



what air forces do

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Note: The following views are solely those of the author and do not necessarily reflect the policy or the opinion of any agency, including the Government of Canada, the Canadian Department of National Defence, the Government of Australia, and the Royal Australian Air Force.

If a nation's air force, military, public, or government does not clearly understand what unique services the air force provides for the nation, the capabilities the air force needs to provide those services become difficult to acquire. One of the tools the military uses to explain its *raison d'être* and core functions is doctrine. Current *Canadian Forces Aerospace Doctrine* describes air force functions using names that were spawned from army operational function terms and were aligned with joint force development terms, which do not, in this author's opinion, adequately explain what the Royal Canadian Air Force (RCAF) fundamentally does.

The aim of this article is to advocate the use of simple, clear, intuitive, and understandable words to describe what the RCAF does in *Canadian Forces Aerospace Doctrine*. The current trend to use conceptual doctrinal jargon to describe RCAF functions, while serving secondary considerations, inhibits basic understanding of what the RCAF exists to do, and therefore makes the identification, prioritization, and justification of the capabilities the RCAF needs to fulfil its purpose more difficult and less effective. The RCAF needs to understand and formally recognize its fundamental aerospace power functions, and it needs to clearly communicate these functions.

After describing the factors affecting what the RCAF does, the role of doctrine and the requirement for clarity in strategic aerospace doctrine, this paper will discuss the current functions of the RCAF, the origins of these functions, and the fundamental aerospace power functions that have emerged from air warfare experience over the last hundred years. Additionally, it will be shown that unity of strategic military effort can be maintained while the way land, sea, and

air forces conduct war and define their war fighting functions can and should be significantly different. Finally, this article will recommend the RCAF modify the way it identifies its functions to clearly highlight the fundamental, enduring aerospace power functions (the reasons why the RCAF exists), while retaining strong links to overall Canadian Forces (CF) capability development terminology.

Factors Affecting What the Royal Canadian Air Force Does

Among the many influences affecting what the RCAF does, two stand out: government direction and military direction. In general, government direction involves defining what the CF and RCAF must do for the nation, and military direction dictates how those objectives can and should be achieved. These influences do not act in isolation, and indeed, military commanders play a crucial role in shaping government direction by acting as military doctrine advocates and educators to government policy makers.

Government direction comes in two forms: defence policy and provision of resources. Nations like Canada do not have the fiscal resources to field a full range of military or aerospace power capabilities, so by stipulating what general military objectives are to be achieved, government defence policy gives the CF the marching orders it needs to get on with the job of enhancing the safety and security of Canadians, supporting the Government of Canada's (GoC's) foreign policy and achieving other national security objectives.¹ Defence policy also indicates into what military capabilities the Government is willing to invest in order to achieve its objectives. Hence, defence policy such as the *Canada First Defence Strategy* both defines and limits what the

CF actually does and what the RCAF is capable of doing.

*The Government's Canada First Defence Strategy (CFDS) defines the roles for the CF and identifies the military capabilities required to meet these roles.*²

Military direction comes from its commanders and doctrine. Command direction of a general nature is normally expressed in the form of strategic plans, business plans, and planning guidance, while experience-proven best practice methods of military force application are found in doctrine. CF Doctrine (joint), *Canadian Forces Aerospace Doctrine*, and the Chief of the Air Staff (CAS) Business Plan provide the following guidance on the role of military forces, the function of the RCAF, and the RCAF mission:

The Role of Military Forces:

“Military forces in democracies are subordinate to the elected civil authority and are prohibited from operating outside the bounds of jurisdiction set by that authority. In addition to combat operations, they are often used for domestic missions such as search and rescue, assistance to other government departments and agencies, aid to civil power, and for disaster relief operations both at home and abroad. However, despite the inherent flexibility and domestic utility of modern military forces, their *raison d'être* remains armed conflict. This distinction separates military forces from other security arms of the government such as police and border patrol.”³

Royal Canadian Air Force Functions:

“Air forces exist to exercise aerospace power on behalf of the nation. This is accomplished primarily through the exploitation of the air and space environments to achieve assigned objectives. A century of air warfare has demonstrated that all effective air forces, whether they

are large or small, are capable of performing a number of specific functions.”⁴

Mission of the Royal Canadian Air Force:

“As an integrated element of the CF, the AF [RCAF] will provide the Government of Canada and Canadians with a relevant, *responsive and effective* aerospace instrument of national power.”⁵

Hence, it can be seen that within the context and control of the CF, the RCAF exists to exercise aerospace power on behalf of Canada. This aerospace power is an element of Canadian military power that is used for both combat and non-combat purposes, but its *raison d'être* remains armed conflict.” What the RCAF must, can and should do is driven by the competing demands between the functions the RCAF *must* fulfil, laid out in government defence policy (the CFDS), and the functions an air force *can* and *should* fulfil—the fundamental doctrinal aerospace power functions that have evolved out of “a century of air warfare” experience. While the CF must always remain responsive to changes in government defence policy, governments and military commanders should recognize the enduring aerospace power employment principles, characteristics, and fundamental functions that should reside in strategic aerospace doctrine to ensure that the RCAF is resourced, organized, equipped, and employed wisely and effectively. It is therefore critical that aerospace doctrine is clear and unambiguous.

Doctrine and the Need for Clarity

Doctrine is a body of knowledge and thought that provides direction and aids understanding.⁶ The primary function of strategic military doctrine is to provide knowledge and understanding of military power and to guide the use of armed forces.⁷ In the Canadian context, Canadian military strategic doctrine is also used to “assist in shaping perceptions within the GoC and the CF about the use of military capabilities

as an instrument of national power,”⁸ and this doctrine is “instrumental in establishing priorities for procurement [of these capabilities]....”⁹ If the fundamental military functions these capabilities are meant to fulfil are not clearly understood, effective prioritization of or justification for their procurement can not easily occur.

Not to have an adequate air force in the present state of the world is to compromise the foundations of national freedom and independence.

— Winston Churchill, House of Commons, 14 March 1933.¹⁰

Canadian strategic aerospace doctrine must, as a primary national and military strategic communications tool, use simple and direct language to clearly describe the fundamental and enduring aerospace power functions the RCAF is meant to fulfil and what unique aerospace power capabilities the RCAF has or needs to fulfil these functions.



Does current aerospace doctrine do this? The latest edition of Canada’s strategic aerospace doctrine is well written, clear and concise regarding the fundamental

and enduring principles, characteristics, and tenets that describe and guide the proper application of aerospace power, and the historical and current national security contexts in which aerospace power has been and is employed. When it comes to describing what the RCAF does, however, Chapter 5 of *Aerospace Doctrine* entitled “The Functions of Canada’s Air Force [RCAF]” uses ambiguous military force development jargon,¹² which is anything but simple or clear (see Figure 2).



Figure 1. The Canadian F-35 Purchase Announcement¹¹

Such is arguably the case regarding the planned procurement of 65 F-35 Lightning II joint strike fighter aircraft for Canada. The lack of general understanding of what this capability is for and what the RCAF exists to do may have contributed to public and government opposition party criticism of this acquisition project.

RCAF Functions

(2010)

COMMAND

ACT

- **SHAPE**
- **MOVE**

SENSE

SHIELD

SUSTAIN

GENERATE

Figure 2. The Functions of the Royal Canadian Air Force.¹³

Canadian Forces Aerospace Doctrine states that the functions of the Air Force are **Command, Act¹⁴, Sense, Shield, Sustain** and **Generate**. These terms promote some doctrinal and conceptual commonality at the military strategic level, but they are almost meaningless to the military doctrine layman. For example, using current terminology, the functional purpose of the CF18 or the follow-on F-35 capability is to fulfil the majority of the **Act (Shape)** Function of the RCAF. To someone inside the military not familiar with the latest doctrinal concepts and terms, or to anyone outside of the military, the **Act (Shape)** Function would be non-intuitive, and therefore, the function of the CF18/F-35 capability might seem vague, suspicious, and/or unnecessary.¹⁵

To be fair, *Canadian Forces Aerospace Doctrine* does indicate what sub-functions exist under the **Act** doctrinal jargon banner and it uses vastly more understandable language to describe them. Unfortunately, readers of this doctrine should not have to drill down into the detail to decipher and appreciate what the RCAF actually exists to do.

The Origins of RCAF Functions: Concepts and Terminology

The following table describes the origins and evolution of the terms used to describe RCAF functions. It can be seen that most of the credit for the introduction of the terms currently used to describe the functions of the RCAF (and the CF Joint Capability Domains) clearly belongs to the Canadian Army (CA).

Army Operational Functions (1999) ¹⁶	Canadian Joint Task List Capability Areas (2000) ¹⁷	Aerospace Doctrine, AF Functions Ed. 1 (B-GA-400) (2007) ¹⁸	Army Operational Functions and Core Functions* (2008) ¹⁹	CF Doctrine - Joint Capability Domains (2009) ²⁰	Aerospace Doctrine, AF Functions Ed. 2 (B-GA-400) (2010) ²¹
Command	Command**	Sense	Command	Command	Command
Act	Info & Intel	Shape	Act	Sense	Sense
Sense	Conduct Ops	Move	Sense	Act	Act – Shape & Move
Shield	Mobility	Sustain	Shield	Shield	Shield
Sustain	Protection	Command	Sustain	Sustain	Sustain
	Sustainment		* Find	Generate	Generate
	Force Generation		* Fix		
	Co-ord with Other Gov't Initiatives		* Strike		

** The Army Op Functions and the original CJTL that both use the function/capability area "Command" were developed concurrently²²

Terms first used by the Army
 Terms first used by CF/Joint
 Terms first used by Air Force

Table 1. Evolution of Functions and Capability Areas/Domains in Canadian Military Doctrine

In 1999, the CA moved away from its six combat functions (command, information operations, manoeuvre, firepower, protection and sustainment) because they were considered to be too focused at the tactical level and they did not easily address the moral domain (the elements of skill, courage and spirit that give a force life and the will to act). The operational functions of Command, Act, Sense, Shield and Sustain were considered broader in scope; they enabled more substantive analysis of future CA doctrine and force design, and they were applicable to the tactical, operational, and strategic levels.²³ By 2001, the CA was aware that the CF Central Staff had developed a CJTL (see Table 1) that included a framework for describing the various capability areas that were required by the CF. The CA thought their operational functions included the same joint capability areas within them; however, they had grouped these areas under different functional terms, which provided a more integrated approach, and although not an exact match, were similar enough that synchronization of effort was not anticipated to be a problem.²⁴

By 2006/2007, the CA's broader, arguably more conceptual approach to the description of its operational functions may also have influenced the CAS. When presented with draft Air Force doctrine that contained functions that were more aligned with the North Atlantic Treaty Organization (NATO) and United States Air Force (USAF) air doctrine, the CAS directed that terms similar to those used by the CA be used and eventually signed off on Sense, Shape, Move, Sustain, and Command as the functions of the Air Force. Edition 1 of *Canadian Forces Aerospace Doctrine* uses these terms, but that document contained no explanation of their origin, and indeed, it implied that these functions were a product of "a century of air warfare" experience.²⁵

In 2008, CA doctrine was introduced that contained its "Functional Framework," which consisted of a combination of its

five, circa 1999, operational functions, plus three core functions (Find, Fix, and Strike). These additional functions were described as the core or dynamic functions used in the application of combat power.²⁶ Shortly thereafter, in 2009, CF doctrine (joint) was promulgated, introducing the concept of joint capability domains that had evolved out of CJTL capability areas first produced in 2000, but which largely shared the same nomenclature as the CA operational functions.

Joint capability domains, although largely used as a capability categorization (administrative) tool, play a role in Canadian military conceptual capability-based planning (CBP) and joint force development thinking. CF doctrine states that the purpose of joint capability domains is to form a conceptual framework that can be used to categorize military capabilities. This framework supports a CBP process, which ensures that the CF has the correct mix of capabilities to support Canadian defence policy. These military capabilities do not focus on a particular environment or equipment but rather on those capabilities required to achieve military effects and ultimately strategic end states.²⁷ The capability framework consists of the 16 capabilities that were developed by joint capability planning teams (JCPTs) through scenario analysis, and the joint capability domains are simply a method to organize them relatively thematically.

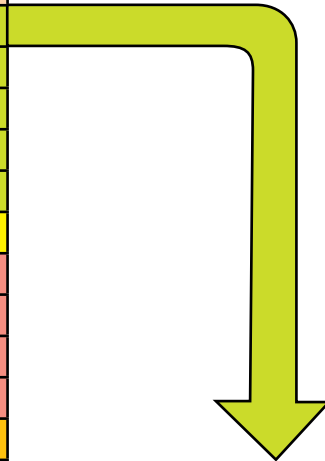
In December 2009, Edition 2 of *Canadian Forces Aerospace Doctrine* was published, indicating that the functions of the Air Force were aligned with CF doctrine. In fact, these RCAF functions are aligned with a joint capability categorization tool that is not, itself, purported to represent the strategic functions or roles of the Canadian military (CF doctrine describes the general role of military forces but does not identify specific functions of the CF).

Clearly the terms used to describe the functions of the RCAF have been

significantly influenced by the CA and the CF joint capability development community. In the end, the RCAF must decide if aligning its functions with these influences

is preferential over alignment with fundamental and enduring aerospace power functions and promoting clarity at the national strategic level regarding the purpose and

Domain	Capability
Command	Command Support
	Communications
	Joint Effects Targeting
Sense	Intelligence
	Surveillance & Reconnaissance
Act	Aerospace Effects Production
	Land Effects Production
	Maritime Effects Production
	Special Ops Effects Production
	Non-Kinetic Effects Production
Shield	Force Protection
Sustain	Sustainment
	Support Services
	Movements
	Theatre Activation & Deactivation
Generate	Force Generation



Capability	Functions	Activities	Example Activities
Aerospace Effects Production	Deny Aerospace to the Opposing Force (OPFOR)	Defend Friendly Aerospace	Conduct Air Intercept
		Defeat OPFOR Aerospace Assets	Conduct Defensive Counter Air
			Conduct Ground Based Air Defence
			Conduct Anti-Air Warfare
	Provide Freedom of Manoeuvre in the Aerospace	Combine Forces for Ops	Conduct Fighter Sweep
			Provide Aerospace Control
		Destroy or Suppress OPFOR Aerospace Assets on the Ground or at Sea	Conduct Combined Air Operations
			Conduct Suppression of Enemy Air Defence
			Conduct Covert Operations
			Conduct suppression of Surface-to-Air & Surface-to-Air Missile threats
		Protect Own Aerospace Assets	Conduct Offensive Counter Air
			Conduct Air Escort
Conduct Combat Air Patrol			
		Monitor Aerospace	

Table 2. The CF Capability Framework and Example Capability (Aerospace Effects Production).

functions of the RCAF. Command, Act, Sense, Shield, Sustain, and Generate do not clearly indicate what the RCAF does or should do. The RCAF already knows the reasons why air forces exist (the fundamental aerospace power functions), but it seems to be reluctant to admit them, publish them, and strategically communicate them. They can easily be found by examining the history of aerospace power; they are already buried deep inside in the current edition of *Canadian Forces Aerospace Doctrine* itself, and they are supported by aerospace power thinking and the doctrine of some of our closest allies.

Fundamental Aerospace Power Functions

*A century of air warfare has demonstrated that all effective air forces, whether they are large or small, are capable of performing a number of specific functions.*³¹

Aerospace Observation.³² The French Aerostatic Corps first used balloons for aerial observation at the Battle of Fleurus in 1794.³³ During the American Civil War, balloons were used for mapmaking, including the use of photography for that purpose, aerial observation of enemy encampments and movement, and for artillery fire direction. Italian fixed-wing, powered aircraft were used for similar observation purposes in 1911 during Italy's military action against Ottoman Empire forces in what is now known as Libya.³⁴ The use of aircraft for surveillance and reconnaissance over land and sea has remained commonplace in conflicts thereafter. Since the early 1960s, camera-equipped satellites have also seen military application as **aerospace observation** means.



PD Photo



Figure 3. AVRO BE2C camera carrying observation aircraft.³⁵



Figure 4. A Canadian AF CP140 Aurora maritime patrol aircraft surveys the northern tip of Ellesmere Island, near the North Pole.³⁶

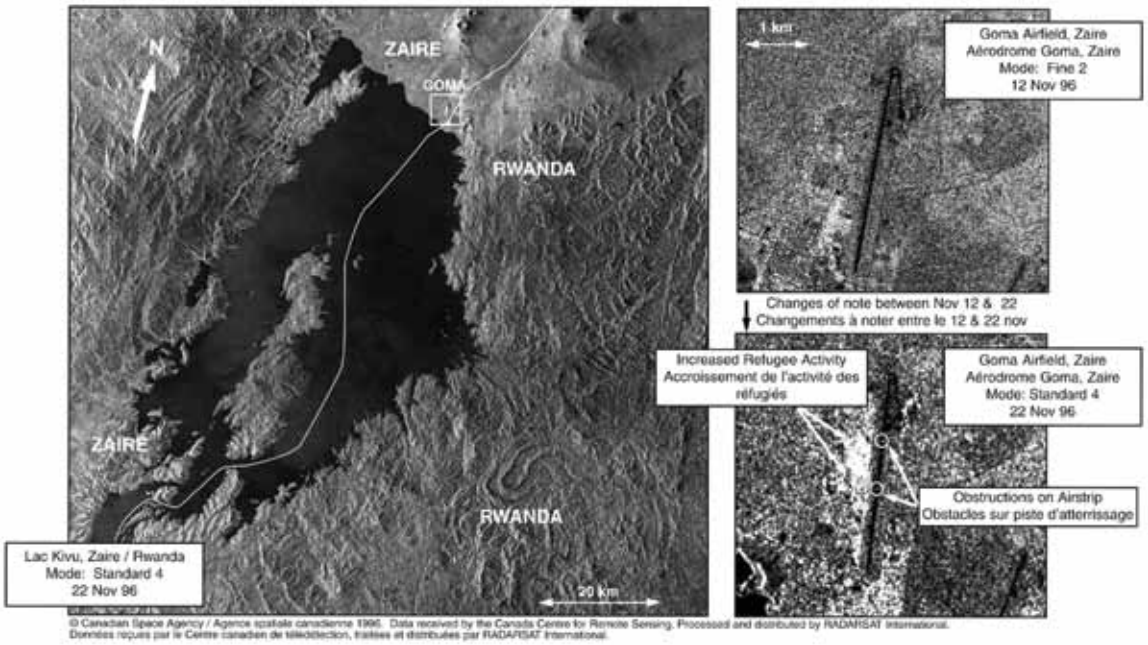


Figure 5. Canada’s RADARSAT-1 provides satellite images of a human crisis of major proportions affecting eastern Zaire in November 1996.³⁷

Air Strike. The effort to directly attack military forces on the ground, national infrastructure, and/or ships at sea from the air began in Libya on November 1, 1911, when the Italians first conducted aerial bombardment of Ottoman enemy forces. Tactical and strategic attack operations from aircraft have been conducted ever since, including aerial bombing and strafing in support of land operations at the front lines, airship and fixed-wing bomber raids deep into enemy territory, and the use of land- and sea-based aircraft to strike surface and sub-surface naval vessels. In more recent times, aircraft have been used to conduct electronic warfare and information operations involving both kinetic and non-kinetic means. These “strikes” aim to directly affect the physical, cognitive, and moral domains of war.



Figure 6. Second World War (WWII) vintage Lancaster Bomber.³⁸



Figure 7. A 425 Squadron (Sqn) CF188 Hornet configured with laser guided bombs during Operation (Op) MOBILE (Libya).³⁹

Air Mobility. As soon as aircraft developed to the point that they could lift and carry more than their own basic load, air mobility became a cornerstone capability of air forces. The primary characteristics that air transport aircraft exploited, that set them apart from surface-based transportation systems, were speed, range, and obstacle avoidance (terrain and threat).⁴⁰ Aircraft that could conduct the **Air mobility** function enabled the rapid and far-reaching deployment, recovery, evacuation and/or resupply of military forces or endangered civilian personnel, as well as, in later years, the extension of the reach of other air capabilities through air-to-air refuelling (AAR). This fundamental aerospace power function has seen and continues to see universal employment throughout the full spectrum of conflict and in response to humanitarian crises and natural disasters.

*The 1948 Berlin Airlift was perhaps the West's greatest victory of the Cold War, a period in which airpower [sic] was repeatedly proved decisive. After the Soviets blockaded Berlin and forbade all land traffic, Allied airpower was able to keep West Berliners provisioned with food and fuel for 15 months. Airpower was shown to be a powerful tool of peaceful diplomacy. The entire world, but especially Germany, saw the West was attempting to save Berlin and its citizens, while the Soviets were trying to destroy them.*⁴³



Figure 8. Canadian evacuees aboard a CC177 Globemaster aircraft at the Port-au-Prince International Airport in Haiti.⁴¹



Figure 10. Search and Rescue Technicians hoist from a CH149 Cormorant Helicopter to a fishing vessel.⁴⁴



Figure 9. A CH147 Chinook leaves a Forward Operating Base (FOB) in Afghanistan.⁴²



Figure 11. Two CF188 Hornets air refuel from a CC130T Hercules on a flight from Canada to Iceland to join Task Force Iceland at Keflavik Air Base, Iceland, in support of Op IGNITION.⁴⁵

Control of the Air. The purpose of this core aerospace power function is to enable the use of an adversary's airspace for your own forces, while denying the adversary's use of the airspace above your own forces or territory. **Control of the air** does not

win wars on its own, but it may ensure that you do not lose them or suffer substantial casualties from enemy air attack.



Figure 12. Battle of Britain vintage Supermarine Spitfire flies with a Canadian CF188 Hornet.⁴⁶



Figure 13. A CF188 Hornet intercepts, identifies and monitors a Russian Tu-95 Bear bomber as it passes through the North American Air Defence Identification Zone (ADIZ) in international airspace.⁴⁷

and military personnel and infrastructure from adversary influence or aerial attack. By establishing some degree of control of the air over the adversary's territory or military forces, aerospace power can also open the door for the other key air activities like air mobility, aerospace observation, and, most importantly, it can permit offensive action like an air strike which can destroy the adversary's ability or will to fight. For the profound effect it can have on many types of warfare, **control of the air** is often considered the primary aerospace power function.



Figure 14. Air controllers participating in Exercise MAPLE FLAG XL (MF40) mission at 42 Radar Squadron.⁵⁰

If we lose the war in the air, we lose the war, and we lose it very quickly.

—Field Marshal Bernard Law Montgomery⁴⁸



Anyone who has to fight, even with the most modern weapons, against an enemy in complete command of the air, fights like a savage against modern European troops, under the same handicaps and with the same chances of success.

—Field Marshal Erwin Rommel, *Rommel Papers, 1953*⁴⁹



Fundamental Aerospace Power Functions versus Royal Canadian Air Force Functions

Aerospace observation, air mobility, air strike, and control of the air represent functions that provide unique aerospace power services to the nation and its military forces. Although many other functions have been and are fulfilled by air forces, these four are both fundamental and enduring,

Control of the air offers both defensive and offensive benefits. It limits or prevents entry into your own territory or military operating area by air, thus protecting civilian

ing, representing what an air force exists to do. Supporting this appreciation of the fundamental aerospace power functions are the *Canadian Forces Aerospace Doctrine* itself,

and the strategic aerospace doctrine of some of our closest allies; namely, the United Kingdom⁵¹ and Australia.⁵² In Canada's case, *Canadian Forces Aerospace Doctrine* states:

“The activities of Act and Sense are arguably the reasons that air forces exist. Their conceptual development mirrors that of the evolution of aerospace power itself. Aircraft were specifically developed to Sense, Shape, and then Move. This evolution was based on advances in both technology and a willingness to exploit it. Nations ultimately create air forces to achieve one or a combination of Sense, Shape, or Move.”⁵³

Canadian Forces Aerospace Doctrine recognizes the reasons that air forces exist (in a footnote, using the generic terms **Sense**,

Shape and **Move**), and this enables the division of RCAF functions into two categories: the reasons why air forces exist; and the other air force functions. If we compare these current doctrinal air force functions with the shared fundamental and enduring aerospace power functions, they align as follows:

Command, Shield, Sustain and Generate are enabling functions common to all three environments; they are necessary for the provision of military power, but they are not the primary reasons why Canada has military or aerospace power. Interestingly, the CF force development analytic framework and CBP process also consider **Sense** to be a joint capability domain that contains only enabling capabilities. From the RCAF perspective though, the enduring aerospace observation function and

Functions of Canada's AF ⁵⁴	Fundamental Aerospace Power Functions
<i>Reasons Why Air Forces Exist...</i>	
SENSE	
Provide the Commander with Knowledge	Note 1.
Collect Data - sensors	AEROSPACE OBSERVATION
Process Data - personnel and IT	Notes 1 and 2.
ACT – SHAPE	
Control of the Air	CONTROL OF THE AIR
Strategic Effect Spt to Land and Naval Forces	AIR STRIKE
Information Operations	Notes 1 and 3.
ACT – MOVE	
Air Mobility (Airlift & AAR) Personnel Recovery	AIR MOBILITY
<i>Other Air Force Functions...</i>	
COMMAND SHIELD SUSTAIN GENERATE	Enabling Functions (notes 1 and 4)

Note 1 – not an air force unique function.

Note 2 – in the air force context, the combination of data collection and processing functions is often termed the Intelligence, Surveillance and Reconnaissance (ISR) enterprise.

Note 3 – aerospace power can contribute to influence operations.

Note 4 – critical services required to raise, equip, sustain, and employ an air force, but not unique aerospace power functions provided to the nation (the reasons air forces exist).

Table 3. The Functions of the RCAF versus Enduring Aerospace Power Functions

the related surveillance and reconnaissance roles in particular are fundamental, directly achieving both national and military information collection objectives, and largely inseparable from the battlespace awareness and targeting processes so relevant to the **control of the air** and **air strike** functions.

The capabilities in the Command, Sense, Shield, Sustain and Force Generation domains are considered “enabling” capabilities, while the capabilities in the Act domain are considered “act” capabilities. Enabling capabilities provide support to act capabilities that produce direct effects within operations.⁵⁵

Unity of Purpose (Ends) not Commonality of Warfighting Methods (Ways)

No single environment has all of the capability required to fulfil national strategic objectives involving the military instrument of national power. Military strategy to achieve these objectives (ends) represents the unified goals of military action, but not unified ways in which to achieve them. The manner in which these goals (military strategic objectives) are achieved involve the complementary combination of air, land, and maritime force warfare methods (ways) and effects, and a mixture of joint and relatively independent single-environment action. Unity of purpose and synergistic effects at the strategic level do not mean one service is the supported service and the other services are just there to help the first one achieve the strategic objectives.

Air, land, and sea power are different beasts, each having different characteristics, strengths and weaknesses driven for the most part by the air, land, and sea contexts in which their associated forces predominantly operate. Hence, air, land, and maritime component employment strategies (ways) and the capabilities required to execute those strategies (means) that maximize a particular force’s strengths, while minimizing their weakness, have evolved differently over time.

For example, the seizing and holding of ground has always been the strength of land forces. When a land force attempts to seize territory, it is most often met by an opposing land force trying to defend it. It is not surprising that Clausewitzian land warfare theory involves looking at war as a series of battles between military forces,⁵⁶ with the defeat of one’s adversary military forces as the key military strategic objective. There is no doubt that land warfare theory has evolved from the time of Clausewitz, and now includes other concepts like manoeuvre warfare theory, but “to close with and destroy enemy military forces” has remained a fundamental function of land forces. In the CA, the core functions of **Find, Fix and Strike** are examples of this fundamental land warfare methodology.

Conversely, almost from the time of its inception, air warfare theory has stressed taking the fight to the enemy’s heartland and directly attacking its strategic centres of gravity. The strategic bombing campaigns of WWII evolved out of air warfare theory such as this, developed by the likes of Douhet.⁵⁷ Later, Warden’s five-ring theory, central to Op INSTANT THUNDER (the air campaign portion of Op DESERT STORM), saw fielded enemy forces as the lowest strategic priority for targeting, while attacking the enemy’s brain and central nervous system to invoke strategic paralysis—its command and control, organic essentials and infrastructure—was the key strategy to win the war.

If air, land, and maritime forces operate predominantly in different contexts, have significantly different characteristics, strengths and weaknesses, apply fundamentally different methods of warfare, and use significantly different capabilities to achieve their objectives, does it seem logical that their fundamental functions would be named the same? Unity of purpose for military forces trying to create joint effects is critical, but commonality of doctrinal

wording that inhibits a general understanding of why a force exists or what fundamental functions it brings to the joint fight is detrimental to true understanding of the largely interdependent but different roles military environments play in joint warfare.

The Way Ahead.

As previously discussed, strategic military doctrine provides knowledge and understanding of military power, guides the use of armed forces, shapes perceptions within the GoC and the CF about the use of military capabilities as an instrument of national power, and influences the CF force development and CBP processes that help drive the procurement of future military capabilities. Current strategic CF aerospace doctrine uses military CBP-friendly terms—spawned from CA operational function terms—to describe the functions of the RCAF that are useful in satisfying one of the above intents of strategic doctrine. It does not, however, clearly or adequately describe the fundamental aerospace power functions in a way that promotes knowledge and understanding of aerospace power, how it should be used, or what military instruments of national power are provided by the RCAF.

A potential solution to this lack of clarity is to include fundamental aerospace power functions in the next edition of *Canadian Forces Aerospace Doctrine*, rename the current “**Functions of Canada’s Air Force**” as “**Capability Domains of the Royal Canadian Air Force**” and show how they align to each other, as well as how they both relate to the other sub-functions, roles, missions or tasks that the RCAF performs. In the interim, an information brochure could be produced, supported by education media like briefing packages and videos that contain this new approach highlighting the fundamental aerospace power functions while recognizing the importance of RCAF capability domains. This supplement to Edition 2 of *Canadian Forces Aerospace Doctrine* should be provided to senior

RCAF commanders and RCAF education institutions. In this manner, the RCAF’s primary, strategically focused, foundation document and supplement would speak in a simpler and more direct way to a broader audience. This audience should include those important stakeholders outside the military who might wonder what functions an expensive aerospace power capability like a multi-role fighter or remotely piloted aircraft fulfils, how these functions link to the RCAF part of the CF mission, and hence, what contribution they make to the overall security of Canada, Canadians and their national interests.

Without throwing the baby out with the bathwater, Table 4 illustrates how aerospace power functions could be expressed in terms of fundamental functions, while retaining the linkage to joint CBP processes and the operational functions of the other environments. While the exact wording of aerospace power functions, sub-functions/roles, and missions shown is not carved in stone, the concept of linking fundamental functions to air force capability domains, instead of replacing fundamental functions with joint capability domains should be embraced.

Conclusion

It is critical that the RCAF strategically and clearly communicates what fundamental services the RCAF provides to the nation, so the nation understands why it is necessary to raise, train, and equip their air force and what is needed to effectively sustain and employ that force. As many CF operations are joint/integrated operations, this information also needs to be clearly understood by the other military environments and government departments involved.

Air force strategic doctrine is the primary medium to define and communicate these core aerospace power functions and capability domains to the RCAF, CA, Royal Canadian Navy (RCN), public, and government. In an effort to align with joint

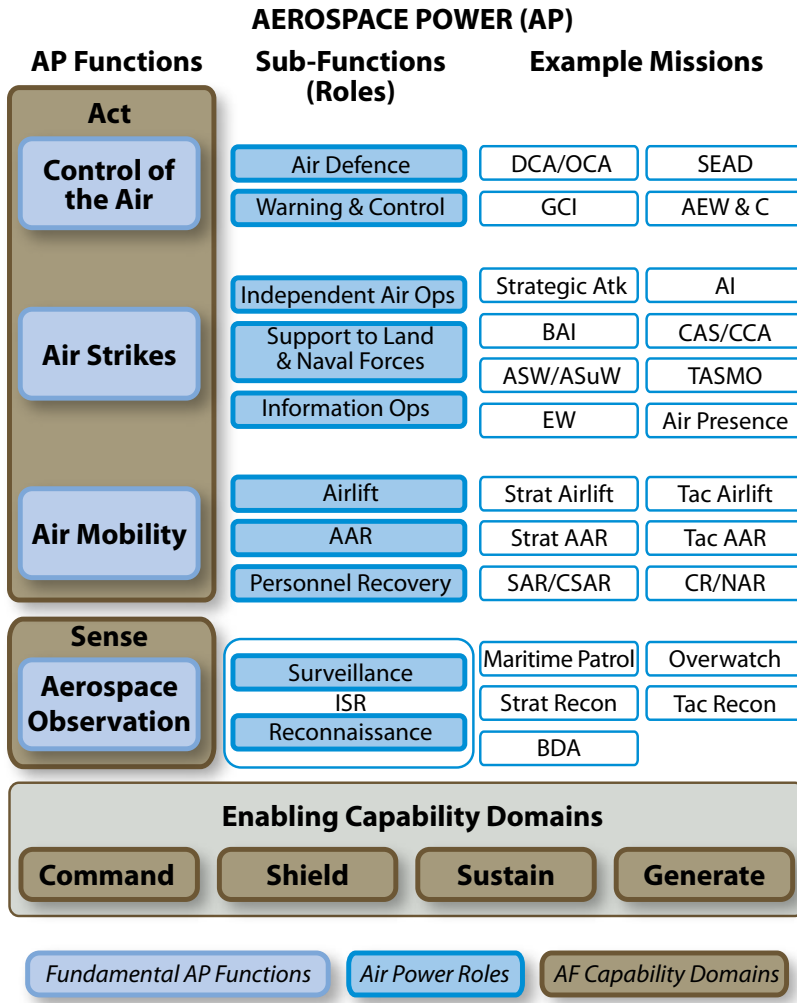


Table 4. Fundamental Aerospace Power Functions and Air Force Capability Domains

doctrinal nomenclature, the RCAF has sacrificed clarity in favour of military force development jargon commonality. This lack of clarity has negatively impacted the ability of the RCAF to justify what it does and what unique capabilities it needs to do its job.

While acknowledging that raising, protecting, sustaining, and commanding air forces are absolute necessities, they are not, in themselves, the reasons why Canada has an air force. When the Canadian citizenry or government finds it difficult to understand, or its air force finds it difficult to explain or justify in simple terms, why

it needs core aerospace power capabilities, perhaps it is time to take a hard look at how the basic functions of the RCAF are expressed. Air forces exist to provide four fundamental services to the nation: control of the air, movement of things through the air, observation of things from the air and space, and when necessary, attacking things from the air. Strategic aerospace doctrine should reflect that. ■

The beginning of wisdom is to call things by their right names.

— Chinese proverb

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Abbreviations

AAR	air-to-air refuelling
AEW&C	airborne early warning and control system
AF	air force
AI	air interception
ASuW	antisurface warfare
ASW	antisubmarine warfare
atk	attack
BAI	battlefield air interdiction
BDA	battle damage assessment
CA	Canadian Army
CAS	Chief of the Air Staff
CAS	close air support
CBP	capability-based planning
CCA	close combat attack
CF	Canadian Forces
CJTL	Canadian Joint Task List
CR	combat recovery
CSAR	combat search and rescue
DCA	defensive counter-air
EW	electronic warfare
GCI	ground controlled interception
GoC	Government of Canada
ISR	intelligence, surveillance and reconnaissance
NAR	non-conventional assisted recovery
OCA	offensive counter-air
Op	operation
RCAF	Royal Canadian Air Force
RECON	reconnaissance
SAR	search and rescue
SEAD	suppression of enemy air defences
sqn	squadron
strat	strategic
tac	tactical
TASMO	tactical support for maritime operations
USAF	United States Air Force

Notes

1. Canada, Department of National Defence (DND), *Canada First Defence Strategy*, 3.
2. B-GJ-005-000/FP-001 Canadian Forces Joint Publication, *CFJP 01 Canadian Military Doctrine*, 2009-04, 2–7, http://dsp-psd.pwgsc.gc.ca/collection_2010/forces/D2-252-2009-eng.pdf (accessed September 7, 2011).
3. *Ibid.*, 2–2.
4. B-GA-400-000/FP-000 *Canadian Forces Aerospace Doctrine*, ed. 2, December 2010, 35.
5. CAS, *Air Force Business Plan FY 10/11*, 30 July 10, Part 1, 2/3.
6. B-GJ-005, 1–1.
7. *Ibid.*, 1–4.
8. *Ibid.*, 1–4.
9. B-GA-400, ed. 2, 1.
10. “Great Aviation Quotes,” <http://www.skygod.com/quotes/airpower.html> (accessed September 7, 2011).
11. The CAS, Lieutenant-General André Deschamps states during a GoC announcement that the CFs will receive 65 fifth generation Joint Strike Fighter F-35 aircraft, beginning in 2016, as a replacement to its current fleet of CF-18s, photo credit: Corporal Darcy Lefebvre © 2010 DND-MDN Canada, FA2010-0218-18 (accessed September 7, 2011).
12. “Jargon – the specialized language of groups of people has its place in the workplace. It can provide useful shorthand to get across specific meaning quickly. But jargon becomes a problem when it stops people understanding your message. When you start using jargon (perhaps unintentionally) with audiences it is not intended for, people will find you very difficult to understand. Even within the group the jargon’s meant for, meanings evolve and newcomers misunderstand. And soon jargon can create barriers within groups too. Whatever the reason you use jargon, if it’s out of place and the audience misunderstands, it can create a two-fold problem. Whilst you fail to convey information to them, you may also succeed in conveying a more subtle, negative message: That you have given little thought to your audience; and perhaps that you are insincere and not to be trusted. Worse, you may never know that your audience has not understood – people often don’t say anything if they mistrust you, or if they fear of looking unintelligent themselves.” “Jargon Busting – Communicating Without Barriers,” <http://www.mindtools.com/CommSkill/JargonBusting.htm> (accessed September 7, 2011).
13. B-GA-400, ed. 2, 35.
14. The Act function is supported by two sub-functions: Shape and Move.
15. See Note #12 above.
16. Canada, DND, *The Future Security Environment: Report 99-02*, Kingston, ON: Directorate—Land Strategic Concepts (DLSC), August 99, 40.
17. Canada, DND, *Strategic Capability Planning for the Canadian Forces*, 13 June 2000, 23, http://www.navy.dnd.ca/leadmark/doc/part2_e.asp (accessed September 7, 2011).
18. B-GA-400, ed. 2, 37.
19. B-GL-300-001/FP-001 *Land Operations*, 2008-01-01, 4–18, <http://info.publicintelligence.net/CanadaLandOps.pdf> (accessed September 7, 2011).
20. B-GJ-005, 2–7.
21. B-GA-400, ed. 2, 35.
22. Canada, DND, *Future Army Capabilities*. Kingston, ON: DLSC Report 01/01, January 2001, 9.
23. *Ibid.*
24. *Ibid.*; also, see footnote #32.
25. B-GA-400, ed. 1, 2007, 37.
26. B-GL-300, 4-19 and 4-21.
27. *Ibid.*, 2-7.
28. Canada, DND, *Strategic Capability Roadmap Version 1.0 Analytic Framework*, DRDC CORA TR 2009-013, Defence Research and Development Canada (DRDC), Operational Research Division, December 2009, 8.
29. *Ibid.*, 9.
30. B-GA-400, ed. 2, 35.

31. Ibid.
32. "Aerospace observation" is a term selected by the author. This fundamental aerospace power function is also known as air observation, (air or space) surveillance, (air or space) reconnaissance, ISR, and ISTAR. Noting that the Royal Australian Air Force (RAAF) use the term "ISR" and the Royal Air Force (RAF) use the term "Intelligence and Situational Awareness" to represent this aerospace power function, it can be argued that the true aerospace uniqueness of this function is derived from the aerospace perspective of the "observing" capability.
33. History of military ballooning, Wikipedia, http://en.wikipedia.org/wiki/History_of_military_ballooning (accessed September 7, 2011).
34. RAAF Air Power Development Centre, *Pathfinder #152 – The Experience of Air Power in Libya*, March 2011, <http://airpower.airforce.gov.au/Publications/List/41/Pathfinder.aspx>, (accessed September 7, 2011).
35. CF Photo, <http://www.airforce.forces.gc.ca/v2/equip/hst/be2c-eng.asp> (accessed September 2, 2011).
36. Photo by Corporal (Cpl) Evan Kuelz, RE2007-056-028, 11 Aug 2007, Iqaluit, Nunavut, Canada, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=6798-RE2007-056-028> (accessed September 7, 2011).
37. Photo credit – Canadian Space Agency, <http://www.asc-csa.gc.ca/images/recherche/photo.aspx?id=225&format=0&search=satellite&page=1> (accessed September 7, 2011).
38. Photo by Private (Pte) Pierre Cloutier, CK2009-0406-01, August 1, 2009, Cold Lake, Alberta, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=9044-CK2009-0406-01> (accessed September 7, 2011).
39. Photo by Cpl Marc-André Gaudreault, Canadian Forces Combat Camera © 2011 DND-MDN Canada, IS2011-6002-133, 3 April 2011, Trapani, Italy, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=10188-IS2011-6002-133> (accessed September 7, 2011).
40. Aircraft, uniquely, can use altitude to vertically avoid and overfly many unsophisticated surface or sub-surface-based threats (mines, IEDs, small arms fire, submarines).
41. Photo by Master Cpl David Hardwick, DA2010-0001-35, Jan 17, 2010, Canadian Embassy, Port-Au-Prince, Haiti, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=9382-DA2010-0001-35> (accessed September 7, 2011).
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43. Phillip S. Meilinger, "A Short History of 'Decisiveness,'" *airforce-magazine.com* 93 no. 9, September 2010, <http://www.airforce-magazine.com/MagazineArchive/Pages/2010/September%202010/0910history.aspx> (accessed September 7, 2011).
44. Photo by Cpl Jax Kennedy, Canadian Forces Combat Camera © 2011 DND-MDN Canada, IS2011-5013-13, 24 March 2011, St John's, Newfoundland and Labrador, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=10159-IS2011-5013-13> (accessed September 7, 2011).
45. Photo by Capt Iain Hannam, 409 Sqn Cold Lake © 2011 DND-MDN Canada, CK2011-0110-29, 4 Apr 2011, Keflavik, Iceland, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=10161-CK2011-0110-29> (accessed September 7, 2011).
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49. Great Aviation Quotes.
50. Photo by Cpl Igor Loutsiouk, FA2007-2043a, 01 June 2007, Cold Lake, Alberta, <http://www.airforce.forces.gc.ca/v2/netpub/index-eng.asp?rid=6575-FA2007-2043a> (accessed September 7, 2011).
51. Referred to as "control of the air and space, air mobility, intelligence and situational awareness (which includes surveillance and reconnaissance), and attack" in *British Air and Space Power Doctrine, AP 3000 Fourth Edition*, 37.
52. Speech delivered by RAAF Chief of Air Force during the 2010 RAAF Air Power Conference, 29 Mar 10, and recent air power doctrine work done by the RAAF Air Power Development Centre reflects the four core functions of Control of the Air, Strike, ISR and Air Mobility.
53. B-GA-400 ed. 2, 36, footnote 3.
54. Ibid., 35.
55. Canada, DND, *Strategic Capability Roadmap Version 1.0 Analytic Framework*, DRDC CORA TR 2009-013, DRDC, Operational Research Division, December 2009, 8.
56. Phillip S. Meilinger, "The Mutable Nature of War," *Air & Space Power Journal* XXIV, Winter 2010, no. 4, 27.
57. "Giulio Douhet was the first airpower [sic] theorist. Born in Italy in 1869 and commissioned as an officer in the Italian artillery in 1882, he began thinking about airplanes in 1909 and had formed the core of his airpower thought by the middle of World War I. His landmark treatise on airpower, *The Command of the Air*, was first published in 1921. . . . He believed that the airplane's inherent speed and ability to reach any point within an enemy country meant that an attacking air force could bypass enemy fielded forces and provide a shortcut to victory." Raymond P O'Mara, *Clearing the Air: Airpower Theory and Contemporary Airpower*, *Air Force Journal of Logistics* 34, issue 1, 55.