fundamental shift in the roles that air power can play against enemy ground forces."[123]

An important consideration of the envisioned threat scenarios is one that is highlighted by the 2005 DPS: "Transition from one type of [3BW] operation to another often happens in the blink of an eye, with little time to react."[124] This reality is drawn from years of CF and Allied experiences in low-intensity conflict and is one of the pivotal reasons why the army has been successful in influencing CF Transformation toward a more land-centric focus. In the army context, the land-centric focus for CF operations is completely understandable. First of all, it has been a historical trait of army leaders to focus almost exclusively on the land battle with the desire for the preponderance of air power to be used to support the land scheme of manoeuvre. Second, unlike their army counterparts, most aerospace and maritime assets tend not to operate for extended periods of time in close proximity to their threats. In general,

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[121]*Ibid*.

[122]*Ibid*.

[123]*Ibid*. It is highly recommended that anyone interested in the subject of CL warfare reads the RAND Corporation report. Doing so will permit a much-more in-depth understanding of and appreciation for this complex and important military subject that is so germane to current conflicts in which Canada is participating and the likely future conflicts in which Canada may participate. The future survival of CF land forces will likely depend on whether the air force is properly resourced for, and if the correct priority is provided to, the CL mission.

[124]Department of National Defence/Canadian Forces (DND/CF), "Canada's International Policy Statement: A Role of Pride and Influence in the World – Defence," http://www.forces.gc.ca/site/reports/dps/pdf/dps_e.pdf; Internet; accessed 2 April 2006.

aerospace and maritime assets are more manoeuvrable than land forces, in that they have more options to retreat to sanctuaries, if necessary and appropriate, in the event that there is a sudden increased threat. In other words, if land forces, "in the blink of an eye", are engaged in the combat block of the 3BW, their only options are to stay and fight, attempt to manoeuvre away, which is limited by land capabilities operating at land speeds, or call for assistance to overwhelm the threat while fighting or manoeuvring.

In a land battle, a call for assistance can be in the form of more soldiers, airlift support or fire support. Deploying more soldiers to the battle increases the potential for more land casualties. Airlift support, in the form of extraction or attack helicopters, for example, also increases the potential for more casualties, as well as the loss of air assets. Direct or indirect fire support, such as artillery or CAS, has inherent coordination problems, but provides needed fire support without further endangering more soldiers or other assets.[125] Above all else, it is the nature of land power's relative inability to find a sanctuary faster than its adversary that dramatically increases its risks in a sudden, elevated-threat environment compared to its aerospace and maritime compatriots. As a result, it makes great sense for CF aerospace power to be aligned to support the 3BW threat scenario.[126] In so doing, the CF should be placing a significant emphasis on one of the most important joint combat capabilities that the air force and the army need now and in the future, the TACS.

[125]This is not to say that CAS assets are not endangered during the execution of CAS missions, but that, in general, they are less exposed than additional land assets arriving to assist in a fire-fight.

[126]One troubling aspect of focusing on the 3BW is the implications that doing so has on the air force and navy force requirements, given that the 3BW represents a relatively low-threat scenario from the perspectives of the aerospace and maritime components. Analysis of this subject, however, is beyond the scope of this paper.

The **link** between the army and the air force is critical to today's and future battlefields and, more specifically, operations in which CF personnel are involved, including 3BW-type scenarios:

> Air-delivered munitions were often weapons of choice in urban areas [in Iraq during Operation Iraqi Freedom] because they penetrated hard structures reliably and precisely, with less risk of collateral damage than indirect-fire weapons presented. As in Afghanistan, TACs [Terminal Attack Controllers – USA term for FACs] were the vital link between air and land forces. …. The Air Force should also work to improve the links between Air Force and Army forces at all echelons. …. **Terminal attack control is the vital link**[emphasis added] between ground maneuver and airborne firepower. Whether airborne or on the ground, the TAC connects the ground commander to air power.[127]

An airborne or ground FAC is vital to achieving ordnance effects on the battlefield, including the urban battlefield, when friendly troops are in close contact with enemy troops as evident repeatedly in Iraq and Afghanistan today. The requirement for FACs to conduct CAS across the spectrum of conflict is on the rise. Increasingly, Western-allied nations are coming to terms with the future of the air-land battle as described in the Rand Corporation report. The USA military has identified a requirement for land forces to have embedded FAC elements (teams of two personnel in each element) down to very low tactical levels.[128] This already has occurred within the US Special Forces and many units in the US Army. As a testament to the emphasis being placed on FAC training in the USAF, the estimated number of FACs required in the USA military is expected to rise as high as almost 900 two-man elements (1800 personnel) by 2006/2007.[129] The Australian Defence Force (ADF) also has identified the requirement for more FACs,

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[127]RAND Corporation, "Beyond Close Air Support: Forging a New Air-Ground Partnership," http://www.rand.org/pubs/monographs/2005/RAND_MG301.pdf; Internet; accessed 19 March 2006.

[128]*Ibid*, 148.

[129]*Ibid*., 148.

increasing their numbers from approximately 20 or 30 to more than 100.[130] These FAC teams already are considered essential to the survival of the light, manoeuvre forces, which, in many cases, rely exclusively on air power for fire support due to the fact that they often operate out of the range of artillery or other fire support, or in urban centres that limit or prohibit the use of anything but air power.[131]

The services provided by the CF TACS Dets is critical to the successful accomplishment of the CL mission. Furthermore, the CF army already has required FAC/TACP capabilities during their conduct of OP ARCHER and will continue to require such services for the foreseeable future.[132] In the event that the CF army cannot obtain sufficient TACS Dets services from the CF air force, one course of action might be to seek the services from a non-Canadian-air-force source, such as an ally. The analysis of this course of action is complex because of the wide range of responsibilities of the TACS Dets and also because of the fact that a fully integrated TACS is nothing short of an entire CL system, including the C2, the fighters, the TACPs, the FACs and all of the other required TACS assets. Receiving all of these assets from an ally probably is expecting far too much. Yet, in certain circumstances, each nation may provide a certain capability and the whole is greater than the sum of its parts. As in all cases with military capabilities, however, the more a nation must rely on its allies, the more risk that nation's political and military senior leadership must accept that the required capability may not

[130]Defense Industry Daily, "Australian Study/RFI re: Combat ID," http://www.defenseindustrydaily.com/2006/01/australian-study/rfi-re-combat-id/index.php; Internet; accessed 19 March 2006.

[131]RAND Corporation, "Beyond Close Air Support: Forging a New Air-Ground Partnership," http://www.rand.org/pubs/monographs/2005/RAND_MG301.pdf; Internet; accessed 19 March 2006.

[132]CTV.ca, "Goddard died in Taliban ambush: commander", http://sympaticomsn.ctv.ca/servlet/ArticleNews/story/CTVNews/20060519/afghanistan_carbomb_060519; Internet; accessed 30 May 2006. As one example, it was reported by the press that the CF army called in an air strike by a B-1B bomber during the attack in which Capt N. Goddard was killed in Afghanistan.

be in the right place at the right time. Moreover, certain combat functions of the CF army may not be executable without indigenous CF air support due to other taskings for the allies' aerospace assets. Even under a joint-force construct, assets may be prioritised to support "nation A" over "nation B" because "nation A" is supplying the assets. In other words, there can be no doubt that the CF land forces currently deployed to Afghanistan would likely receive far more air support and be able to conduct more-numerous and more-effective combat engagements if the CF provided its own, indigenous, CL air power, TACS and TACP/FAC personnel.

Not all coalition nations' governments have the same agenda or views on the method of conduct of all aspects of the operation. One of the best examples is the situation surrounding the fall of Srebrenica in July 1995 during the UN-lead, NATO-enforced mission in Bosnia and Herzegovina in which 20,000 Bosnian Muslims were murdered by Serb forces.[133] The Dutch action at Srebrenica is a case study on how badly things can go wrong during a 3BW-type scenario if a nation doesn't have its own capability to influence the evolving situation. In the end, evidence suggests that the only air strikes the Dutch soldiers on the ground at Srebrenica were able to organise were those carried out by their own nation's F-16s.[134] Srebrenica proves the high synergy value of having a coordinated, joint force of a nation's air and land power deployed together on operations. If, for example, Canadian troops were to find themselves in a similar situation in Afghanistan to the Dutch troops in Srebrenica, the value of having

[133]United Nations Human Rights System, "Report of the Secretary-General pursuant to General Assembly resolution 53/35: The fall of Srebrenica," http://www.hri.ca/fortherecord1999/documentation/genassembly/a-54-549.htm; Internet; accessed 26 March 2006.

[134]GlobalSecurity.org, "The Role of Close Air Support In Peace Operations," http://www.globalsecurity.org/military/library/report/1997/Rudder.htm; Internet; accessed 26 March 2006.

Canadian fighter-pilot or AEC expertise in the CAOC, Canadian GLOs working in the CAOC alongside their air-force colleagues and Canadian strike aircraft available to support Canadian soldiers brings a tremendous amount of Canadian power in the form of synergy, contiguousness and unity of purpose. The CF should not take lightly the Dutch CL lessons learned from Srebrenica.

It is highly likely that the Canadian army cannot do without a FAC capability and is unlikely to find an ally to provide it. It is worthwhile to determine whether it can or should accomplish the FAC tasking of its own accord. Furthermore, the risks involved in a unilateral approach by the army must be determined, if that approach was to be taken. The Rand Corporation article makes it clear that, in the USA military, air force personnel are required to provide the FAC (TAC, ETAC, FAC(A)) capability. The rationale is:

> In every case, the TAC must be an expert in the tactical application of air power and familiar with the capabilities and limitations of aircraft platforms (bombers, fighters, gunships, and attack helicopters), the characteristics of munitions (guns, missiles, rockets, gravity bombs, laser-guided bombs, and GPS-guided bombs), and delivery tactics. He must have a clear understanding of the ground situation to ensure that the aircraft and munition are appropriate for the mission, generating the desired effect against the enemy at acceptable risk to friendly forces. An experienced TAC can quickly determine if an aircraft flight path or dive angle is suitable, aborting the mission if the approach would threaten friendly forces. Even with advanced munitions such as laser-guided bombs (LGBs) or JDAMs, the aircraft approach vector is still important.[135]

This view is supported strongly by other documents:

[135]RAND Corporation, "Beyond Close Air Support: Forging a New Air-Ground Partnership," http://www.rand.org/pubs/monographs/2005/RAND_MG301.pdf; Internet; accessed 19 March 2006.

> There are inherent difficulties with target acquisition and clear separation from friendly forces which can be reduced by integrated planning and ground or airborne forward air controllers ....[136]
>
> UK Doctrine

> … Since close air support requires the highest level of integration between air and ground maneuver, specific procedures and training are required for air and ground terminal attack controllers and CAS aircrew. Air operations in close proximity to friendly forces require particular emphasis on the avoidance of fratricide. CAS requires detailed planning, coordination, and training for effective and safe execution. Though occasionally the result of malfunctioning weapons, fratricide has often been the result of confusion on and over the battlefield.[137]
>
> USAF Counterland Doctrine

> The mobility and firepower of CAS can make an immediate and direct contribution to the surface battle, but only when all players adhere to a complicated orchestration process.[138]
>
> USAF Counterland Doctrine

> **Close air support is one of the most complex missions performed by the Air Force.**[emphasis added] The very complexity can limit the overall efficiency of CAS, but it is the only way to get air support on enemy targets in close proximity to friendly positions. Effective CAS requires proper training, equipment, and an understanding of the strengths and limitations of aerospace power. **This is why the tactical air control system (TACS) has been organized so that only airmen directly control aerospace power, even when that power is acting in support of ground combat.**[emphasis added][139]
>
> USAF Counterland Doctrine

One doesn't have to look beyond Canadian borders to identify areas where lessons might be learned and support can be obtained for the argument that better air-land integration mechanisms can save CF lives and CF air personnel should play a more

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[136]Royal Air Force, "Joint Force Employment," http://www.raf.mod.uk/downloads/doctrine/07.pdf; Internet; accessed 20 March 2006.

[137]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 37.

[138]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 39.

[139]United States, Department of Defense, *Air Force Doctrine Document 2-1.3 Counterland*. (Washington, D.C.: U.S. Government Printing Office, August 27, 1999), 42.

significant role due to the risks involved. The Tarnak Farm fratricide incident[140] may have been more preventable if Canada's deployed land-forces personnel were more informed about air procedures, such as ACPs and ACMs. Perhaps history would have been kinder to Canada if, during that fateful deployment, a TACS Dets member or two had been embedded with 3 Princess Patricia's Canadian Light Infantry Battle Group, another couple of TACS Dets members had been embedded in the CAOC, a Canadian Radar Squadron had been deployed to the theatre and tasked as a primary or secondary CRC to deconflict local-area land and air elements, a squadron of Canadian CF-18s had been employed in the theatre, cognisant of their Canadian-army compatriots' *modus operandi* and communicated with them concerning air-ground integration procedures on a regular basis, and, prior to their deployment, force generation exercises were realistic and involved a considerable amount of liaison between air and land personnel.

By no means are these speculations meant to imply that there were failings within the army or air force hierarchy or that the Boards of Inquiry (BOI) were lacking in their Tarnak Farm findings. In fact, quite the opposite is the case. The Tarnak Farm BOI itself absolved 3 PPCLI of any responsibility because they acted within the guidelines of the proper, in-theatre reporting regulations. But it also highlighted its concern with some shortcomings in the coordination between the air and land components at that time that still may exist today. As stated in the BOI's final report:

> It is clear to the Canadian Board that a number of systemic shortcomings existed in the quality and nature of the co-ordination between ground and air forces, as well as between the CAOC and the tactical flying units. Had they been corrected, the incident might have been prevented. …. … there are a

[140]In 2002, soldiers of 3 PPCLI were conducting a night, live-fire, small-arms training exercise on the Tarnak Farm Range. Four soldiers were killed and eight wounded when an American F-16 dropped a 500-lb GBU-12 precision-guided munition on their position.

> number of secondary deficiencies that, if corrected, may have prevented the accident. These are largely but not limited to systemic shortcomings in air coordination and control procedures, as well as mission planning practices by the tactical flying units. The effects of these shortcomings are compounded by expectancy on the part of both ground and air authorities that all Airspace Control Measures would be understood and applied.[141]

An in-depth knowledge of all of their own land-force regulations and procedures ***plus*** all of the aerospace regulations and procedures is not a realistic expectation for the land forces deployed into a JOA. Aerospace regulations and procedures are **not** the domain of the army leadership on deployments into areas where deadly air power is employed in close proximity to ground forces. Land force commanders and their personnel should be able to rely on air experts who have grown up in the air environment, understand it implicitly, are embedded with them and can provide sound advice on aerospace matters. As discussed in the historical background chapter of this paper, this is a major, repeated lesson learned since WW I. At this time, this also is a lesson being learned again in Iraq and Afghanistan. In fact, an analysis article in Janes Defense Weekly entitled, *Back to the Future*, describes how "… the US Air Force and US Army are in the midst of rekindling the close integration of air and ground activities that they say was exemplified in the final campaigns of the war in Europe in 1944-1945."[142] According to USAF and US Army officials "… the greatest CAS asset remains the human in the loop. …. … the focus of reinvigorating CAS revolves in large part around these ground controllers, most of whom the air force provides."

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[141]Tarnak Farm Board of Inquiry, "Tarnak Farm Board of Inquiry: Final Report," http://www.vcds.forces.gc.ca/boi/00native/final-report.doc; Internet; accessed 21 March 2006.

[142]Michael Sirak and Joshua Kucera, "Back to the Future," *Janes Defense Weekly*, April 21, 2004, 21.

Despite the acknowledgement of the importance of other effects that aerospace power brings to the battlespace, the ability to deliver the destructive power of explosive munitions remains one of the most critical effects required on the modern battlefield. Lately, the coalition experience on the ground in Afghanistan has shown that air power can be decisive. The Canadian army and those armies of Canada's Allies have relied heavily on air power for the delivery of precision effects, mostly in the form of munitions dropped from coalition fighter-bomber or bomber aircraft.[143] For now and for the foreseeable, medium-term future (at least until 2025), there is a significantly high probability that the manned, precision fighter-bomber (and, now, precision bomber[144]) will remain the keystone capability in aerospace CL operations.[145] If or when the delivery platform of the precision munition shifts away from the manned fighter-bomber, as long as an aerospace platform is delivering the weapon, an airman likely is the best qualified person to coordinate the achievement of the effect within the context of controlling the wider and overarching aerospace picture. This will be especially true if the desired effect is expected to take place in close proximity to friendly surface forces.

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[143]RAND Corporation, "Air Power Against Terror: America's Conduct of Operation Enduring Freedom," http://www.rand.org/pubs/monographs/2005/RAND_MG166.pdf; Internet; accessed 18 March 2006.

[144]Air University Press, "Ground-Aided Precision Strike: Heavy Bomber Activity in Operation Enduring Freedom," http://aupress.au.af.mil/Maxwell_Papers/Text/Theisen_MP31%20.pdf#search='doctrine%20definition%20counterland', 18 March 2006.

[145]Air War College: Gateway to the Internet, "UCAV – The Next Generation Air-Superiority Fighter?," http://www.au.af.mil/au/awc/awcgate/saas/lewis.pdf; Internet; accessed 19 March 2006. Most articles investigated as research for this paper indicate that the year 2025 is the very earliest that the USA could field a realistic capability for UAVs to perform the CL mission to the same level as the manned fighter-bomber capability. Even were fully combat-capable UAVs to be fielded by 2025, undoubtedly, political and senior military officials would desire a certain number of years of actual combat proving before contemplating a significant reduction in manned fighters. It is considered prudent, therefore, for the CF to plan and structure its TACS capability around the manned fighter (CF-18 and its replacement). The resources committed to a full TACS capability would be completely portable to a combat-UAV-centred strike force, in the event technology permits the fielding of such a capability.

By definition this is CAS, an airman should be the FAC on a CAS mission and the FAC role should be considered a core combat capability.

In summary, the provision of aircraft-delivered ordnance is critical on today's, and the anticipated future, battlefields on which the CF will be operating. This includes operations in which CF personnel currently are involved, including 3BW-type scenarios. The link between the army and the air force is absolutely critical to these operations. Whether they be CF-18s, UAVs or the munitions dropped from another nations' air platforms, the TACS Dets can and should be the critical C2 link between the aerospace and land forces. This critical capability is not being addressed adequately by any other means. On deployed operations, the Canadian army will not receive a significant number of embedded FACs from another Allied nation because those nations are struggling to provide their own forces with sufficient numbers of properly qualified, sufficiently experienced air personnel. The Canadian army cannot and should not pursue this capability within its own force structure. Except in exceptional circumstances[146], the air force should be provided the sufficient human resources and funds to train and sustain TACS Dets personnel to provide this operational capability. The army's combat personnel pool would diminish in pursuing this as a task. Furthermore, the army personnel will not possess the inherent, necessary air-related experience that lowers the risk of accidents and incidents when controlling within the complex air environment of the modern battlespace.

[146]For example, properly trained SOF or specialised infantry (eg. FOO)

REVERSING THE CF TACS CAPABILITY DEFICIENCY

The lack of an effective TACS, including the required C2 and FAC capabilities, has created a significant CL capability deficiency that must be addressed by the CF's senior leadership. This chapter explores the military occupation code (MOC) that should provide the bulk of the personnel for the TACS Dets, the number of personnel that must be provided initially to the TACS Dets for FAC qualification and the envisioned, future force structure for the TACS Dets, including positions, ranks and numbers of personnel. It is argued that, for critical operational and ground- and flight-safety reasons, the TACS Dets should be manned by air-force personnel. Furthermore, the air force should provide to the TACS Dets sufficient personnel strength to permit an effective conduct of the CL mission.

Historically, due to the nature of CAS tactics, FACs had to be very familiar with the way CAS was conducted from the pilot's perspective. As recent as the year 2000, CF CAS missions were often conducted using low-level, high-speed, pop-up procedures. The 1991 Gulf War, however, proved to be a turning point in the conduct of weapons-delivery tactics used by fighter-bomber pilots. A fundamental and wholesale shift has occurred in the manner in which fighter pilots conduct the majority of their CL missions. Flying at low altitude increases the risk of being threatened by the multitude of new and increasingly capable man-portable, air-defence systems, anti-aircraft artillery and other low-altitude, surface-to-air missiles that, by design, are often far more effective at tracking and destroying aircraft flying at lower altitudes. The new method of conducting the majority of CL missions is from medium to high altitudes, well above the engagement

envelopes of many threats.[147] The higher ingress and egress altitudes afford the pilots more of an opportunity to react to any threats that might be fired at them. By achieving air superiority, the fighter-bombers obtain the freedom to manoeuvre unopposed over the battlefield, with an ability to acquire visually targets from much higher altitudes and from further away. The advent of FLIR tracking systems, laser designators and PGMs further advances the conduct of the CL mission in a manner advantageous to the higher-altitude TTPs.

The FAC mission is not unaffected by technological advances in the conduct of the CL mission. In principle, the role of the FAC remains exactly the same but the changes that benefit the pilots also have the greatest impact on the conduct of the FAC's mission; fighter-bomber, target-area loiter-time at altitude. In general, the FAC and the pilot are now able to spend a great deal more time coordinating what the pilot sees versus the FAC's description of the target area and the target. Air superiority over the battlespace permits multiple, higher-level attacks to occur by the same aircraft, previously considered a dangerous tactic due to increased threat exposure. New tactics and precision weapons create a force-multiplier situation, whereby fewer aircraft are required to create more harm to the enemy. This is enhanced by the fact that, in general, aircraft consume less fuel when operating at higher altitudes, increasing on-station time. Advances in technology, such as the transmission of common link pictures[148], global positioning system geo-coordinate-reference systems, electro-optics, secure

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[147]Code One: An Airpower Projection Magazine, Operation Iraqi Freedom Debrief: Views from Some of the People Who Were There, http://www.codeonemagazine.com/archives/2004/articles/jan_04/jan04_oif27.html, Internet; accessed 12 May 2006. This is not to imply that there is not a requirement for low-altitude attacks when necessary. Low-altitude bomb, rocket and strafing attacks have been used by coalition pilots during OAF & OIF missions.

[148]LINK 16, for example.

communications and others, significantly eases the burden of synchronising the pilot's and the FAC's respective "SA pictures." For example, with the proper equipment, the FAC can now see exactly what the pilot sees on the pilot's display. With such a common picture between them, the FAC's confidence level to provide the pilot with clearance to engage the target increases dramatically. In the past, in order to decrease the risk of fratricide, it was mandatory for FACs to obtain visual contact with strike aircraft prior to providing strike pilots with weapons-release clearances. As confidence levels in precision weapons increases and further technological advances are made, FAC's are able to provide engagement clearances to pilots without having to see the aircraft, something that would have been unacceptable in the earlier days of CAS.

With the correct technology and procedures, the entire CAS function shifts from being conceived as air power supporting land power to one of land power supporting the targeting by air power. But even this statement is misleading if not blatantly incorrect. The reality is that, finally, the gap between surface and aerospace powers has been "bridged" by advanced technology. Now, the CL mission truly can be a unified, joint mission. Both the land and the air forces should work in unison to achieve the desired effect on the battlespace. But the key link in the joint CAS chain remains the TACS Dets personnel. The ideal qualities of a FAC are an understanding of air power and an ability to operate the inherent high-tech controlling systems and, although a fighter pilot remains the ideal FAC candidate, it is now much less critical that the FAC has a comprehensive background as a pilot. Without exception, all AECs are trained to employ high-tech systems for aircraft-control purposes. It makes sense, therefore, that, although any CF air operations MOC would suffice as a FAC, the skills of an AEC are particularly well suited

to the modern FAC mission. AECs understand air power. They are trained to control aircraft. They are trained in ACPs and ACMs and they are adept at integrating multiple aerospace assets into a fused environment. Furthermore, a significant number of CF AECs are well grounded in fighter operations, having gained their experience controlling fighters in CADS, on the Radar Squadrons, on board AWACS and ships, and in control towers. On the modern battlefield, AEC is a strong candidate MOC to lead the CF FAC mission.

A detailed, costed calculation of the required numbers of CF TACS Dets personnel is beyond the scope of this paper. Only an initial estimate will be provided. The CF has four brigades. Under the managed-readiness programme, each brigade should have a minimum of three G3 Air members who are FAC capable. Gagetown requires an additional four FACs to train the increased numbers of expected students and to provide a doctrine-development and standards cell. One of these should be a major's position. In addition, Canadian Special Operations Forces Command (CANSOFCOM) likely will employ a minimum of four FACs. Table 5.1 summarises the numbers.[149]

It has been established that, at least in the early stages of rebuilding the CF's CL capability, the AEC occupation should lead the control and management of the TACS Dets.[150] Currently, the TACS Dets PML calls for five fighter pilots to fill the five G3 Air positions, one at each Brigade, and one FAC training coordinator at the CTC Gagetown.

[149]It is worth a reminder that Australia, whose military is similar in size to the CF, is increasing its number of FACs to over 100, as stated earlier in this paper.

[150]If the fighter pilot occupation regains health, the CF would benefit greatly from a combination of AEC, fighter-pilot and army FACs manning robust TACS Dets and training centres.

Table 5.1 – Estimated Minimum Requirement of CF air force FACs

Location	Number FACs
Edmonton	3
Petawawa	3
Valcartier	3
Gagetown (FAC)	3
Gagetown (Doctrine / Standards)	4
CANSOFCOM	4
TOTAL	**20**

Due to a major shortage of fighter pilots for approximately the past 15 years, TACS Dets positions either have remained vacant or have been filled by AECs. Since 1998, at least three of the TACS Dets positions have been filled by AECs, including the training coordinator position at CTC Gagetown. Table 5.2 shows the TACS Dets manning status as at April 2006.

Table 5.2 –TACS Dets Manning Status - April 2006[151]

Location	Position	MOC
Edmonton	G3 Air	Fighter Pilot (Deployed to Afghanistan; no backfill)
Petawawa	G3 Air	Vacant
Valcartier	G3 Air	Tactical Aviation Helicopter Pilot
Gagetown	G3 Air	Vacant
Gagetown	FAC Training Coordinator & Standards Officer	AEC

Source: Edmond, Captain W., electronic-mail dated 17 March 2006.

[151]Captain W. Edmond, (Canadian Forces Base Gagetown: electronic mail dated 17 March 2006.)

Currently, there are a number of significant obstacles to overcome in order to create a viable and sustainable operational FAC capability. The current TACS Dets manning level is critically low; three positions filled out of only five established. A probable initial requirement is for at least a total of 20 FACs designated as permanent TACS Dets FACs.[152] Similar to the Royal Australian Air Force, the true requirement is likely as high as 100. Current AEC occupational manning levels are very low. Either another AEC commitment would have to be reduced or AEC recruitment would have to be increased dramatically in order to provide the personnel numbers to the TACS Dets. Fighter-pilot, occupational-manning levels are too low to contribute to TACS Dets manning. There is a capability deficiency associated with the high-tech equipment required to complete the CAS mission with ease.[153] Fighter-aircraft assets for training FACs are extremely limited. Operating costs of the CF-18 prohibit its use for FAC training beyond the YFR required to maintain CF-18 pilot CAS proficiency. The civilian, CATS air assets have limitations, as described earlier.

Some innovative solutions are required in order to improve the situation of too few FACs. Unfortunately, many of the solutions are not designed for long-term sustainment of a viable occupation. For example, recruiting directly into the FAC branch would be incompatible with the precept that the preponderance of FACs should be experienced air force personnel with a background in air operations. Likewise, increasing the numbers of recruited AECs offers poor immediate results, given that the

[152]Captain W. Edmond, (Canadian Forces Base Gagetown: electronic mail dated 17 March 2006.) 20 TACS Dets FACs does not include the possible numbers of FACs that will be desired by the army and the SOF, which will depend on their anticipated CONOPS. Initial indications from the JTF-2 is that 24 FACs are required within the next two years.

[153]Captain W. Edmond, (Canadian Forces Base Gagetown: electronic mail dated 17 March 2006.) For the aircraft – LINK 16, LINK-capable targeting pod. For the FAC – IR pointers, NVGs, PRC-117F radios, and laser range finders.

AEC branch is already undermanned and the initial increased recruitment will fill existing personnel "holes." Besides, transferring experienced AECs from current positions to the TACS Dets could not be accomplished until new recruits were trained to replace the departing, experienced personnel.

Another option that could be analysed further for its merits is an internal, CF, recruiting campaign designed to "blitz" target CF personnel with operations experience who may be interested in a rewarding and challenging change of pace. Potentially, with the diminished number of C-130 Hercules hours there might be air force navigators who would be interested in doing something "completely different" for a ground tour. The same might be true for any other air-operations-related occupation. There might be non-commissioned officers in similar circumstances as the navigators, such as Airborne Electronic Sensor Operators. The navigator occupation, which has migrated from navigation to "… tactical mission specialists who plan, co-ordinate and direct a wide range of rewarding missions..."[154], likely would provide personnel with a high degree of aptitude for the TACS Dets mission. Tactical Aviation helicopter pilots likely are as capable as fighter pilots in the conduct of the FAC mission. Some of the personnel within the TacAvn MOC also may be interested in FAC as a ground job.

Another potential solution might be to employ FACs as an air-force-contributed element of CANSOFCOM, in a similar manner to the employment of SOF TacAvn assets. Under this solution, personnel would be recruited from within the CF just as they are for JTF-2. The promise of employment as an air force SOF FAC might appeal to many air force personnel looking for a high degree of challenge.

[154]Canadian Forces Air Navigation School, "CFANS Students," http://www.cfans.com/students.htm; Internet; accessed 24 March 2006.

Yet another option might be to open the FAC positions to the reserves. Potentially, there are significant numbers of retired CF personnel with air-force-operations experience living near the locations of the four brigades and Dwyer Hill. A recruiting campaign might entice these experienced personnel to return on full or part-time status. This solution has a number of drawbacks that are common to all reserve positions, such as gaining and maintaining currency.

Certainly, the option that offers the best chance of long-term success is for the AEC community to be given full responsibility for the TACS Dets, along with the associated funding and resources to create and sustain a viable TACS Dets force structure with the necessary equipment and training. Even though the AEC branch would be responsible for the TACS Dets, an arrangement should always exist for non-AEC air force personnel to be posted to the TACS Dets. A diversity of air-related backgrounds would bring synergy to the FAC profession. It would also ensure that a pool of experienced FACs would be built up within the air force, providing more air force personnel with an understanding of the CL mission. A Joint Counterland Working Group (JCLWG), which currently is known as the Offensive Air Support Working Group (OASWG), should be funded by CTC Gagetown, CANSOFCOM and 1 Cdn Air Div HQ and should be held at least once per year. Only by prioritizing CL issues much higher on the air force and army agendas will Canada's CL capability be realized to its full potential. Furthermore, the CF must ensure that the CAOC and TACS Dets positions are declared and treated as core combat capabilities. Finally, CAS and AI exercises should be planned and executed from within the Winnipeg CAOC and, during the exercises, a BCD should be established therein. The Joint Targeting Cycle should be exercised

making full use of the MAAP, JGAT, JIPTL and other doctrinal elements that should exist within a modern, functional, CL-capable CAOC.

There are a number of possible solutions to the FAC personnel deficiency problem that can and should be analysed further under a JCLWG. There are significant training challenges to overcome in the event that the CF decides to increase the number of FACs. One of the ways to accomplish training is to leverage simulation technology. The new CF-18 simulator known as the Advanced Distributed Combat Training System (ADCTS) is based on Distributed Mission Operations (DMO) technology whereby the ADCTS can be linked to other combat simulators across a global net. A DMO-type simulator should be developed for the FAC training centre at Gagetown such that both FACs and pilots could be trained together using the ADCTS linked with the DMO FAC simulator. In the interim, the CF FAC budget should be increased to permit CF FACs to be trained in the USA or other Allied countries, if the training is available.[155] This option should be investigated by the JCLWG.

CONCLUSION

The basic components of a doctrinal TACS are the CAOC, the ASOC, dedicated comms dets, the TACP, FACs, ALOs, GLOs, and ground attack aircraft. All of the components that comprise a TACS are necessary for the effective conduct of aerospace combat taskings in the CL role. Currently, however, there exists in the CF no fully established TACS. Two of the most critical CF TACS components that do exist, albeit in

[155]There is a chance that the USA would have difficulty providing FAC training billets to Canada, given its intent to train so many of its own FACs over the next two years.

a severely degraded capacity, are the CAOC and the TACS Dets. In order for the CF's CL capability to mature, the CF must take steps to prioritise the CAOC and the TACS Dets as core combat capabilities. Such action would be consistent with the USAF's declaration of the modern CAOC as a weapons system in its own right, with the ability to maximise the power of aerospace and land forces engaged in the CL mission, to enable timely decisions by commanders and to translate those decisions into effective tactical action.

Currently, the air force has all but conceded the TACS Dets and FAC training to the army. In 2006, only three air-force personnel are assigned to the TACS Dets; a token gesture. One reason for the air force's lack of CL capability is a critical shortage of the key personnel: fighter pilots and AECs. However, it must be acknowledged that there are three additional reasons. The first is a lack of sufficient air force priority on the CL mission throughout the past 15 years. The second is the air force's very slow response to the impact of technological advances in C2 capability, combined with a lack of appreciation of the combat capability that the modern CAOC brings to the CL mission. The third is the CF army's lack of emphasis on the CL capability. Outside of one GLO located within 1 Cdn Air Div HQ, there are no army GLOs located at either of Canada's two main fighter wings. Nor is there a CF BCD located within the Winnipeg CAOC or "plugged into" the CAOC from another location. The Canadian air force's and army's general neglect of almost the entire TACS has created a situation whereby Canada's CL capability is almost combat ineffective. In the context of modern warfare, the CF cannot claim an effective CL capability simply because its CF-18 pilots and a very small number of FACs can conduct CAS. Only when the CF develops a robust TACS, with fully

manned TACS Dets and an ability to perform the full Joint Targeting Cycle within its CAOC, will it be able to make such a claim. For this reason, it is imperative for the CF to declare the CAOC and the TACS Dets core combat capabilities. Only then will there be sufficient priority placed on funding and manning for these critical CL components.

The conclusion from the analysis of Canada's strategic-guidance documents is that the GOC and the senior military leadership within the CF would like the CF to pursue an integrated jointness and increase its "… focus on close support to ground forces."[156] The CF should make every attempt to identify areas within the CF that are expressly preventing the achievement of focused, joint effects. The disconnect between the army and the air force is significantly hampering the achievement of an indigenous CF CL capability. This disconnect is manifested in a poor joint C2 capability between the two Services and a lamentable deterioration of the CF TACS. In short, the wholesale neglect of the CF's TACS must be reversed if the CF wishes to resurrect its CL capability.[157]

The provision of aerospace-delivered ordnance is critical on today's and envisioned future battlefields and, more specifically, on operations in which CF personnel are involved, including the 3BW-type scenario detailed in the 2005 DPS. Furthermore, the Canadian army cannot do without a FAC capability, is unlikely to find an ally to provide it and should not pursue it unilaterally. Aerospace regulations and procedures are not the domain of the army leadership on deployments into areas where

[156]Department of National Defence/Canadian Forces (DND/CF), "Canada's International Policy Statement: A Role of Pride and Influence in the World – Defence," http://www.forces.gc.ca/site/reports/dps/pdf/dps_e.pdf, 19 March 2006.

[157]The renaming of the Operations Centres within the army, navy and air force as JEOCs, along with a standardization of the C2 structures, systems and procedures, will assist in developing the desired level of jointness articulated in the DPS. (See Appendix 1.)

deadly air power is employed in close proximity to ground forces. Land force commanders and their personnel should be able to rely on air experts who have grown up in the air environment, understand it implicitly, are embedded with them and can provide sound advice on aerospace matters. The USAF-US Army model of USAF JTACs embedded with US Army units proves that the concept can be executed in real operations.

Across the spectrum of war, the army now and in the foreseeable future requires precision munitions with destructive power to be delivered from the air. Whether the munitions are delivered from a manned or unmanned vehicle is secondary to the fact that the integration and coordination of its delivery in close proximity to friendly land forces should be an airman as the predominant controller of the delivery. The ability to integrate air-delivered munitions in close proximity to friendly forces is a comprehensive skill that requires in-depth education, training and experience. Such a broad range of in-depth knowledge and skills takes years to develop. Furthermore, the skills are required across the spectrum of the TACS: within the C/JAOC, the MAAP, the JIPTL, the airspace-control planning cells, the ASOC, the TACP, the FAC teams and the CAS aircrews. The army and the air force must place a significantly higher emphasis on the training for these positions and they should be considered core combat skills for those personnel involved in the CL mission.

Analysis shows that Canada and its Allies have a long and distinguished history of CL capability. When resourced properly, and with only air superiority as a logical higher priority, Canadian airmen have provided an outstanding level of CAS service to their Land Force colleagues in almost every major battle since WW I. Unfortunately,

history seems to show that the only time Canada's CL capability receives the correct attention and resources is during times of major war. This was true at least up until the Korean War and even throughout the Cold War period there was a considerably robust CL capability due to Canada's commitment to NATO. Ironically, simultaneous with Canada's participation in its first CL missions since Korea during the 1991 Gulf War, Canada's CL capability was beginning its rapid recession. The combined effects of the withdrawal of the CF from Europe, the FRP, the retirement of the CF-5, significant reductions in CF-18 YFR, the lack of pilots and technicians, changing tactics from the low- to the medium- and high-altitude arena, the lack of weapons ranges for the employment of medium- and high-altitude weapons deliveries and an extremely high operations tempo caused the CF TACS and CL capability to deteriorate faster than any capability to slow its "not-so-graceful degradation."

The fact that CF soldiers were employed in mid-intensity, combat operations in Afghanistan with no supporting CAS from Canadian CF-18s should be seen as a significant failure to employ the CF in a joint combat manner. History also shows that, many times over the years, Canada and its allies have had to re-learn the major lessons of CL conflict that were learned by the blood of Canadian airmen and soldiers. The mission is complex and, therefore, the TTPs must be sound and agreeable to all involved. It takes a high degree of interoperability and willingness for the Services to cooperate. Solid communications are essential. Advances in technology have provided the impetus for a fundamental shift in the approach to warfare as it was conceived during the Cold War. Above all, the ability to communicate rapidly between the Services has provided an unprecedented level of information sharing. As a result, there are few, if any, barriers to

successful conduct of the CF CL mission except for the will of the CF's senior leadership to direct it to happen and maintain it as a core combat priority.

Unfortunately, although CF-18 modernisation will provide a solid AI capability to the CF, it alone will not provide the CF with a CAS capability. The CAS capability requires significant numbers of personnel across the entire TACS. Unfortunately, there is a critical shortage of the key personnel required to conduct the CL mission: fighter pilots and AECs. As a result, the number of CF FACs is alarmingly low. The trend throughout Canada's Allies is for the number of FACs to increase significantly in order to accommodate the new realities of light, manoeuvre warfare being embraced by most, if not all, Allied armies. Such a force structure necessitates a heavy reliance on precision-munitions effects delivered by air power and the link to successfully integrating air power with land forces is the CAOC and the TACS Dets. Except in certain circumstances (some SOF units, for example), the FAC should be an airman and the AEC community should be the lead military occupation for managing the FACs. Alarmingly, the CF only has five positions assigned for FACs and only three of those positions are manned as at April 2006. There is an identified requirement for a minimum of 20 FACs and this number has a high risk of being far too few, given that the USAF has identified a requirement for 900, two-person teams of FACs and the RAAF has identified a requirement for at least 100 over the next two years. In attempting to resolve the FAC shortage, the CF could recruit directly into the FAC branch, accepting the high risks associated with the lack of experience, recruit more AECs and slowly build up the AEC FAC capability, conduct a FAC recruiting "blitz" from within the CF – navigators, AESOPS, TacAvn pilots and other air experienced Air Operations personnel may be

prime candidates, conduct a FAC recruiting "blitz" from within the CF into CANSOFCOM with the idea of attracting recruits looking for the challenge of the SOF field, and a combination of the above options. The long-term goal of "growing" the capability over time, eventually strengthening the AEC branch should be pursued.

Unfortunately, nothing seems to have changed since WW I. Between the two main force employers of the CL mission, the army and the air force, there continues to exist a natural, yet unhealthy divide regarding the use of air power and who should control it. Ironically, in today's CF, the army and the air force mostly agree on the use of air power. It is agreed that CAS is an important role for the CF-18, there is an acknowledged will to cooperate and the TTPs exist to conduct the mission. Unfortunately, the CF has devoted insufficient human resources to filling all of the positions that are required for a full TACS. The main reason for not manning these positions is that they are not viewed as core combat capabilities. Unless this view is altered, the Canadian CL mission will never mature beyond the basic, tactical level and the full potential of Canadian air power will never be realised.

The GOC and the senior DND leadership also must accept the responsibility for the degradation of Canada's CL capability. Drastic budget cutbacks over many decades forced difficult choices and some of the critical components of the CF TACS were not appreciated as core combat capabilities. As such, they virtually were abandoned in favour of, arguably, less-critical combat capabilities. If nothing else, the current dire CF CL situation was completely predictable given historical behaviour. The CL lessons of

WWs I and II and the Korean War remain valid. If Canada continues to ignore these lessons from its own history, then the lessons currently being re-learnt in the deserts of Afghanistan and Iraq also will be forgotten.

The farther away from the CL mission the Canadian air force moves, the more the mission may be marginalised, either to be absorbed by the other Services or contracted to a civilian organisation. To transfer the CL mission from air-force to non-air-force personnel may well ring the death knell of the Canadian air force. If all of the CF's aerospace capabilities exist with absolutely no requirement to issue rules of engagement to the operators of those capabilities, one must ask whether there truly is a requirement for those capabilities to exist under the umbrella of an air force. Canada, the CF and, especially, the air force leadership, must continue to pursue relentlessly the premier air force capability – the ability to deliver force from the air – for without the force, all that remains is air.

APPENDIX 1

A NOMENCLATURE PROPOSAL FOR THE JOINT EFFECTS OPERATIONS CENTRE AND THE JOINT PRECISION EFFECTS CONTROLLER

In pursuit of fulfilling its mandate, the Canadian Forces (CF) has undergone and continues to undergo significant changes to its force structure. Under the direction and guidance of the current Chief of the Defence Staff (CDS), General (Gen) R.J. Hillier, the CF command and control (C2) structure has been re-organised in accordance with joint doctrine. The recent force structure changes being forged by the CDS are some of the most dramatic changes implemented in the CF since Integration/ Unification in 1968. The reason for these changes has been well documented and the underlying themes are, first, effective C2, and, second, increased jointness, as proven by the following extract from the 2005 Defence Policy Statement showing the first two priorities of CF transformation:

> … [the CF will] adopt a fully integrated and unified approach to operations, by:
>
> > • transforming their command structure, which will include changing how they organize themselves for operations, thereby enhancing their ability to deploy at home and abroad. Modifications to domestic command and control will be especially significant. … ; and
> >
> > • establishing fully integrated units capable of a timely, focused and effective response to foreign or domestic threats to Canadian security. **Maritime, land, air and special operations forces will emphasize cooperation and teamwork at all levels to achieve a**

> **total effect greater than the sum of the individual parts** [emphasis added] …[158]

It is clear, then, that one of the most important areas of development within the CF today is the C2 links between the three Services. When these links are broken, there is a less-than-optimum exchange of information and capability for the various forces to support one another. In the CF, as in our Allies' militaries ever since World War II, one of the main mechanisms used to establish the link between the three Services, especially between the air and land forces, is the TACS. In the case of a small force such as the CF, even the term TACS is misleading; it engenders a sense of single-Service parochialism. With no reference at all in its name to the surface side of what is, by all accounts, an air-surface battle, the Tactical *Air* Control System has outlived its usefulness as a descriptor of its role. Likewise, so has the term for the Combined/Joint *Air* Operations Centre (C/JAOC) and Forward *Air* Controller (FAC). 21st Century names should be considered for each of these terms.

The C/JAOC could use an updated name that more accurately reflects its role in providing joint effects across its assigned Joint Operations Area. The Joint Effects Operations Centre (JEOC) or the Combined Effects Operations Centre (CEOC) should be mandated as the common prefix name for any and all of the three CF Services' operations centres; a suffix could be added for each Service's C/JEOC operating within its purview. For example, the Canada Command (CANCOM) operations centre would be the Canadian domestic JEOC, with no suffix required. The 1 Canadian Air Division/Canadian NORAD Region Headquarters (HQs) operations centre could be the

[158]Department of National Defence/Canadian Forces (DND/CF), "Canada's International Policy Statement: A Role of Pride and Influence in the World – Defence," http://www.forces.gc.ca/site/reports/dps/pdf/dps_e.pdf; Internet; accessed 19 March 2006.

CEOC(Air) (or CEOC(A)). The two Maritime HQs could have their JEOC(Maritime West) (or JEOC(MW)) and JEOC(Maritime East) (or JEOC(ME)). The JEOCs associated with the Land Forces could be known as JEOC(LW), JEOC(LC), JEOC(LE), JEOC(LA) and JEOC(LN).[159] Purely by leveraging off of the name, the strategic-political guidance to become more joint and the strategic-military leadership's desire to focus on effects are inculcated into the very fabric of every sailor, soldier and airman who likely will work in one of the country's operations centres at some point in their careers. Moreover, an adoption of a common name builds the foundation for commonality of architecture, doctrine, language (lexicon), heritage, mission and purpose. In short, the foundation of a CF team is built and, potentially, a CF culture, which is one of the stated goals of the CDS for Transformation.[160] The CF should take the C/JEOC idea one step further and establish a Joint C2 Standards Team that consists of selected personnel from the three Services to ensure that C2 architecture and doctrine is established in a joint manner. Were this to occur, the reticence of military personnel to work in the environments of each other's Services would be lowered. The fear of not understanding the environment is reduced when all of the systems, terminology and practices are common throughout all three Services. Furthermore, there is a force-multiplier effect achieved by educating all personnel on a common system. Any of the Services personnel can be posted on operations in any C2 environment when they are familiar with all of the systems and most of the methodology associated with that environment. Given the

[159]The "EOC" portion is the important aspect of this nomenclature. LW-Land West; LC-Land Central; LE-Land East; LA-Land Atlantic; LN-Land North are merely examples. The Maritime and Land Force EOCs could be considered CEOCs if they are deemed to be multi-national EOCs (USA forces under NORAD or NORTHCOM, for example).

[160]Welcome to the Parliament of Canada, "Standing Committee on National Defence and Veterans Affairs," http://www.parl.gc.ca/infocomdoc/38/1/NDDN/Meetings/Evidence/NDDNEV39-E.PDF#search='canadian%20forces%20Transformation%20CDS%20goals'; Internet; accessed 1 April 2006.

United States Air Force's Chief of Staff, Gen J. Jumper's, assessment that the operations centre is a weapons system, achieving anything less than a fully integrated, joint approach to Canada's most joint weapon system, C2, will be a failure to maximize the operational capability of the CF joint force.

Similar to the JAOC (JEOC), the TACS is much more than just an air control system. It is a mix of air and surface elements that can be employed in a capacity to create an effect on the battlespace, which may include a Countersea mission rather than strictly a CL mission. As such, the TACS should become known as the Joint Precision Effects Control System (JPECS). Such a name better reflects the modern capabilities and desired mission of this complex and capable joint system.

As has been shown, the TACS Dets personnel are far more than just FACs who call in air strikes; FAC is just one of their functions. They also coordinate airspace, act as ALOs and coordinate all manner of air assets across the battlespace. In the USAF, the Aerospace Environment Control occupation is known as Air Battle Managers. Although this name is an excellent descriptor of what that USAF military occupation does, the word "Air" still belies the jointness of the position. Furthermore, the word "manager" conjures a non-military image of air force personnel being more about managing than about leading. With leadership being one of the major foundations of military officership, the term "manager" would be inappropriate. As Effects-based Operations teaches us, a seemingly minor discrepancy in a name can actually engender a strategic effect of sowing a sense of discord between the Services. The army personnel who deploy into combat with their air force representatives by their side do not want an air force "manager" with them. They will want to have the confidence that, above all, the air

force personnel are professional warriors specialised in assisting them by bringing in a precision, potentially decisive, effect onto the battlefield. There is no sense in devising a modern name for the occupation that should be destined to be the link between the CF aerospace and CF surface forces if the name itself does not engender confidence in the capabilities of the personnel assigned to be the link. The USA military is considering adopting the term Joint Terminal Attack Controller (JTAC); the US Army has suggested the possibility of a Universal Observer. It is proposed that the term Joint Precision Effects Controller (JPEC) embodies all of the requirements of the modern battlefield and it will ensure that the personnel posted to these positions remain focused on jointness and precision effects in all they do.

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