National Defence / Défense nationale

ASSISTANT DEPUTY MINISTER (REVIEW SERVICES)

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Evaluation of Air Force Readiness




October 2017

1258-3-005 (ADM(RS))

Canada

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Acronyms and Abbreviations

1 CAD	1 Canadian Air Division
2 CAD	2 Canadian Air Division
ADM(IE)	Assistant Deputy Minister (Infrastructure and Environment)
ADM(IM)	Assistant Deputy Minister (Information Management)
ADM(Mat)	Assistant Deputy Minister (Materiel)
ADM(RS)	Assistant Deputy Minister (Review Services)
AEW	Air Expeditionary Wing
AFAST	Airfield Activation Surge Team
AFEC	Air Force Expeditionary Capability
AFERSET	Air Force Expeditionary Readiness Standards and Evaluation Team
AMC	Aerospace Management Committee
AMOR	Annual Military Occupation Review
ATF	Air Task Force
CAF	Canadian Armed Forces
CAOC	Combined Aerospace Operations Centre
CDS	Chief of the Defence Staff
CFAWC	Canadian Forces Aerospace Warfare Centre
CFDS	*Canada First* Defence Strategy
CJOC	Canadian Joint Operations Command
Comd RCAF	Commander Royal Canadian Air Force
CMP	Chief of Military Personnel
DGAEPM	Director General Aerospace Equipment Program Management
DND	Department of National Defence
DRDC	Defence Research and Development Canada
DRMIS	Defence Resource Management Information System
ELE	Estimated Life Expectancy
FE	Force Employment
FG	Force Generation
FOL	Forward Operating Location
FP&R	Force Posture and Readiness
FY	Fiscal Year

GC	Government of Canada
HQ	Headquarters
IM/IT	Information Management / Information Technology
ISSCF	In-Service Support Contract Framework
LLP	Lessons Learned Program
LoO	Line of Operation
MRP	Managed Readiness Plan
NDHQ	National Defence Headquarters
NORAD	North American Aerospace Defense Command
NP	National Procurement
NWS	North Warning System
O&M	Operations and Maintenance
Op	Operation
OPRED	Operational Readiness
OTU	Operational Training Unit
PAA	Program Alignment Architecture
PMF	Performance Measurement Framework
PML	Preferred Manning Level
Reg F	Regular Force
Res F	Reserve Force
RCAF	Royal Canadian Air Force
RPP	Report on Plans and Priorities
RPRC	Real Property Replacement Cost
SAR	Search and Rescue
SJS	Strategic Joint Staff
SMaRT	Strategic Management Readiness Tool
TARM	Total Air Resource Management
TES	Trained Effective Strength
USA	United States of America
UK	United Kingdom
VCDS	Vice Chief of the Defence Staff
YFR	Yearly Flying Rate

Executive Summary

This report represents the results of the evaluation of the Air Force Readiness Program. The evaluation was conducted by Assistant Deputy Minister (Review Services) (ADM(RS)) in compliance with the Treasury Board Policy on Evaluation (2009), which has been replaced by the Treasury Board Policy on Results (July 1, 2016). The evaluation examined the relevance and performance of the program over a five year period, from fiscal year (FY) 2011/12 to FY 2015/16.

Overall Assessment

- There is an ongoing need for the Air Force Readiness Program, as it is the raison d'être of the RCAF. The program is aligned with the roles, responsibilities and priorities of the federal government and the Department of National Defence (DND) / Canadian Armed Forces (CAF).
- The Air Force Readiness Program ensures RCAF force elements meet readiness expectations across the full spectrum of operations. Key readiness initiatives have advanced RCAF readiness significantly.
- [redacted]
- The program is assessed to be fiscally well-managed, [redacted]

Program Description

The Air Force Readiness Program is the responsibility of the Commander Royal Canadian Air Force (Comd RCAF). The Royal Canadian Air Force's (RCAF) mission is to provide the Government of Canada (GC) with a combat-capable, multi-purpose Air Force. The program will generate and sustain relevant, responsive, effective air power across the spectrum of conflict, from humanitarian operations to combat missions. This is accomplished by bringing air forces to a state of readiness for operations, assembling and organizing Air Force personnel, infrastructure, supplies, and materiel. It's also accomplished by providing individual and collective training to prepare the RCAF to defend Canadian interests domestically, continentally and internationally.

Relevance

There is a continued need for the Air Force Readiness Program to generate and sustain Air Force elements that enable the RCAF to be employed across the full spectrum of operations. The Air Force Readiness Program is aligned with federal government and departmental roles and responsibilities within the *National Defence Act*. In support of the RCAF, the Air Force Readiness Program has contributed to the federal government and departmental priorities of defending Canada, protecting Canadians at home and abroad, and making a highly visible and significant contribution to a safer and more secure world.

Performance

The RCAF's focus on readiness has continued to ensure its force elements have met readiness expectations. The RCAF high readiness fleets have maintained a daily response posture to support the safety and security of Canadians. When assigned to missions, the recent development of the Air Force expeditionary capability (AFEC) and supporting mechanisms has advanced RCAF readiness significantly. With the implementation of the RCAF Managed Readiness Plan (MRP), the force generation (FG) of Air Task Force (ATF) Headquarters (HQ) has been developed according to Air Force expeditionary task standards, ensuring that deployed command elements are appropriately trained and prepared for operations. [redacted] Further refinement of various Air Force Readiness Program governance mechanisms should facilitate more effective force element readiness preparation and planning.

Looking ahead, the RCAF will continue to be affected by resource pressures. Over the evaluation period, RCAF capabilities have increased significantly without overall increases in personnel or baseline funding. [redacted] While ongoing initiatives to address many personnel issues are encouraging in the short term, the critical shortages of specific aircrew occupations and technician trades, and Reserve Force (Res F) personnel in general, has strained the existing RCAF establishment. Furthermore, the replacement or upgrade of several aging RCAF aircraft fleets will be required in the coming years. [redacted] [1] [redacted] In general, without further progress in addressing its personnel and equipment requirements, the RCAF will be increasingly challenged to sustain its readiness capabilities in the future.

While RCAF initiatives are on-going in some areas, there are several challenges that are not currently being addressed by initiatives or projects. A summary of evaluation findings and associated recommendations can be found in Table 1. Recommendations are presented to facilitate the achievement of a more effective Air Force Readiness Program.

The paragraph numbering in the right column does not match with the numbering on the left. Recommend this be corrected as it is confusing for the reader. Suggest alpha characters to correspond with items in the left margin, instead.

[1] NORAD is a bi-national military command of the United States and Canadian governments that provides aerospace warning, aerospace control, and maritime warning over the North American continent and its approaches.

Key Findings	Recommendations
Relevance	
1. There is an ongoing and future need for Air Force readiness to enable and prepare the RCAF to conduct operations in support of Canada, Canadians, and Canadian national interests.	
2. There is alignment between the Air Force Readiness Program with departmental and federal roles and responsibilities.	
3. The Air Force Readiness Program is consistent with federal government priorities and the DND/CAF roles of defending Canada, defending North America and contributing to international peace and security.	
Performance – Effectiveness	
Governance and Force Structure	
4. RCAF governance of readiness is effective, but there are opportunities for improvement.	4. a). The RCAF continue to develop the RCAF FP&R Directive to ensure all missions are well developed. The Directive should explicitly include assumptions, risks, and supporting capabilities, or reference other documents which may be needed to adequately define the parameters of the mission to be met.
	4. b). The RCAF documents the planning process that generates FG yearly flying rate (YFR) and annually updates the variables leading to that allocation for each RCAF fleet.
	4. c) The RCAF regularly review and update the MRP. The MRP should include enhanced direction based on recent operations and better defined air aetachment unit and sub-unit readiness requirements.
	4. d) The Strategic Joint Staff (SJS) work with the RCAF and Assistant Deputy Minister (Materiel) (ADM(Mat)) to evolve the Total Air Resource Management (TARM) process to both plan and report performance. This process should demonstrate how all requests for air effects are met by RCAF capabilities or by other means. It would also permit the DND/CAF to identify RCAF capability or capacity gaps and evaluate the cost-effectiveness of contracted air resources.

Aircraft and Materiel	
5. [redacted]	5. The RCAF reassess FP&R aircraft and equipment requirements and documents the current materiel deficiencies. The RCAF must strive to ensure the quantity of aircraft and equipment in major capital equipment acquisition activities reflects those requirements.
6. Due to the ongoing introduction of new fleets (CH-147, CC-130J, CH-148), RCAF resource plans have identified a requirement for increased YFR and National Procurement (NP) funding.	
7. Estimated life expectancy (ELE) dates constrain materiel procurement. Delayed RCAF ELE changes have caused supportability challenges.	7. The RCAF review the ELE change process to ensure the supportability of legacy systems is not negatively impacted. To avoid capability gaps, legacy capabilities and associated ELEs should be sustained until replacement capabilities reach full operating capability.
Infrastructure and Information Systems	
8. While much of the RCAF infrastructure and information systems are adequate, [redacted] Assistant Deputy Minister (Infrastructure and Environment) (ADM(IE)) is now responsible for addressing infrastructure requirements and Assistant Deputy Minister (Information Management) (ADM(IM)) and Shared Services Canada are responsible for addressing core and common information system requirements.	
9. [redacted]	
Units and Personnel	
10. [redacted]	10 a). The RCAF conduct an independent review to study RCAF manning issues and assess aircrew requirements from a cross-occupational perspective. This verifies the aircrew occupation sizes in advance of the Future Aircrew Training Project.
	10 b). The RCAF conduct an independent establishment review to validate human resources requirements for all RCAF capabilities to re-establish and re-balance the RCAF personnel baseline.
11. Notwithstanding new RCAF initiatives, recent CAF Reserve policy changes and Regular Force (Reg F) demographics are forecast to reduce RCAF organizational capacity. The current Air Reserve is sustainable only as long as sufficient skilled Reg F retirees continue to seek employment in the Air Reserve.	11. The RCAF continue to evolve the Air Reserve to enable personnel to be trained and employed to perform relevant tasks in support of RCAF requirements. Reg F occupation management should include oversight of Res F positions to ensure holistic and optimal employment of military personnel resources.

12. ATF collective training has significantly improved and effectively supports Air Force readiness requirements. However, alignment of collective training exercises with FP&R requirements is not always readily apparent.	12. The RCAF align collective training plans to RCAF FP&R missions to ensure each Air Force element regularly demonstrates required readiness through a defined validation activity.
13. The RCAF expeditionary capability has reached an effective initial operating status but is constrained by equipment and infrastructure deficiencies. These deficiencies are expected to be addressed by the AFEC Capital Program.	
Providing and Sustaining Air Force Readiness	
14. The Air Force Readiness Program has demonstrated its effectiveness across the full spectrum of operations.	
Performance – Efficiency and Economy	
15. RCAF collective training costs are not being captured in a way that allows overall cost awareness and efficient management.	15. The RCAF develop the capability to strategically monitor and manage readiness training costs. This should include the costs of all force element training exercises and other collective training events in support of Air Force readiness.
16. The RCAF materiel sustainment cost trend is rising. It will continue to increase as older fleets incur more costly maintenance and increased flying of new fleets increases contracted service costs.	
17. While the RCAF infrastructure portfolio has been increasing, RCAF investment in maintenance and repair has been below established targets.	
18. The cost of the RCAF governance of the Air Force Readiness Program has remained relatively stable.	
19. The RCAF collects a broad range of information and data to support resource decisions, but internal use of its Performance Measurement Framework (PMF) and Lessons Learned Program (LLP) has been limited.	19. The RCAF continue to improve its LLP and further develop and integrate its PMF into its decision making processes.
20. The RCAF has initiated a plan to further invest in simulation for FG of select fleets. This is expected to reduce the relative cost of FG YFR.	
21. The Air Force Readiness Program is economical and fiscally well-managed.	
22. The RCAF's introduction of new capabilities in conjunction with decreased overall funding levels is threatening the future viability of the Air Force Readiness Program.	
23. The RCAF is pursuing initiatives to mitigate funding and personnel pressures.	

24. Using data from Janes Online, the Air Force Readiness Program is economical in comparison with select allies, although aspects of the program (overall budget, procurement, and operations and maintenance (O&M)) appear to be relatively underfunded.	

Table 1. Summary of Key Findings and Recommendations. This table provides a brief synopsis of report findings and recommendations.

Note: Please refer to Annex A—Management Action Plan for the management responses to the ADM(RS) recommendations.

1.0 Introduction

1.1 Context for the Evaluation

This report represents the results of the evaluation of the Air Force Readiness Program conducted by ADM(RS) in compliance with the Treasury Board Policy on Evaluation. This policy was replaced by the Treasury Board Policy on Results on July 1, 2016. The evaluation examined the relevance and performance of the program over a five year period from FY 2011/12 to 2015/16.

Since 2011, nine evaluations, reports or audits have been conducted on aspects of the RCAF or issues that impact the RCAF. Unless there is a requirement for the evaluation to emphasize a previously identified issue from these reviews, they have not been restated. The related evaluations, reports or audits are:

- 2016 Fall Reports of the Auditor General of Canada: Report 5 – Canadian Armed Forces Recruitment and Retention, and Report 7 – Operating and Maintenance Support for Military Equipment
- Canada and Defence of North America: NORAD and Aerial Readiness, Report of the Standing Committee on National Defence, September 2016
- Evaluation of the DND/CAF Contribution to the National Search and Rescue (SAR) Program, January 2015
- Evaluation of Maritime Air Capabilities, June 2014
- Evaluation of Aerospace Equipment Maintenance, February 2013
- The State of Readiness of the Canadian Forces, Report of the Standing Committee on National Defence, December 2012
- Evaluation of Air Force Training and Readiness Part 1 – Initial Air Force Occupation Training, November 2012
- 2012 Spring Report of the Auditor General of Canada: Chapter 2 – Replacing Canada's Fighter Jet
- 2011 Fall Report of the Auditor General of Canada: Chapter 5 – Maintaining and Repairing Military Equipment

1.2 Program Profile

1.2.1 Program Description

The Comd RCAF has functional command of the RCAF and, through the Air Force Readiness Program, is responsible for the development, management, generation, and sustainment of Air Force elements.[2] The Air Force Readiness Program brings Air Force elements to a state of readiness for operations, by assembling and organizing Air Force personnel, supplies, and materiel. It includes the training and equipping of Air Force elements and their means of

[2] Force elements are organizational entities that can be used to provide specific mission effects. This includes qualified personnel, equipment, and key weapon systems which can be force generated, such as aircraft, and assigned to tasks.

deployment, sustainment and recovery. As such, the RCAF is primarily a "force generator" within the CAF.

The Air Force Readiness Program is designed to provide the GC with relevant, responsive, and effective air power[3] to meet current and future defence needs. This includes, amongst other things, protecting Canadian sovereignty, defending North America, providing disaster relief, conducting SAR, supporting United Nations peacekeeping operations, and contributing to the security of our allies and to allied and coalition operations abroad.[4]

To conduct the Air Force Readiness Program, the Comd RCAF is supported by the air staff at National Defence Headquarters (NDHQ) in Ottawa and by 1 Canadian Air Division (1 CAD) HQ, the Joint Forces Air Component Command and the Canadian NORAD Region HQ located in Winnipeg, Manitoba. These are the principal organizations that force generate and employ air power at home and abroad. 2 Canadian Air Division (2 CAD) HQ, also in Winnipeg, has oversight over RCAF individual training and education, including delivery of start from the beginning training for RCAF occupations and core RCAF development courses. The Comd RCAF is also supported by the Canadian Forces Aerospace Warfare Centre (CFAWC) in Trenton, Ontario as the center of excellence for air power development, including concept development and experimentation and the LLP.

The Air Force Readiness Program is carried out by the RCAF Reg F, Res F and civilian personnel through 14 wings located across Canada. Ten wings also include a Canadian Forces Base along with other operational and support units. Wings vary in size from several hundred personnel, such as 9 Wing Gander and 5 Wing Goose Bay, to larger wings such as 8 Wing Trenton, 4 Wing Cold Lake and 14 Wing Greenwood with several thousand personnel.[5] RCAF wings comprise 136 units and 23 aircraft fleets,[6] which include approximately 400 aircraft.[7] The Res F component of the RCAF is incorporated into the air staff at NDHQ, 1 CAD HQ, 2 CAD HQ and most Air Force wings, squadrons and units across Canada.[8]

The ATF[9] construct is how the RCAF organizes and presents forces to an Air Component Commander and/or force employer. The ATF may be used at the operational or tactical level, depending upon the scale and complexity of the operation.[10] This will normally include the baseline components of an ATF Commander and HQ, operations support elements, mission

[3] Air power is that element of military power applied within or from the air environment to create effects above, on, and below the surface of the earth. Canadian Armed Forces Air Doctrine, 3rd Edition, October 2015.
[4] MND Message, Defence Program Review (DPR), 2014-15.
[5] http://www.rcaf-arc.forces.gc.ca/en/wings-squadrons.page, consulted October 4, 2016.
[6] The RCAF owns 16 fleets of aircraft, and the remaining seven aircraft fleets are comprised of contracted training aircraft.
[7] The RCAF fleet comprises approximately 311 RCAF aircraft and 87 leased/contracted aircraft.
[8] http://www.rcaf-arc.forces.gc.ca/en/air-reserve/index.page, consulted September 21, 2016.
[9] The ATF is a temporary grouping of RCAF formations, units or detachments that is formed to conduct a specific operation, mission or task. (Defence Terminology Bank record 694281).
[10] Canadian Armed Forces Air Doctrine, 3rd Edition, October 2015.

support elements, and associated air detachments.[11] The RCAF also has the capability to form Air Expeditionary Wings (AEW)[12] which can be assigned to an ATF Commander. In addition, the RCAF is tasked with providing Canada's contribution to NORAD, including radar and control facilities assigned to 22 Wing at Canadian Forces Base North Bay, Ontario.

1.2.2 Program Objectives

At the strategic level, readiness is defined as a measure of the ability of a force element to undertake an approved task, and consists of two components: operational capability and response time.[13] The Air Force Readiness Program is intended to provide Canada with combat-effective, multi-purpose air power.[14] The program is designed to generate and sustain relevant, responsive, aerospace forces that are able to respond to a spectrum of tasks, as may be directed by the GC, within a required response time.

1.2.3 Stakeholders

The primary stakeholder for the Air Force Readiness Program is the Comd RCAF. The other principle DND/CAF stakeholder organizations are the SJS and the Canadian Joint Operations Command (CJOC).[15] Other CAF stakeholder organizations include the Royal Canadian Navy, Canadian Army, and Canadian Special Operations Forces Command, all of which may operate with the RCAF in joint training and operations.

Other key partners enabling the Air Force Readiness Program include ADM(Mat), Chief of Military Personnel (CMP), ADM(IE), ADM(IM), and the National Search and Rescue Secretariat. Other government department stakeholders include Public Safety Canada and Global Affairs Canada.

1.3 Evaluation Scope

1.3.1 Coverage and Responsibilities

This evaluation focuses on Air Force readiness: an assessment of the ability of the RCAF to deliver on the domestic and international defence commitments required by the GC, which are supported primarily by 1 CAD and its force elements. The role of 2 CAD, RCAF *ab initio*, or

[11] The air detachment is a “fleet-specific combat force package that generates aerospace power.” (Defence Terminology Bank record 34897).
[12] The AEW is a deployable, task-tailored, tactical-level force comprised of a command element, one or more air operations elements, an operations-support element, a mission-support element and a force-protection element. (Defence Terminology Bank record 34903).
[13] SJS Director of Strategic Readiness (December 2008), Interim Directive – CF Readiness.
[14] A multi-purpose Air Force includes a range of specialist modern air power assets, weapons, and aerospace services which are designed to meet national objectives and goals. Combat capability remains a distinguishing feature of a multi-purpose Air Force.
[15] CJOC is an amalgamation of the three former operational commands; Canada Command, Canadian Forces Expeditionary Command, and the Canadian Operational Support Command.

start from the beginning, training and training fleets will only be discussed where their role directly supports operational readiness (OPRED).

The 2013 Program Alignment Architecture (PAA)[16] uses the title Aerospace[17] Readiness to report on activities which encompass both the air and space domains. RCAF activities involving space[18] are outside of the scope of this evaluation as they include DND/CAF capabilities and initiatives beyond the role of the RCAF solely. Other RCAF activities outside the scope of this evaluation that are linked to readiness include: the RCAF's contribution to the SAR Program (ADM(RS) evaluation completed January 2015); Maritime Air Capabilities (ADM(RS) evaluation completed June 2014); Aerospace Equipment Maintenance (ADM(RS) evaluation completed February 2013); and Air Force Initial Occupation Training (ADM(RS) evaluation completed November 2012).

The evaluation's assessment will focus on the extent that the Air Force Readiness Program's four immediate outcomes and the intermediate outcome are achieved:

Immediate Outcomes

- Required governance and force structure is in place to achieve required readiness levels;
- Aircraft and materiel[19] are available in required quantity, type and condition to achieve required readiness levels;
- Infrastructure[20] and information systems are available in the required quantity and condition to achieve required readiness levels; and
- Units and personnel are trained in required quantity, composition and skill sets to achieve required readiness levels.

Intermediate Outcome

- The RCAF provides and sustains suitable Air Force readiness.

1.3.2 Resources

The PAA attributions challenge coherence between readiness program activities and impedes accurate cost comparison over the period reviewed by the evaluation. The attribution of FY 2013/14 PAA aerospace readiness expenditures total $1.61 billion which is 10 percent of total DND/CAF expenditures. However, the changes in PAA framework beginning in

[16] The structure of the 2013 PAA changed to more clearly separate the activities traditionally known as FG and FE.
[17] The environment, meaning the air and space environments, which surround the earth and extend through the air into space from the earth's surface. (Defence Terminology Bank record 34894).
[18] The mandate of the DND space organization is to develop a comprehensive defence space program to exploit the medium of space in support of Canada's national interests.
[19] Materiel includes the systems, vehicles, aircraft, arms, parts, and materials used to support and maintain air operations. Canadian Armed Forces Air Doctrine, 3rd Edition, October 2015.
[20] Infrastructure applies to all fixed and non-permanent installations for the support and control of military forces. It includes runways, roads, telecommunication networks, relocatable temporary camps, and all types of utilities such as power generation, electrical distribution, telecommunication ducting, natural-gas networks as well as water and sewage systems. Canadian Armed Forces Air Doctrine, 3rd Edition, October 2015.

FY 2014/15 and revised attribution of aerospace readiness expenditures total $467 million and now represent only 3.1 percent of total DND/CAF expenditures.

Because of the discrepancy in the PAA attribution of aerospace readiness expenditures, the evaluation used relevant organizational budgets and expenditures to review expenditures related to readiness. The evaluation also addressed elements of the PAA that report on readiness preparations and broader elements of the Air Force Readiness Program that enable readiness and sustain future readiness capability.

1.3.3 Issues and Questions

The evaluation addresses five core issues related to the relevance and performance of the Air Force Readiness Program. The methodology used to gather evidence in support of the evaluation questions is at Annex B and the program Logic Model is at Annex C. An evaluation matrix listing each of the evaluation questions, with associated indicators and data sources, is at Annex D.

2.0 Findings and Recommendations

The following sections evaluate the relevance and performance of the Air Force Readiness Program. The evaluation examined the extent to which the generation and delivery of Air Force readiness addresses an ongoing need, is aligned with GC priorities and DND/CAF strategic outcomes and objectives, is appropriate to the role of the federal government, achieves its intended outcomes, and demonstrates efficiency and economy.

2.1 Relevance—Continued Need

To determine whether the Air Force Readiness Program continues to address a demonstrable need, the following two key performance measures were used:

- evidence of past engagement of Air Force readiness; and
- requirement for Air Force readiness in the future security environment.

Findings are based on evidence from document reviews and key informant interviews with RCAF and CJOC staff.

Key Finding 1: There is an ongoing and future need for Air Force readiness to enable and prepare the RCAF to conduct operations in support of Canada, Canadians, and Canadian national interests.

2.1.1 Performance Measure: Evidence of past engagement of Air Force readiness over the past five years

Over the past five years, the RCAF has been actively engaged in a wide range of defence and security activities including domestic, continental, and international operations.[21] Some of the more significant operations include combat operations in Afghanistan, Libya, and Iraq and humanitarian missions in the Philippines and Nepal. The RCAF maintains a daily operational response posture to ensure domestic and continental defence including protection of critical infrastructure and the ability to respond to a terrorist attack. Similarly, the RCAF SAR fleets maintain a daily response posture to support the safety and security of Canadians. The RCAF also supports many operations that recur on an annual or frequent basis.[22]

[21] Afghanistan includes Operation (Op) ATHENA and Op ATTENTION. The airlift deployment of the Disaster Assistance Response Team for Op RENAISSANCE 13-1 (Philippines) and 15-1 (Nepal) are examples of recent major humanitarian aid missions. Other expeditionary air capabilities have been deployed in response to armed aggression or to enhance global peace and security: Op MOBILE (Libya), Op IGNITION (Iceland), Op IMPACT (Iraq) and Op REASSURANCE (Lithuania, Romania).

[22] Operations conducted by Royal Canadian Navy ships with embedded maritime helicopters or maritime patrol aircraft involve the RCAF and include: Op ARTEMIS, Op CARIBBE and Op SAIPH. All recurring arctic operations also involve RCAF capabilities: Op NANOOK, Op NUNALIVUT, Op NUNAKPUT, and Op NEVUS. Operations supporting other government departments and agencies or providing disaster relief include: Op SABOT, Op DRIFTNET, Op LENTUS, Op LUSTRE, and Op FORGE.

2.1.2 Performance Measure: Requirement for Air Force readiness in the future security environment

As stated in the 2013 Chief of the Defence Staff (CDS) Directive for CAF FP&R, the CAF operates in a strategic environment marked by complexity and volatility. These dynamics will continue to shape CAF activity in the years to come, particularly as the CAF strives to maintain a multi-role military that is capable of responding to threats and hazards at home and on the continent, as well as responding to a myriad of security challenges that result from international terrorism, regional flashpoints, and fragile states.

It has been acknowledged that the future security environment will constantly challenge CAF capabilities. "When possible, state and non-state actors alike will seek to combine conventional, irregular and high-end asymmetric methods concurrently, often simultaneously in the land, sea, air, and space environments and the cyber domain to gain advantage in future conflict."[23] "The air environment will be increasingly congested with manned and unmanned aircraft."[24] To face these challenges the CAF "must be able to operate across the length and breadth of Canadian territory, including its maritime and airspace approaches and it is likely that the GC will continue to assign difficult expeditionary operations."[25] For the future, Canada will require "flexible, adaptive, resilient, deployable forces able to operate with a high degree of situational awareness with precision, and the ability to minimize collateral damage and casualties."[26] RCAF force elements, enabled through the Air Force Readiness Program, will contribute to mitigating unpredictable defence and security risks and be a highly capable force ready to meet future challenges.

Interviews with CJOC senior staff underscored and confirmed the relevance of the RCAF for international, domestic, and continental operations; and the requirement to maintain the readiness of RCAF combat capabilities.

2.2 Relevance—Alignment with Federal Roles and Responsibilities

This section examines the extent to which the generation and delivery of Air Force readiness by the RCAF aligns with departmental and federal roles and responsibilities. The following performance measures were used to assess the alignment with federal roles and responsibilities:

- alignment with government acts, legislation and strategic direction; and
- the extent to which the RCAF conducts activities that support the responsibilities of other government departments, other levels of government, or the private sector.

The findings in this section are based on documents reviewed and key informant interviews, including senior RCAF and CJOC staff.

[23] National Defence The Future Security Environment 2013-2040, published 2014.
[24] Ibid, Urban Terrain and Human Geography.
[25] Ibid, Conclusion.
[26] Ibid, Conclusion.

Key Finding 2: There is alignment between the Air Force Readiness Program with departmental and federal roles and responsibilities.

2.2.1 Performance Measure: Alignment with government acts, legislation and strategic direction

Defence is a core federal government responsibility as articulated in the *Constitution Act*,[27] which defines and outlines the responsibilities and duties of the federal government, including the armed forces and defence. Furthermore, Article 17 of the *National Defence Act*[28]establishes the DND/CAF as separate entities, operating within an integrated NDHQ, as they pursue their primary responsibility of providing defence for Canada and Canadians. Moreover, the Act assigns the Minister as the authority in charge with all matters relating to defence, including the land, naval and air services of Canada. The *Aeronautics Act*[29] also assigns specific responsibilities to the DND/CAF for the management of all military aeronautical products.

2.2.2 Performance Measure: The extent to which the RCAF conducts activities that support the responsibilities of other government departments, other levels of government or the private sector

Within the whole-of-government framework,[30] the generation and delivery of a combat-capable multi-purpose Air Force falls within the "Safe and Secure World through International Engagement" strategic outcome area, which reflects the government's priority to promote peace and security, freedom, democracy, human rights and the rule of law throughout the world. The Air Force Readiness Program has the relevant and credible capacity to play a major role in supporting this priority. Some operations have been in direct support of other federal and provincial government departments and agencies, as provided for in the Federal Emergency Response Plan. The RCAF also supports other federal government departments by enabling humanitarian and disaster relief operations around the world.

2.3 Relevance—Alignment with Government Priorities

This section examines the extent that the generation and delivery of Air Force readiness is consistent with federal government priorities and DND strategic objectives. The following performance measures were used to make this determination:

- alignment with or inclusion of Air Force readiness in stated government priorities; and
- alignment with or inclusion of Air Force readiness in DND/CAF priorities or strategic outcomes.

[27] 1867 *Constitution Act*, section 91.
[28] 1985 *National Defence Act.*
[29] 1985 *Aeronautics Act*, section 3.1 and 4.2.
[30] The federal whole-of-government framework maps the financial and non-financial contributions of federal organizations to a set of high-level outcome areas defined for the government as a whole. It is available at http://www.tbs-sct.gc.ca/ppg-cpr/frame-cadre-eng.aspx, consulted June 3, 2016.

Key Finding 3: The Air Force Readiness Program is consistent with federal government priorities and the DND/CAF roles of defending Canada, defending North America and contributing to international peace and security.

2.3.1 Performance Measure: Alignment with or inclusion of Air Force readiness in stated government priorities

The 2013 Speech from the Throne pledged the government to renew the extant defence policy.[31] It stipulated, "now and in the future, Canada's Armed Forces will defend Canada and protect our borders; maintain sovereignty over our northern lands and waters; fight alongside our allies to defend our interests; and respond to emergencies within Canada and around the world."[32] In the 2015 Speech from the Throne, the government committed to strengthening its relationship with allies, and to continue to work with its allies in the fight against terrorism and renew our commitment to United Nations peacekeeping operations. The government also committed to completing an open and transparent process to review defence capabilities with the goal to invest in building a leaner more agile, better-equipped military.[33]

The RCAF remains an integral element of the broader commitments to defence and security. The Air Force Readiness Program support to NORAD operations contributes to this vital Canada-United States of America (USA) alliance and supports the government priority of defending Canada against external threats. Air Force capabilities also remain core elements in being able to globally project force (land, sea or air power) in support of United Nations peacekeeping or in the fight against terrorism.

2.3.2 Performance Measure: Alignment with or inclusion of Air Force readiness in DND/CAF priorities or strategic outcomes

The provision of combat-ready air power by the RCAF is directly aligned with the DND/CAF priorities of "Ensuring Operational Excellence Both at Home and Abroad" and "Maintaining Required CAF Posture and Defence Readiness"[34] and is in accordance with the CDS direction for the CAF FP&R.[35] The CAF FP&R defines the scope of the operational forces required to meet the policy and missions established by the GC. The Air Force Readiness Program activities, which generate deployable, combat-ready air power, provide direct support to CAF combat-ready forces in support of the six defence policy missions.

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[31] The defence policy during the observation period was the *Canada First* Defence Strategy (CFDS). The missions listed in the CFDS are: (1) conduct daily domestic and continental operations, including in the Arctic and through NORAD; (2) support a major event in Canada, such as the 2010 Olympics; (3) respond to a major terrorist attack; (4) support civilian authorities during a crisis in Canada such as a natural disaster; (5) lead and/or conduct a major international operation for an extended period; and (6) deploy forces in response to crises elsewhere in the world for shorter periods.
[32] Speech from the Throne 2013.
[33] Speech from the Throne 2015.
[34] Defence Priorities 2015-16.
[35] CDS Directives on CAF FP&R (2012 to 2016).

The DND Reports on Plans and Priorities (RPP) (FYs 2011/12 to 2013/14) placed specific emphasis on providing Canada with a combat-capable, multi-purpose Air Force. These reports consistently included the priority to generate and sustain relevant, responsive, combat capable aerospace forces that are able to respond to the spectrum of tasks, as may be directed by the government, within the required response time. The RCAF aligns to this priority through "bringing aerospace forces to a state of readiness for operations, by assembling, and organizing aerospace personnel, supplies, and materiel. This includes the training and equipping of aerospace forces and the provision of their means of deployment, sustainment and recovery to defend Canadian interests domestically, continentally and internationally."[36]

Following the 2013 PAA update, recent DND RPPs (FYs 2014/15 to 2016/17) describe PAA outcomes through the employment of force elements with the requisite defence capabilities to conduct maritime, land, air, special, and joint operations to respond to defence missions. The Air Force Readiness Program aims to sustain the readiness state of fighters, fixed wing transport and utility aircraft, helicopters, and other Air Force elements that operate in and support the aerospace environment and have been assigned to roles requiring them to be ready for operations.

2.4 Performance—Achievement of Expected Outcomes (Effectiveness)

The effectiveness of the Air Force Readiness Program was assessed by measuring the extent to which program outcomes were achieved. The outcomes considered in this evaluation are identified in the program logic model as immediate and intermediate program outcomes:

Immediate outcomes:

- required governance and force structure is in place to achieve required readiness levels;
- aircraft and materiel are available in required quantity, type and condition to achieve required readiness levels;
- infrastructure and information systems are available in the required quantity and condition to achieve required readiness levels; and
- units and personnel are trained in required quantity, composition and skill sets to achieve required readiness levels.

Intermediate outcome:

- the RCAF provides and sustains suitable Air Force readiness.

2.4.1 Immediate Outcome – Required governance and force structure are in place to achieve required readiness levels

The following performance measure was used to assess this immediate outcome:

- extent to which appropriate Air Force governance and command and control structures are in place to effectively incorporate readiness planning, prioritizing and decision-making.

[36] DND RPP 2013-14, Program 2.3 Aerospace Readiness.

The following findings are based on evidence from document reviews and key informant interviews with staff from the RCAF, 1 CAD HQ, SJS, ADM(Mat) / Director General Aerospace Equipment Program Management (DGAEPM), and CJOC.

2.4.1.1 Performance Measure: Extent to which appropriate RCAF governance is in place to effectively incorporate readiness planning, prioritizing and decision making

Key Finding 4: RCAF governance of readiness is effective, but there are opportunities for improvement.

The overarching strategic direction provided by the extant defence policy provides the context for RCAF strategic planning. RCAF strategic guidance and plans are aligned with GC, DND/CAF policies and strategies, including the CDS Guidance to the CAF[37] and the annual CAF FP&R Directive.

CAF readiness requirements, including those for the RCAF, are articulated by the CDS in instructions contained in the annual CAF FP&R Directive.[38] Included are the directions for each force generating organization to deliver against each task, as well as constraints, restraints, or restrictions. The CAF FP&R tasks represent the baseline that informs reporting to the GC and supports the conduct of strategic assessments in support of emerging operational requirements. The detail associated with these requirements is classified, as it defines the capacity of the CAF to respond to FP&R requirements. The CAF FP&R also provides a framework for Level 1 FG feedback on the readiness of applicable force elements to perform the required missions. Force generators produce semi-annual reports to identify issues, risks, or trends with the preparation of their assigned force elements. This reporting is enabled with the Strategic Management Readiness Tool[39] (SMaRT) for the reporting and collation of this data.

Key RCAF strategic documents include: Air Force Vectors,[40] Future Concepts Directive,[41] RCAF Campaign Plan,[42] annual RCAF Business Plans, and RCAF FP&R.[43] From the Comd RCAF's perspective, the Air Force Vectors expresses, the defence and security challenges facing Canada. It also provides guidance to the RCAF so that they can generate the air power and expertise required by the CAF to meet those challenges. The Future Concepts Directive articulates future opportunities through experimentation and the development of proven concepts. The annual RCAF Business Plans document priorities, expected deliverables, risks and pressures of assigned resources.

The RCAF Campaign Plan was developed to operationalize the strategy outlined in the Air Force Vectors document. It establishes six lines of operations against where tasks can occur and how

[37] CDS Guidance to the CAF 2015.
[38] The CDS Directive for CAF FP&R was first issued in December 2011.
[39] The SMaRT was developed by the SJS and introduced in 2015.
[40] Air Force Vectors, A-GA-007-000/AF-008, 1st Edition, 2014.
[41] Future Concepts Directive, version 2.0, dated January 27, 2016.
[42] RCAF Campaign Plan, version 2.0, dated November 16, 2015.
[43] RCAF Force Posture and Readiness Directive 2015, dated March 26, 2015.

the performance of those tasks can be measured. Readiness is one of the lines and consists of the following two sub-lines of operation:

- high readiness – dealing with forces at high readiness and those being developed from normal readiness to high readiness; and
- normal readiness – dealing with the development of forces to reach or sustain normal readiness levels by capability components based on the air power core capabilities.

The Comd RCAF issues the RCAF FP&R annually to further amplify the direction needed for Air Force elements to satisfy the CAF FP&R requirements. Since the CAF FP&R defines each mission type in isolation, the RCAF must address each mission and the effects concurrent demands can have on force elements that are constrained by unit size or number of aircraft and major equipment. The RCAF analysis of CAF FP&R requirements balances out the likelihood and relative importance of concurrent mission demands, resulting in rationalized numbers of Air Force elements within the RCAF FP&R.

On a quarterly basis, 1 CAD HQ gathers performance data from RCAF force elements to support its PMF and the air staff's preparation of the semi-annual SMaRT reports. In general, RCAF performance reporting has noted that individual force element readiness requirements have been met, but there are challenges to meet multiple concurrent missions. This situation is acknowledged by SJS and is an issue common to all force generators. The availability of aircraft fleets to meet concurrent requirements is discussed in Section 2.4.2.1.

While the CAF FP&R does not include all tasks regularly performed by the RCAF,[44] the RCAF is still expected to be fully prepared to execute any of the defined CAF FP&R tasks. From the perspective of performance measurement and asset employment, continuous tracking of how major air assets are employed with a cross-reference to CAF FP&R expectations would enable the RCAF to identify resource capacity pressures and refine priorities.

While the RCAF FP&R Directive provides a baseline for managing RCAF readiness, it has a level of ambiguity that does not permit critical assessment and it does not include sufficient detail to consider all aspects of mission readiness. Expected RCAF FP&R tasks can generally be satisfied within known resource constraints and acceptable risk mitigation, but the impact of risk mitigation is not explicitly stated, and there is no mention of required force element capabilities and expected threat environments. The evaluation has also noted some discrepancies or inconsistencies between requirements. In some cases this includes missing references for the necessary preparedness period. Without a clearly defined requirement, reporting on how well the requirement is met is subject to interpretation. Finally, the RCAF FP&R Directive relies upon amplifying direction in contingency plans or force employment (FE) concept documents,[45] where they exist, to provide detail on threat levels and anticipated tempo of operational effort. Based on

[44] FP&R directives do not include FG, air display, or airlift activities not associated with operational missions.
[45] FE concept documents formally describe the concept of operation of a fleet, and how it is structured, employed and sustained. Some FE concept direction is prepared when the major capital project that acquires a capability is approved. The RCAF FP&R has tasked 1 CAD to further develop FE concept documents to clearly describe established or evolving FE models, the identification of resources tied to readiness, and the effects they produce.

the evaluation's review, it is not clear that all specific capabilities and supporting logistics that are needed to sustain a particular mission are being assessed.

According to RCAF staff, the strategic monitoring of capabilities only provides an initial status of force element readiness. Except for capabilities which are maintained at immediate readiness levels, true force element readiness assessments are only conducted when strategic assessments are developed during the operational planning process. Through completion of that process, key aspects of the potential mission are determined. These aspects include the potential threat environment, expected tempo of operations, the specific Air Force elements that can be offered for employment to shape the intended effect, and the potential impact to other RCAF responsibilities. Although readiness is primarily focussed on being prepared for FE, when choosing to employ force elements, the need to sustain capability while completing RCAF FG at the same time, must be considered. In some cases, force elements can only be force employed for a limited duration without adversely affecting their capability. Including the FG requirements in the RCAF FP&R would provide increased strategic-level awareness of potential FE impacts on FG.

To facilitate readiness training and long term planning, it would also be beneficial for the RCAF to more clearly document assumptions, risks, and required capabilities for each of its force elements, within its FP&R and/or other FE documents. RCAF force elements sometimes have only limited advance preparation for new operational requirements, sometimes creating initial problems on deployment.[46] Continued development of readiness requirements would also enable clear tracking of capability sufficiency or deficiencies which could lead to a more compelling cases for force structure changes or capital investment. Equipment changes should result from deliberate investment and change management rather than being completed as an urgent operational change.

ADM(RS) Recommendation

1. The RCAF continue to develop the RCAF FP&R Directive to ensure all missions are well developed. The Directive should explicitly include assumptions, risks, and supporting capabilities, or reference other documents which may be needed to adequately define the parameters of the mission to be met.

OPI: Comd RCAF

Several key readiness-related committees and processes ensure that Air Force readiness requirements are met in the near term and sustained in the future. These include the following:

- YFR Management Process;
- RCAF MRP;
- Aerospace Management Committee (AMC); and
- TARM Process.

[46] Op IMPACT witnessed the initial use of the CP140 for beyond line of sight communications and sustained deployment of the CC150 air-to-air refuelling aircraft. New CF188 weapons capabilities were also introduced at the start of previous operations.

The responsibilities that are managed in these committees and processes are well defined, enabling each to work in conjunction with the others. The responsibilities for ensuring integrated and coordinated decisions across these activities are met through Deputy Comd RCAF oversight of all strategic and resource issues and through Comd 1 CAD oversight of FG and all operational issues. The Comd RCAF ensures effective oversight over the RCAF governance of readiness with regular engagement with Deputy Comd RCAF and Comd 1 CAD. The following further explains and assesses these key RCAF readiness mechanisms.

Yearly Flying Rate Management Process

The capacity of the RCAF to perform missions on behalf of the CAF is defined by the established RCAF force structure, which is composed of force elements, personnel, and major equipment, including the number of aircraft and aircrews. Once an air capability has been established, planning occurs to determine how much flying is needed to sustain the capability (FG) and how much flying is needed/anticipated to perform the capability (FE). This force structure sets the basic components used to determine each fleet's YFR allocation. YFR remains the most critical RCAF metric for understanding operational capacity of the RCAF aircraft fleets because it is the key measure of RCAF performance and the primary cost driver for all flying activities.

To maintain sufficient qualified aircrew to perform the FP&R tasks, RCAF aircraft are employed in FG activities and flown to satisfy training, re-certification, and experience development requirements. The amount of FG flying consumes the majority of YFR. Once the RCAF has planned sufficient YFR to generate its capabilities, additional YFR is included for FE tasks. The tracking of missions between FG and FE is often nuanced because complementary effects can sometimes be accomplished during missions planned for either purpose. The development of aircrew to hold more senior flying responsibilities often requires experience gained in FE tasks. Therefore, final planning of FG YFR needs to be conducted with an expectation of how much FE YFR can be conducted. To reinforce the requirement to deliver relevant defence services, the RCAF PMF should include tracking the overall and fleet-by-fleet ratio of FE YFR to FG YFR.

Through the annual business planning process, the RCAF forecasts a planned level of YFR along with all of its other resource needs.[47] The funding allocations, which are then provided to commanders, determine the level of activities and risks that can be undertaken for the applicable FY. The planned level of YFR is a critical input to ensure that material sustainment is sufficient enough to enable the planned level of operations. Further, the planned level of YFR is also a critical input for planning the types of activities that can be supported throughout the year from the assigned resources. YFR is then carefully reported, tracked and adjusted as needed by 1 CAD HQ in-year to maximize operational output and resource utilization.

Although YFR is critical to the overall management of RCAF flying capabilities, FG and FE YFR planning is not documented in a fashion that supports detailed external understanding or critical review. This understanding is important because FG typically represents about three-

[47] These include financial and personnel resources, including funding to support many of the other direct costs associated with flying operations, such as the cost of aviation petroleum, oil and lubricants worldwide, the cost of temporary duty, and potential effects of currency exchange rates.

quarters of the total RCAF YFR and therefore determines the majority of RCAF expenditures and DGAEPM NP expenditures. During interviews, stakeholders described the process for defining FG YFR as a bottom-up force structure based calculation, which is subsequently influenced by usage history and the Commanders' priorities. Each fleet determines its requirements based on the number and experience levels of their aircrew, the complexity of their operations, and opportunities to meet FG requirements in ways other than flying. It is also important to note that many aircraft fleets have multiple aircrew occupations, each of which has differing standards to attain. Since the RCAF has operated many of its fleets for many years, usage history provides an accepted baseline to be maintained or to be changed if required. Following this process, RCAF leadership approves a YFR plan that combines RCAF FG needs with fleet FE levels that balance operational priority against resource limitations. However, no approval document or documents with relevant assumptions, variables and values was available to evaluate and validate the process explained by the stakeholders. Better overall understanding of the rationale for assigned annual FG YFR would also support funding requests and mitigate the frustration that occurs due to unsatisfied FE YFR requests.[48] An explanation of the FG calculation for each aircraft fleet could be included as an annex to the annual TARM planning information.

ADM(RS) Recommendation

2. The RCAF document the planning process that generates FG YFR and annually update the variables leading to that allocation for each RCAF fleet.

OPI: Comd RCAF

RCAF Managed Readiness Plan

The RCAF MRP[49] was first introduced in 2012 by Comd 1 CAD to satisfy the requirements of the RCAF Campaign Plan and FP&R. It is essentially a centrally controlled readiness plan to synchronize unit and force element training and readiness activities within a well-defined cycle across multiple RCAF wings.

The MRP provides the RCAF with two standing high readiness ATF HQs to concurrently support both a deliberate Line of Operation (LoO) 1 for a major operation that may be sustained indefinitely, and a contingency LoO 2 for a surge operation of expected short duration in response to either domestic or international crises. The MRP was initially established as a geographically based plan aligned to the Canadian Army MRP and assigned a 16-month duty cycle for the LoO 1 ATF. With the stand-up of Op IMPACT in 2014, that ATF cycle was appropriately re-aligned to support the six month Op IMPACT deployment schedule.

[48] Defence Research and Development Canada (DRDC) developed the "Air Force Structure Analysis" model, which may provide a means to generate detailed FG YFR requirements.
[49] Royal Canadian Air Force Managed Readiness Plan 2012-2017, Rev 1, dated May 8, 2013.

In accordance with the MRP, when a LoO 1 is activated, 2 Wing Air Expeditionary Support Squadron provides the rapidly deployable Airfield Activation Surge Team[50] (AFAST) as an initial interim ATF. This organization is deployed with MRP force elements to form an AEW.[51] Through the MRP, the AEW construct provides scalable, task-tailored, readily deployable, expeditionary air power. Upon completion of AEW activation, the 2 Wing activation team will withdraw and a Wing ATF, designated through the MRP, will complete the deployment rotation. According to stakeholders, the introduction of the 2 Wing AFAST has reduced the setup time of RCAF deployed bases from 93 days to 14 days. The sustainment of the LoO is also guided by the MRP.

Also, 2 Wing is responsible for the generation of the LoO 2 contingency ATF. As such, 2 Wing is required to maintain a constant state of high readiness and must be capable of deploying an ATF within seven days in support of LoO 2. Therefore, 2 Wing reconnaissance elements are on a continuous 12-hour notice to move status. By leveraging expertise from 2 Wing, the Air Force Expeditionary Readiness Standards and Evaluation Team (AFERSET), and the CFAWC, the generation of ATF HQs have been notable success stories for RCAF readiness, resulting in the establishment of formal HQ training and Air Force task standards, the conduct of collective verification exercises and a more formalized OPRED declaration process. All of these improvements have contributed to the success of recent exercises and operations.[52]

The MRP also provides direction to operational force elements (tactical aviation, fighter, and intelligence, surveillance and reconnaissance squadrons) for cycling between normal and high-readiness periods. Other force elements, such as SAR and air mobility squadrons, are always deemed to be at high readiness and are therefore not subject to a readiness rotation. Readiness preparations for Air Force elements are conducted through on-going readiness training activities and participation in major joint or collective training events. Well established readiness training processes remain in effect and are referenced by the RCAF MRP, which include training for tactical aviation assets which directly support the Canadian Army; and maritime aviation assets which directly support the Royal Canadian Navy. The recent organizational change to four tactical fighter squadrons should assist in distributing missions and readiness requirements across the fighter force. However, the MRP provides no substantive detail on the way a unit will complete readiness activities. If these details are contained in other references, this should be clearly identified.

RCAF capabilities that are provided from a single designated squadron must also maintain a continuous level of high readiness due to the pace of operations conducted from main operating bases or deployed locations. A future revision of the MRP should address the management of sub-unit air detachment readiness within these organizations, taking into account what the

[50] The AFAST is a scalable airfield activation team composed of up to 55 members and will usually be the "first in, first out" RCAF component of the ATF in theater. The team needs all the RCAF specific "fly away kits" to enable them to conduct their airfield activities, including the building of bed down camps, work spaces, communications and information systems, and expeditionary air traffic management.
[51] Each of the AEW elements may originate from various RCAF wings as designated through the MRP and may comprise of a command element, an operational support element, a mission support element and one or more combat capable air detachments.
[52] The RCAF Air Task Force, the New Kid on the Block. *Royal Canadian Air Force Journal*, Volume 4, Number 4, Fall 2015.

defined force structure can sustain. Certain RCAF capabilities can only be deployed for short duration before significant effort needs to be applied to sustain required FG. This information could also be described in FE concept documents to standardize and further reinforce the clear definition of what resources are available and how they are to be employed.

ADM(RS) Recommendation

3. The RCAF regularly reviews and updates the MRP. The MRP should include enhanced direction based on recent operations and better defined Air Detachment unit and sub-unit readiness requirements.

OPI: Comd RCAF

Aerospace Management Committee

The AMC is co-chaired by the RCAF Director General Air Readiness and ADM(Mat) DGAEPM. The AMC meets annually to ensure the fiscal resources provided by the NP budget[53] are sufficient for necessary maintenance activities, including procurement of spare parts, to maintain aircraft availability and satisfy the forecasted YFR for each aircraft fleet.[54] Aviation maintenance involves both military personnel and substantial support from industry. The level of complexity of modern military aircraft systems is significant and the resulting support is costly. The support provided from industry to complete major repair and overhaul activities or to provide replacement spares requires time to establish contracts for those services. To address the timeframe requirements involved in establishing major support service contracts, the AMC process assesses the requirements over the next three fiscal years which enables future planning for required FG and FE. The result of each annual AMC cycle is the determination of the sustainable YFR that can be supported with the assigned funding which leads to the RCAF's determination of the executable YFR, including any sustainment risks that may be accepted to meet the planned YFR.

Whenever there is insufficient approved YFR for force employers, equipment sustainment is often thought to be the factor limiting flexibility in operations. However, the ability to provide more equipment or materiel capacity may be the result of one or many factors which include: NP funding availability, staff capacity, O&M budget availability, or fleet and aircrew limitations.

[53] ADM(Mat) manages the NP account for the DND/CAF
[54] The 2016 OAG report on operating and maintenance support for military equipment recognized that the AMC process is effective in developing annual plans for equipment maintenance. But it also noted that a more strategic approach is needed to align the annual resource planning process, capital acquisitions, investment planning, and budgeting to have a more comprehensive and integrated view that will better align resources with operations.

Total Air Resource Management Process

After the AMC process has enabled the RCAF to confirm the executable YFR, the TARM process is followed to allocate YFR to Air Force capabilities for FE tasks. Co-chaired by the SJS and RCAF, the TARM process ensures a level of rigour to the prioritization of assigning air resources and enables the force employers to identify and prioritize their requests for air effects, leading to an approved allocation of air support. In FY 2015/16 the TARM process allocated a total YFR of 95,825 flying hours between RCAF FG (58,160 hours), Operational Funds Account[55] for deployed operations (14,261 hours) and FE (23,604 hours).[56]

Requests for air effects often exceed available resources. Due to limited RCAF resources, planned allocations can also be superseded by in-year higher priority non-forecasted activities. Stakeholder interviews indicated that this issue has been particularly common with the airlift fleets but is also quite prevalent for intelligence, surveillance and reconnaissance capabilities. As a result, some CAF stakeholders no longer identify all of their air resource requirements for the TARM but contract alternative air assets instead. This results in an incomplete awareness by the RCAF of all force employer air requirements.

When air requirements are directed to alternative sources instead of RCAF resources, the visibility of those needs drop from the planning processes even when RCAF resources may be available to address them. It is recommended that the SJS, with the RCAF, encourage all force employers to identify all requirements for air effects through the TARM so that support deficiencies can be identified and documented. Steps should also be taken with ADM(Mat) staff to enable the strategic tracking of all expenditures for contracting alternative air services to assess if these resource choices are cost-effective options for the department. Each annual TARM planning cycle should be informed with an understanding of both the previous year's plan and actual performance.

ADM(RS) Recommendation

4. The SJS work with the RCAF and ADM(Mat) to evolve the TARM process to both plan and report performance. This process should demonstrate how all requests for air effects are met by RCAF capabilities or by other means. It would also permit the DND/CAF to identify RCAF capability or capacity gaps and evaluate the cost-effectiveness of contracted air resources.

OPI: Director of Staff SJS
OCI: Comd RCAF, ADM(Mat)

[55] The operational funds account is a corporate financial account used for costs that are directly in support of a named operation. Costs can include equipment and material for the operation, backfill for personnel deployed to the operation, and restoration costs for equipment lost or damaged during an operation. This is only a representative list of examples and is not exclusive to the types of expenses that may be funded from this account.
[56] TARM Apportionment FY 2015/16, dated May 20, 2015

2.4.2 Immediate Outcome – Aircraft and materiel are available in required quantity, type and condition to achieve required readiness levels

The following performance measures were used to assess this immediate outcome:

- extent to which RCAF aircraft and other equipment is available (in required quantity, type and condition) to meet readiness requirements; and
- extent to which materiel (in required quantity and condition) is available to meet readiness requirements (i.e. sparing).

Findings are based on evidence from document reviews and key informant interviews with staff from the RCAF, 1 CAD HQ, ADM(Mat), and CJOC.

2.4.2.1 Performance Measure: Extent to which RCAF aircraft and other equipment is available (in required quantity, type and condition) to meet readiness requirements

Key Finding 5: [redacted]

The RCAF closely monitors aircraft availability and serviceability. Table 2 provides the size of the operational[57] fleets, current fleet ELE dates, and recent 1 CAD serviceability data. As the table shows, in general, the aircraft available for FG or FE operations represents about half of the size of each aircraft fleet. While this data is useful, it does not indicate if sufficient aircraft are ready to conduct the missions assigned to the RCAF. In order to assess that aspect, the evaluation reviewed the RCAF FP&R.

[57] For the purpose of this report, operational fleets are those which could take part in operational missions. They exclude the CC144 (Challenger), CT114 (Tutor), the multi-engine utility flight aircraft, and the training fleets.

Fleet	Name	Introduction	Current ELE	Fleet Size	Average Number of Serviceable Aircraft[58]	
					Q4 2015/16	Q1 2016/17
CF-188	Hornet	1982-88	2020[59]	76	||||	||||
CP-140	Aurora	1980-81	2030	18	|||	|||
CC-130H	Hercules	1974-96	2021	12	|||	|||
CC-130J	Hercules	2010-12	2047[60]	17	|||	|||
CH-124	Sea King	1963	2018	27	|||	|||
CH-149	Cormorant	2000-03	2025	14	|||	|||
CH-146	Griffon	1994-97	2021	85	||||	||||
CC-150	Airbus	1993-94	2028[61]	5	|||	|||
CC-138	Twin Otter	1971	2025	4	|||	|||
CC-115	Buffalo	1967	2020	6	|||	|||
CC-177[62]	Globemaster III	2007-15	2045[63]	5	|||	|||
CH-147	Chinook	2013-14	2033[64]	15	|||	|||

Table 2. RCAF Operational Fleets. This table lists the name of aircraft, the date of its introduction, the fleet's ELE, the fleet size and serviceability data of the RCAF operational fleets as of Fall 2016.

As outlined in Section 2.4.1.1, the CAF FP&R specifies general RCAF capabilities required for each of the core missions assigned by the GC. The Comd RCAF issues the RCAF FP&R to amplify the direction from the CAF FP&R and directs specific and more detailed readiness levels for RCAF force elements. The RCAF FP&R aircraft and equipment requirements are adjusted to balance the likelihood of concurrent missions and to remain within allocated resources. The resulting rationalized RCAF FP&R requirements thus provide a baseline to assess total RCAF equipment and readiness requirements. Given fiscal realities, the evaluation assesses this is a practical and efficient means of quantifying required assets.

[58] The serviceability data is from the 1 CAD PMF report, and is the average for the quarter indicated.
[59] As of May 2017, a capital project is planned, but not yet approved by Treasury Board, to maintain the CF-188 compliance with regulatory and interoperability standards.
[60] There has not yet been a formal ELE approved by the VCDS; 2047 is based on the original capital procurement project.
[61] The current date of 2028 is based on in-service support contracts and is not the ELE of the aircraft or its systems. The CC-150 weapons system manager has initiated a mission mix study to determine the structural impact of the roles executed by the CC-150. Results are expected to be available in June 2018. This will result in the determination of a VCDS approved ELE.
[62] Four CC-177 were delivered in 2007-2008. A fifth CC177 was acquired in 2015.
[63] The ELE is in the process of being staffed for VCDS approval.
[64] The proposed ELE for the CH-147 is from the AMC 2016 Executive Report, dated June 15, 2016. A VCDS ELE date has not yet been approved.

The RCAF reports the readiness of force elements against the CAF FP&R readiness requirements to the SJS. In comparing the number of available aircraft or major equipment (such as tactical control radars) against the identified FP&R requirements, the evaluation noted that the RCAF does not have sufficient aircraft or equipment in many cases. The limited size of many RCAF force elements constrain how many different missions can be supported at the same time. Although FP&R details are classified, the recent government announcements confirming the inability of the fighter fleet to meet both NORAD and North Atlantic Treaty Organization requirements concurrently[65] are reflective of the types of challenges the RCAF has to manage. Air staff personnel responsible for FP&R oversight indicate that these deficiencies are understood and have been accepted by the SJS staff. However, such deficiencies are not reflected in any separate correspondence which was available to the evaluation. The acceptance of these limitations should be appropriately documented.

The above notwithstanding, evidence shows that sufficient RCAF aircraft are being kept serviceable and mission-ready to allow the RCAF to meet its annual FG and FE requirements. Although the RCAF does not create an annual report of completed tasks versus planned tasks, AMC documents indicate that each fleet typically completes about 90 percent of its planned YFR. Furthermore, even when deployed on an operation, the RCAF normally retains some partial capability to conduct other missions. This limited ability to conduct concurrent missions is consistently indicated in the semi-annual readiness SMaRT reports to the SJS.[66] In that limited sense, the RCAF demonstrates appropriate readiness to conduct concurrent operations.

While the RCAF FP&R is assessed as effective for defining the general quantities and types of aircraft or equipment required to support GC directed missions, several stakeholders commented on its lack of detail, particularly regarding the potential threat environments and the capabilities required to counter potential threats. In other words, even if the RCAF has sufficient serviceable aircraft to conduct a type of mission, they may not have sufficient mission-ready aircraft. The range of potential threat environments and required aircraft self-protection capabilities are not specified in the FP&R or documented in fleet-specific RCAF FE concept documents, many of which have not yet been completed.

Within the past decade, the RCAF has successfully completed modernization projects which prolonged the ELE of the CP-140 aircraft and CF-188 aircraft. In addition, new RCAF capabilities have been recently procured (CC-130J, CC-177, and CH-147F). Projects are also underway to replace the CH-124, the CC-115 and CC-130H SAR aircraft. However, several more major aircraft replacement or upgrade projects will be required in the coming years. Table 2 provides the introduction dates and current ELE dates of the RCAF aircraft fleets. [67]

[65] Replacing Canada's CF-18 Fleet. http://www.forces.gc.ca/en/business-equipment/fighter-jets.page, consulted November 25, 2016.
[66] The CDS FP&R directs all force generators to report readiness data on a recurring cycle. Force generators produce semi-annual reports to identify issues, risks, or trends with the preparation of their assigned force elements.
[67] http://www.forces.gc.ca/en/business-equipment/maritime-helicoper.page, consulted January 16, 2017.

[redacted][68][redacted]

[redacted][69][redacted]

ADM(RS) Recommendation

5. The RCAF reassess FP&R aircraft and equipment requirements and documents current materiel deficiencies. The RCAF must strive to ensure that the quantity of aircraft and equipment in major capital equipment acquisition activities reflects those requirements**.**

OPI: Comd RCAF

2.4.2.2 Performance Measure: Extent to which materiel (in required quantity and condition) is available to meet readiness requirements (i.e., sparing)

Whereas the focus of the previous performance measure was on the availability of required RCAF equipment capabilities, the focus of this performance measure is on the sustainment of

[68] To mitigate this issue, the GC is considering procurement of an interim fleet of 18 new Super-Hornet aircraft to supplement the remaining CF-188 fleet. http://www.forces.gc.ca/en/business-equipment/fighter-jets.page, consulted November 23, 2016.
[69] While much more expensive than unguided weapons, the use of missiles and precision guided munitions in operations are preferred due to their increased precision and reduced risk of collateral damage.

those capabilities. The following finding is based on evidence from document reviews and key informant interviews with RCAF staff, including 1 CAD HQ, and ADM(Mat) staff.

Key Finding 6: Due to the ongoing introduction of new fleets (CH147, CC130J, CH148), RCAF resource plans have identified a requirement for increased YFR and NP funding.

As outlined in Section 2.4.1.1, the annual AMC seeks to ensure adequate NP funding to support RCAF aircraft fleet requirements for the executable YFR of the upcoming year. It also assesses sustainability of RCAF aircraft and equipment for the two following years to ensure adequate NP funding for spares and contracted support.[70] Table 3 outlines NP expenditures versus demand since FY 2010/11.

	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
NP Demand ($)	$943,735	$955,992	$1,086,514	$1,153,517	$1,003,448	$1,134,381
NP Expenditures ($)	$803,194	$916,720	$951,800	$976,787	$921,446	$1,085,478
NP Expenditures as a % of NP Demand	85.1%	95.9%	87.6%	84.7%	91.8%	95.7%

Table 3. NP Demand and Expenditures. This table provides the NP demand, NP expenditures, and NP expenditures as a percentage of NP demands, from FY 2010/11 to FY 2015/16.[71]

As Table 3 indicates, NP funding expenditures have consistently been less than NP demand. As noted in the CFDS, such a funding gap in NP can impede the CAF's ability to maintain its equipment and readiness levels. In order to meet annual YFR requirements, significant cuts were made to spares procurement and contracted maintenance services between FY 2012/13 and FY 2013/14. Those cuts compromised supportability for the follow-on years, but allowed the executable YFR for the upcoming year to be sustained. Stakeholder interviews indicated that the impacts of those underfunded years continue to be felt, as low spare levels and reduced contracted maintenance resulted in lower equipment serviceability rates. However, NP funding was significantly increased in FY 2015/16 and reviews of current AMC minutes and interviews confirm that, in general, planned NP funding allocations are now adequate until at least FY 2018/19. At that point additional increases will be required to ensure supportability of all equipment systems.

While the legacy fleets could absorb some cuts in NP funding and still sustain the annual YFR by delaying spares procurements and contracted maintenance, this flexibility has been eroded in recent years. This is because the aircraft fleets using the In-Service Support Contract Framework

[70] NP requirements are now based on the RCAF executable YFR versus the previously used target YFR which did not account for the RCAF capacity to execute (source: AMC 2016 Executive Report). Target YFR is the total YFR required to fully meet the FP&R directive for FG and FE capabilities. The executable YFR is the maximum YFR that 1 CAD can fly based on constraints such as aircrew availability, aviation petroleum, oil and lubricants and the environment (source: 2016 AMC Intro Brief and Program Assessment, dated June 15, 2016).
[71] The financial data is from the AMC 2016 Executive Report, dated June 15, 2016.

(ISSCF)[72] incur contractual obligations with fixed costs independent of flying rate, in addition to variable costs generated by flying hours. Unlike the legacy fleets maintained by DND, the NP expenditures for the ISSCF fleets cannot be reduced without corresponding reductions in YFR. Flexibility with NP funding will continue to erode in the near term as the introduction and operationalization of new ISSCF fleets require increased executable YFR. This YFR will continue to increase relative to the YFR of the older legacy fleets that are maintained by DND. This means that any unplanned, in-year and future NP reductions will have a bigger impact on the legacy fleets.[73]

Key Finding 7: ELE dates constrain materiel procurement. Delayed RCAF ELE changes have caused supportability challenges.

As described in the previous section, several RCAF aircraft fleets are approaching their ELE. With approved mid-life capital investments, the RCAF extends the life of aircraft by replacing key structural components and updating obsolete equipment systems. Extending ELEs is an efficient practice, as long as maintenance and upgrades are more cost-effective than replacing the entire aircraft fleet and its supporting infrastructure, and as long as the aircraft can be modernized to remain an effective platform. Further extensions to ELEs have been necessary to accommodate capital procurement delays. Timely aircraft ELE revisions are important because the procurement of aircraft spares is constrained and is not permitted past the designated ELE date. All changes to an ELE date are controlled by Comd RCAF through the Director General Air Force Development based on DGAEPM assessments, and must be approved by the Vice Chief of the Defence Staff (VCDS). If a decision to extend an ELE is delayed for too long, this prevents timely investments necessary to mitigate obsolescence through modifications or spares procurement, potentially increasing support costs and decreasing aircraft availability. This situation occurred with the CC115, where ELE extension delays[74] resulted in poor availability of spares, exacerbated by a world-wide shortage of engine components, which are no longer being manufactured. The evaluation was advised that the RCAF has recently instituted a force development tracking tool that identifies milestones for commencing the required processes for ELE extension or a decision to replace the capability. Although these planning activities are valuable, additional work is required to address deficiencies with the current ELE change approval process.

[72] The ISSCF fleets include the CC130J, CC177, CH147, and CH148.
[73] The risk that long-term, fixed-price ISSCF contracts for specific fleets might reduce the amount of funding available for the other fleets was previously raised by the OAG in the 2011 report on Maintaining and Repairing Military Equipment. The same report also highlighted several other risks regarding ISSCF contracts.
[74] The delays in extending the CC-115 ELE were the result of delays in progressing the Fixed Wing Search and Rescue Project, which is planned to replace the CC-115 and other SAR aircraft.

ADM(RS) Recommendation

6. The RCAF review the ELE change process to ensure the supportability of legacy systems is not negatively impacted. To avoid capability gaps, legacy capabilities and associated ELEs should be sustained until replacement capabilities reach full operating capability.

OPI: Comd RCAF
OCI: VCDS, CFO and ADM(Mat)

2.4.3 Immediate Outcome – Infrastructure and information systems are available in the required quantity and condition to achieve required readiness levels

To assess this immediate outcome, the following performance measure was used: the extent to which RCAF infrastructure and support elements are available to meet readiness requirements. Findings are based on evidence from document reviews and key informant interviews with RCAF Air Staff, including 1 CAD HQ.

2.4.3.1 Performance Measure: Extent to which RCAF infrastructure, information systems and support elements are available to meet readiness requirements

Key Finding 8: While much of the RCAF infrastructure and information systems are adequate, there are some deficiencies that impact RCAF readiness. ADM(IE) is now responsible for addressing infrastructure requirements and ADM(IM) and Shared Services Canada are responsible for addressing core and common information system requirements.

Key Finding 9: Insufficient infrastructure spending (capital, maintenance and repair) has generated RCAF infrastructure risk.

Appropriate infrastructure is required to ensure the RCAF can maintain readiness to adequately train its force elements and to readily support RCAF operations and exercises. Since April 2016 the responsibility for real property has been centralized, making the ADM(IE) the single realty property custodian for the DND/CAF; however, prior to 2016 the RCAF, in addition to other DND and CAF organizations, managed their own infrastructure. Over the evaluation period, the RCAF did not meet the infrastructure maintenance requirements, funding an average of 45 percent of the maintenance requirement.[75] As highlighted by the Auditor General, this situation was not unique to the RCAF.[76] Although RCAF stakeholder interviews indicated that, as a minimum, critical maintenance issues and mandatory regulatory and safety issues have been addressed, the eventual impact of the accumulated under-investment in maintenance and

[75] Further details are provided in section 2.5.1.3.
[76] Report of the Auditor General of Canada, Fall 2012.

recapitalization of RCAF infrastructure remains a concern.[77]

[redacted][78] These issues are presented only as a representative list since all RCAF wings and locations were not assessed. Further, given the accumulated infrastructure deficit, there is uncertainty regarding how the transfer of infrastructure responsibilities to ADM(IE) might impact the RCAF in the future.

[redacted][79]

[redacted]

[77] According to 1 CAD business plans for FY 2014/15 and FY 2015/16, "Decades of underinvestment and a lack of a preventative maintenance program have had a significant impact. Each year of infrastructure under-funding increases the accumulated maintenance deficit that exists and increases the risk of a catastrophic failure due to a lack of maintenance on systems that are well beyond their original intended useful life. The accumulated maintenance deficit means that escalating cost pressures year-over-year are unavoidable and the risk of failure to operations rises."

[78] Section 2.4.4.3 discusses the staff, equipment and facility issues of the 2 Wing high-readiness expeditionary capability.

[79] In accordance with the Safety Orders for Canadian Forces Air Weapons Systems, airfield facilities, inhabited buildings, assembly places, traffic routes, nearby public areas or other areas which could be exposed to the effects of an explosion/fire within a designated area must be separated from the designated area by appropriate safety distances.

In addition |||||||||||, RCAF infrastructure in northern Canada consists of 5 Wing Goose Bay, Canadian Forces Station Alert, and the NORAD FOLs in Inuvik, Yellowknife, Iqaluit, and Rankin Inlet. By their nature, these locations are remote and the infrastructure is subject to the effects of extreme temperature conditions. Apart from Yellowknife (and Inuvik in Winter), they can only be resupplied by sea or air. Stakeholder interviews indicated that most FOL airfield facilities are generally considered adequate, but underfunding has led to some infrastructure deficiencies related to the hangars, equipment storage facilities, accommodation, and communications equipment. There is currently a 1 CAD project underway to review FOL deficiencies and requirements.

While the RCAF is expected to operate within northern Canada and the arctic, several of its aircraft fleets[83] are restricted to flying only from paved airfields. Excluding 5 Wing and the FOLs, most Canadian runways in the far north, including Canadian Forces Station Alert, have gravel surfaces and are therefore unsuitable for fighter operations. In addition, in the far north, runways tend to be short and less able to support large aircraft. This limits operations to being based at the northern FOLs, or other allied airfields, or being dependent on the availability of air-to-air refueling, when it is available, to operate at extended ranges. |||||||||||||||||||||||||

[80] NWS support is managed by DGAEPM within the oversight of AMC with military and contracted support.
[81] The need to evolve and modernize NORAD is discussed in the Report of the Standing Committee on National Defence - Canada and Defence of North America: NORAD and Aerial Readiness, September 2016.
[82] The CAF Capability Investment Database provides a rough order magnitude cost of $5 billion for this project.
[83] Including the CF-188, CP-140, CC-144, and CC-150.

Information management, command, control and communication systems are normally managed as major equipment but the evaluation will address concerns with these systems in this section as capability support elements. To manage assigned operational responsibilities, Comd 1 CAD / Canadian NORAD Region[84] relies on the Combined Aerospace Operations Centre (CAOC)[85] in Winnipeg. The CAOC is, in effect, a control center that enables operational command and control of RCAF force elements as they conduct missions domestically and around the world. However, the CAOC has experienced some secure communications interoperability issues with allies and with operating locations in the north. To review these issues, 1 CAD has initiated the AOC 2020 project to examine deficiencies and propose options to evolve the CAOC capabilities to meet current and future requirements.

The implementation of the Defence Resource Management Information System (DRMIS) Plant Maintenance Module in support of aircraft maintenance activities in the CC-130J and CH-147 fleets is impacting RCAF domestic and deployed operations. The use of this DRMIS module has resulted in significant delays in launching aircraft.[86] In addition, the use of the module is estimated to currently require an additional 60 RCAF maintenance person-years[87] to work around deficiencies, which has reduced maintenance staff efficiency.[88] Another more direct impact on readiness is the lack of an adequate mobile DRMIS solution to support deployed operations. The current mobile application requires hours of additional paperwork workarounds resulting in unreliable maintenance turnaround times. As a result of these negative impacts, the plan to implement the DRMIS Plant Maintenance Module to other aircraft fleets has been suspended while steps to address the current issues have been initiated.[89]

Finally, while issues concerning Shared Services Canada are beyond the scope of this evaluation,[90] some stakeholder interviews indicated that there are ongoing delays and numerous Shared Services Canada related issues impacting RCAF operations and exercises. At the operational and tactical levels, these changes to information systems management are negatively impacting the readiness of the RCAF command and control capability. As stated by Comd 1 CAD, “delays in Shared Services Canada projects are placing constraints on access to secure systems critical to operations and are having a negative impact on the security posture across 1 CAD”.[91]

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[84] The Comd 1 CAD is double-hatted as the Commander of Canadian NORAD Region and is responsible for all RCAF operations, including NORAD operations, which are focused on the aerospace defence of North America, and also acts as the Joint Forces Air Component Commander for the CJOC.
[85] The RCAF chain of command executes command and control of deployed RCAF units through the CAOC.
[86] RCAF DRMIS Commander’s Update Brief, dated March 2016, attributed a loss of 1000 CC-130J flying hours and several sorties cancelled or delayed for the CH-147.
[87] RCAF DRMIS Commander’s Update Brief, dated March 2016.
[88] The 2016 OAG report on Operating and Maintenance Support for Military Equipment also found that some performance data as recorded in DRMIS was poor and unreliable, requiring additional information to be compiled manually. For example, in many cases, the data accuracy for the CC-130J was found to be below 50 percent, and therefore could not be used to assess contractor performance in ISSCF contracts.
[89] RCAF. DRMIS Scoping and Design Directive, dated July 21, 2016.
[90] IM/IT issues are the focus of an ADM(RS) Evaluation “Evaluation of the Information Systems Lifecycle Program” and ADM(RS) Audit “Audit of IM/IT Framework to Support Transition to Shared Services Canada.”
[91] Shared Services Canada – Issues In Support of RCAF Operations, dated September 2015.

Although the evaluation has made several observations on infrastructure and information systems deficiencies, most of these issues are in the process of being addressed by the RCAF.

2.4.4 Immediate Outcome – Units and personnel are trained in required quantity, composition and skill sets to achieve required readiness levels

The following performance measures were used to assess this outcome:

- sufficient trained personnel (in required quantity and type) to support current and future RCAF readiness requirements;
- extent to which training is sufficient to meet readiness requirements; and
- extent to which the AFEC has the necessary resources (personnel/equipment/materiel) to satisfy readiness requirements.

Findings resulting from the assessment of this immediate outcome are based on evidence from document reviews and key informant interviews with staff from the RCAF, including 1 CAD HQ, 2 CAD HQ, 2 Wing, 3 Wing and 8 Wing.

2.4.4.1 Performance Measure: Sufficient trained personnel (in required quantity and type) to support current and future RCAF readiness requirements (RCAF FP&R)

Key Finding 10: [redacted][92]

All RCAF capabilities are enabled by highly trained personnel, which include CAF Reg F personnel, Res F personnel, and DND public servants. The RCAF employs several strategic processes to oversee this critical resource. The Annual Military Occupation Reviews (AMOR) monitor all aspects of military personnel production and career development for the 26 RCAF managed occupations. These reviews contribute to the CMP processes which control the Strategic Intake Plan and the actions to maintain occupational work forces at healthy levels. The RCAF's human resources also include significant numbers of non-RCAF managed trades.[93] The health and management of these other trades can also directly impact RCAF operations.

Within the RCAF, operational training units (OTU) and the generation of force element readiness are the responsibility of Comd 1 CAD. Table 4 lists the total number of 1 CAD personnel from FY 2010/11 to FY 2015/16 and shows that the total number of personnel has declined by 906 people, a 5.6 percent decrease. This decrease is comprised of a 12.6 percent decrease in civilian employees, 9.3 percent decrease in Res F personnel and 3.6 percent decrease in Reg F personnel. Not surprisingly, interviews with RCAF personnel at various wings and HQs confirmed the lack of personnel andalso indicated that their most significant issues are ongoing personnel reductions that are straining existing resources.

[92] Medium term is defined as three to five years.
[93] These are often referred to as "purple" trades. These trades are centrally-managed occupations that are not unique to any one of the three major environments of the CAF, such as logistics, medicine, justice, and military police.

1 CAD	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16	Change	Percentage Change
Reg F	11978	11768	11767	11501	11478	11542	-436	-3.6%
Res F	1931	1925	1788	1752	1726	1751	-180	-9.3%
Civilian	2296	2214	1995	1950	1965	2006	-290	-12.6%
Total	16205	15907	15550	15203	15169	15299	-906	-5.6%

Table 4. 1 CAD Personnel Numbers. This table provides the 1 CAD Reg F, Res F, civilian and total personnel numbers from FY 2010/11 to FY 2015/16.[94]

Various issues have contributed to the reduction in 1 CAD personnel numbers. For example, previous GC public service reductions and limited human resource capacity to staff positions[95] have contributed to the reduction in the civilian workforce. For the RCAF Reg F occupations, recruitment has not kept pace with attrition.[96]

Figure 1 compares the preferred manning level (PML) of all the RCAF-managed Reg F occupations versus the trained effective strength (TES) of those occupations.[97] In general, the PML represents the required number of positions for a given occupation, whereas TES represents the actual number of employable personnel. While the trend line gap between the two had been closing, since FY 2013/14 it has been increasing and now the gap in personnel numbers is approximately 700.

[94] The personnel data is from HRMS.
[95] The ADM(RS) Evaluation of Defence Civilian Human Resources Management Staffing (June 2016) examined HR staffing issues, and will not be discussed in this evaluation.
[96] The 2016 OAG report on CAF Recruitment and Retention also discusses several recruitment, training, and retention issues.
[97] PML is the total number of jobs assigned to an occupation, including dedicated advanced training positions. TES is defined as the total strength, not including those not yet occupation-qualified and those no longer employable (non-effective strength status).

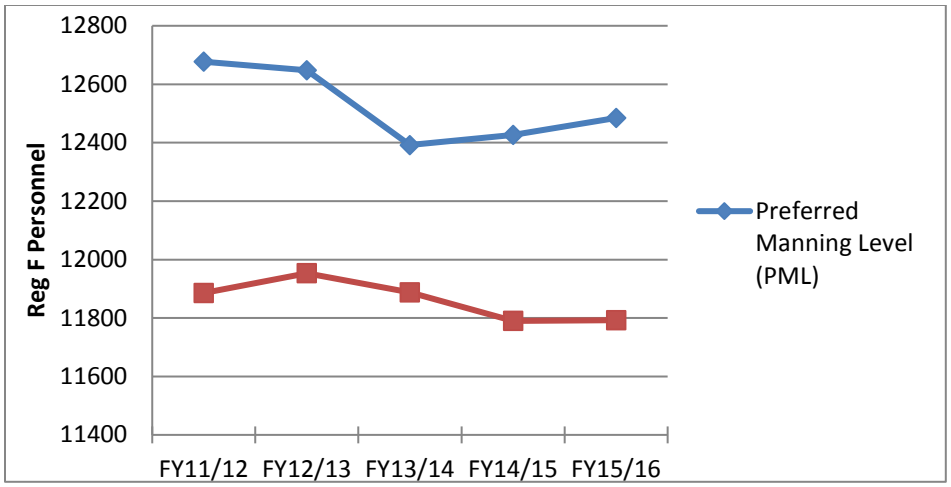

Figure 1. PML and TES of all the RCAF-Managed Reg F Occupations. This graph compares the PML or required number of positions for a given occupation and TES or actual number of employable personnel for all the RCAF-managed occupations from FY 2011/12 to FY 2015/16.

According to the AMORs, the Strategic Intake Plans to recruit greater numbers have repeatedly fallen short.[98] This has led directly to a reduced ability to intake personnel, particularly into more technical and specialized trades, which encompass the majority of RCAF occupations.

The RCAF-managed occupations with the most critical shortages are pilots, avionics technicians and aircraft structures technicians. These three are among the largest RCAF occupations. Four other occupations also have shortages that are closely monitored: Aerospace Controllers, Communications and Electronics Engineers, Aviation Technicians, and Airborne Electronic Sensor Operators.

The RCAF expects to resolve the deficiencies for the aircraft maintenance technician trades by FY 2020/21 with increased recruitment and increased occupation training production in concert with recruitment incentives and PML adjustments.[99] Increased intake, however, will not address the need for experience to be distributed across rank levels. According to the RCAF, 48.6 percent of its Reg F personnel have less than 10 years of experience.[100] The experience level of RCAF technicians is further exacerbated by the regular posting cycle and lost opportunities to develop skills due to the use of contracted maintenance. These factors have eroded RCAF technical skills and lengthened maintenance times. As a result, 1 CAD has initiated programs, such as Op PRODUCTION,[101] to mitigate the effects of decreased technician experience levels. Op PRODUCTION originally began in 2007 to address increasing periodic maintenance times. After meeting with some success, Op PRODUCTION was suspended in 2010 as a result of spending cuts.[102] However, Op PRODUCTION has recently been re-started and uses

[98] Records of Discussion, FY 2015/16 AMOR Royal Canadian Air Force Occupations, dated June 23, 2016. Recruiting challenges may have been exacerbated by cuts to Canadian Forces Recruiting Group, both in terms of personnel and recruitment centres.
[99] Brief from the AMOR FY 2015/16 – Air Maintenance Technician Occupations.
[100] RCAF Level 1 Business Plan FY 2015/16, dated December 2014.
[101] A4 Maintenance Operation Production Program Brief, dated October 7, 2015.
[102] The Chief Review Services (former designation of ADM(RS)) Evaluation of Aerospace Equipment Maintenance, dated February 2013, para 2.3.4.4, shows the efficiency improvements before the program was interrupted.

Performance measures, training, best practice sharing, methodologies and quarterly reporting to reduce the duration of periodic inspections.

The situation for aircrew occupations has its own unique factors. Every year, some 2000 candidates apply to become RCAF pilots, but, on average, 80 earn their pilot wings. Although applicants for aircrew occupations complete specific selection testing, there is still a high rate of failure through the occupation training cycle. This is causing the RCAF to consider changes to the selection process. Similar processes that are used by our allies with higher success rates have been studied to develop recommendations for change. However, these RCAF changes are still in the early stages and it is too soon to assess their success.

The pilot occupation training processes are also some of the CAF's most complex and costly. Flying training is highly dependent on the contracted training services that provide this capability. Pilot training is composed of common and separate training phases supporting three different streams (multi-engine, jet, and rotary wing). With controlled capacity for each course, often pilot trainees must wait months, sometimes more than a year,[103] before being scheduled for their next phase of training. As a result, some candidates move on to other careers. For those remaining, time spent awaiting training is consumed in a variety of ways which may or may not be beneficial to an individual's career. Once a pilot has completed their phase III advanced flight training, they are awarded their "wings." Although qualified as a pilot they are not yet operationally employable. Similar to other aircrew positions, occupational training is directly followed by training conducted by 1 CAD OTUs on a specific type of operational aircraft.[104] Whenever the RCAF needs to produce more pilots the solution is not as simple as increasing recruiting and initial training. The capacity of OTUs needs to be considered along with the positions that OTU graduates will fill once they are assigned to operational squadrons. Operational squadrons also need to have a sufficient number of experienced pilots who can address the more qualified demands while new pilots are produced from training, on-the-job experience and progression. (Recommend that the author check that my suggestions communicate the correct meaning in the previous sentence. I guessed at what the author was trying to say.) Each aircraft fleet has a crewing structure that defines the flying experience requirements to be qualified and to remain current with required proficiencies for each type of aircrew job. Within each job type there are advanced skill positions (aircraft captains, check pilots, section leads, mass attack leads, etc.) that require additional training and experience. The flying required to obtain skill qualifications and proficiency requirements contributes to the FG YFR required for each fleet and any compromise in YFR typically slows or limits aircrew development. The training system is also often challenged by the unanticipated attrition of experienced pilots. This production / absorption / attrition problem is an issue closely monitored by the Comd RCAF.

With an understanding of training system constraints, the RCAF has taken steps to increase the health of the pilot occupation. With the upcoming closeout of the existing contracts for flying training, a new capital project (Future Aircrew Training) is in early stages of development to

[103] Brief from the AMOR FY 2015/16, dated December 8, 2015
[104] Before commencing their OTU training, fighter pilot candidates must first complete additional flying training at 15 Wing Moose Jaw followed by phase IV fighter transition and lead-in training at 4 Wing Cold Lake.

establish a modern flexible solution in the 2023 timeframe.[105] In the interim, to increase the number of pilots, other RCAF training contracts and training facilities in the USA are being used to a limited extent. To further increase TES, the RCAF has also initiated a number of programs to re-enroll previous RCAF pilots and to recruit or temporarily receive loans of pilots from allied Air Forces. These programs have had some success; between 2009 and Spring 2014, the RCAF enrolled 31 former foreign military pilots and re-enrolled another 43 ex-RCAF pilots who had left the RCAF.[106] In FY 2015/16, these programs accounted for 16 additional pilots.[107] In addition, because of problems retaining recently trained CH-147 Chinook pilots, a restricted release period of three years was implemented for pilot officers who complete the Chinook operational training.[108] Although all of these measures should gradually increase the TES of the pilot occupation, current projections do not forecast this occupation reaching PML until the FY 2023/24 timeframe.[109]

Pilot occupation personnel are employed not only in jobs that only pilots can perform, but also in jobs that require a sound understanding of RCAF operations, including jobs that can be performed by other occupations. While the AMOR process reviews all jobs assigned to an occupation, it can be perceived as a stove-piped process that does not strategically assess all personnel resources across occupations. With each Branch Advisor focused on their occupation(s), there is little holistic oversight to ensure that each job is being performed by the most appropriate RCAF resource. Since the training and salary of pilots costs considerably more than that of other RCAF officer occupations, a multi-occupational review should be undertaken to examine the factors contributing to RCAF manning issues, to ensure the investment in aircrew training is right sized, and to enable cross-occupation choices to be considered in order for the RCAF to employ and sustain the most appropriate and cost-effective personnel resources needed to support its capabilities.

[105] Defence Acquisition Guide. http://www.forces.gc.ca/en/business-defence-acquisition-guide-2016/aerospace-systems-351.page, consulted October 10, 2016.
[106] Toronto Star article, Hiring foreign pilots helps bottom line, air force says, dated July 30, 2014. https://www.thestar.com/news/canada/2014/07/30/hiring_foreign_pilots_helps_bottom_line_air_force_says.html, consulted October 10, 2016.
[107] Brief from the AMORw FY 2015/16, dated December 8, 2015.
[108] CANFORGEN 138/15 CMP 063/15 271654 Jul 15 was issued to prevent pilots releasing within three years after their CH-147 Chinook OTU training.
[109] FY 2015/16 AMOR forward looking intake and production model for pilot occupation.

ADM(RS) Recommendation

7. The RCAF conduct an independent review to study RCAF manning issues and assess aircrew requirements from a cross-occupational perspective to verify the aircrew occupation sizes in advance of the Future Aircrew Training Project.

OPI: Comd RCAF

Current RCAF personnel issues have been further exacerbated by the introduction and addition of new RCAF capabilities in recent years, including 2 Wing and the CC-130J, CC-177, CH-147 aircraft fleets, without sufficient increases in the RCAF personnel establishment, and without reductions in other RCAF requirements.[110] New capabilities have also incurred increasingly complex IM/IT integration requirements, creating challenges for the limited number of RCAF communications information systems maintenance personnel. The RCAF has met the new personnel demands by reassigning personnel positions from existing RCAF units, further straining the personnel demands at those units. As a result, [redacted] of 1 CAD units have a manning deficiency [redacted] below their designated PML.[111] However, this statistic understates the extent of the issue, since imposed cuts to unit establishment numbers have the counter effect of appearing to improve unit manning percentages.

The RCAF has been forced to enable new capabilities at the cost of existing capabilities and the resulting impacts of these personnel issues on RCAF readiness are difficult to assess. Reviewing the operational aircrew capacity risk to support the CFDS/FP&R missions, the RCAF identified [redacted] out of a total of 35 capability areas where the aircrew establishment was at 85 percent or less than the requirement. [redacted][112] The aircrew capacity risks are highest and most prevalent for strategic air-to-air refuelling, medical evacuation, tactical aviation, and fighter missions involving offensive or defensive counter air operations, close air support, and combat support. Wing staff who were interviewed confirmed that some operational and support personnel resources are often at or below minimum levels, and as a result, personnel fatigue and overtime issues are increasing. Major operational deployments further strain wing personnel when qualified and experienced personnel are deployed for several months, adding further stress on the personnel remaining behind to support ongoing operational tasks, domestic operations and exercises. This situation differs from the typical Canadian Army employment model where force elements complete defined periods of readiness preparation, FE, and force reconstitution. For example, RCAF wings that deploy an ATF continue to support domestic operations and

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[110] This issue has also been highlighted in the 2016 OAG report on Operating and Maintenance Support for Military Equipment, which found that DND has not increased or reallocated personnel to adequately support new equipment. The report also provides some examples, indicating that while the original manning estimate for supporting the CH147 was 641personnel, only 482 had been approved, and only 322 had been filled. Similarly, for the CC130J, only 251 of 350 maintenance personnel positions had been filled, and there are 34 percent- fewer pilots than planned. The impact has been reduced equipment usage, maintenance, and availability.
[111] 1 CAD Business Plan, FY 2015/16.
[112] From a brief by Acting Director General of Air Readiness on Canadian Armed Forces Airpower Readiness, dated June 29, 2015.

exercises. The effects of these workplace challenges are a contributing factor to higher levels of attrition in recent years of pilots[113] and several other RCAF occupations. As the Comd RCAF stated in April 2015, "given the cumulative impacts of resource reductions, missed Strategic Intake Plan targets over several years, and the addition of new Air Force capabilities, there are now clear signs that the sustainability of the CFDS-mandated RCAF force structure is at risk in the medium to longer term."[114]

ADM(RS) Recommendation

8. The RCAF conduct an independent establishment review to validate human resources requirements for all RCAF capabilities to re-establish and re-balance the RCAF personnel baseline.

OPI: Comd RCAF

Key Finding 11: Notwithstanding new RCAF initiatives, recent CAF Reserve policy changes and Reg F demographics are forecast to reduce RCAF organizational capacity. The current Air Reserve is sustainable only as long as sufficient skilled Reg F retirees continue to seek employment in the Air Reserve.

The current situation and forecast for the health of the Air Reserve is also a significant concern. Figure 2 shows the Air Reserve TES versus its PML. The declining Air Reserve figures contrast sharply with the CDS Directive calling for an increase to the Air Reserve PML to 2400 by 2019.[115]

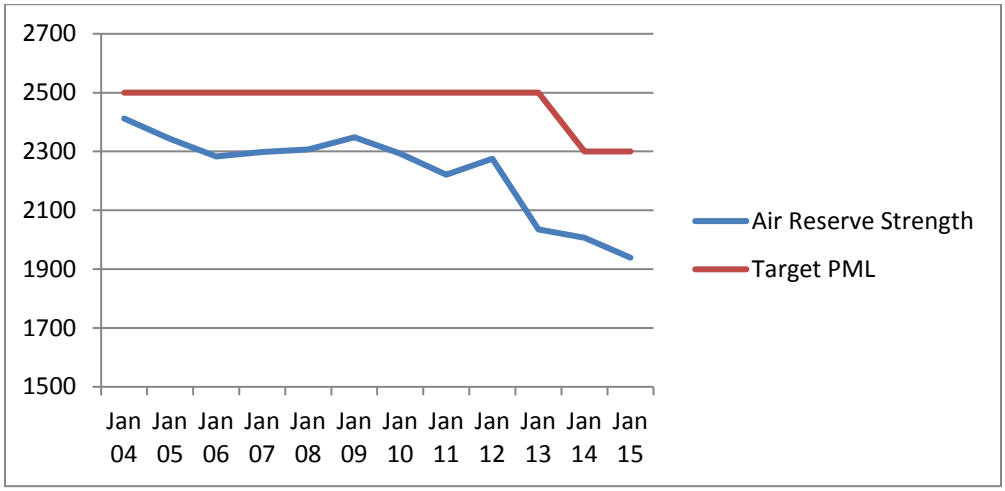

Figure 2. PML and TES of the Air Reserve. This graph compares the PML and TES of the Air Reserve from 2004 to 2015.

[113] AMOR FY 2015/16 brief for the pilot Occupation, dated December 8, 2015.
[114] Comd RCAF Cover Letter Record of Discussion – FY 2015/16 AMOR Series Air Force Occupations, dated April 10, 2015.
[115] CDS Initiating Directive on Reserve Strategy 2015: Strengthening the Primary Reserve.

Maintaining RCAF Res F occupation standards at levels equivalent to Reg F standards has allowed Res F personnel to be employed and embedded in RCAF units alongside or in place of Reg F personnel with few differences. This has enabled the employment of individuals to supplement the Reg F, as opposed to the creation of Res F units performing dedicated functions. It has also resulted in the majority of personnel in the Res F being recruited from personnel retiring from the Reg F. Options exist for personnel to join the Res F 'untrained' for select occupations, but the capacity to train is time consuming and often limited to accessing full-time Reg F training courses, which are not conducive to part-time employment. As a result, Res F personnel without previous Reg F experience are a minority. When the RCAF experienced earlier personnel reductions or organizational pressures, the RCAF was often able to mitigate those challenges by employing Res F personnel in full-time (Class B) positions. Prior to 2012, this effectively supplemented the Reg F with a large number of full-time Res F personnel. However, with the creation of the Reserve Force Pension Plan and the completion of the Primary Reserve Employment Capacity Study in 2012, the CAF introduced new limitations on the full-time employment of Res F personnel. These changes have required the RCAF to employ the majority of Res F personnel in part-time (Class A) positions with limited surge opportunities for full-time employment.[116] As a result, the Air Reserve TES has been declining as the RCAF struggles to find suitable roles for Air Reserve personnel, as well as find candidates for the many available Res F positions.

To assist in understanding the effects of the Res F policy changes, a DRDC Study on the Air Reserve was completed in 2015. The study noted that, "the current Air Reserve model is increasingly unsustainable and is insufficient to meet government growth targets…without significant change to personnel intake."[117] The study forecasts that, unless more active measures are taken to increase recruitment in the near term, the Air Reserve population would likely continue to decrease over the next 10 years, dropping to less than 1200 by FY 2024/25. This is due to the changes brought on by the Primary Reserve Employment Capacity Study, changes to the Reg F demographics, and longer Reg F terms of service, all factors contributing to a diminishing pool of prior skilled personnel likely to transfer to the Res F. To improve recruitment, the DRDC study recommended creating entry-level positions for essential tasks that are general in nature and suitable for part-time employment achievable with a limited training investment. Such tasks would also benefit the RCAF by allowing more highly trained Reg F members to focus their efforts on their primary duties.

As a result of the DRDC study, the RCAF has taken several first steps to stabilize and grow the Res F. Significant progress has been made in establishing a recruiting capability within the Air Reserve at each RCAF Wing to ensure all retiring Reg F personnel are made aware of Res F employment opportunities and are supported in navigating the administrative hiring process. This work force retention initiative helped the Air Reserve meet its recruiting targets for FY 2015/16, but this did not address the broader issue of the changing Reg F demographics highlighted in the DRDC study.

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[116] The change in annuitant policy meant CAF members could not work full-time and concurrently collect a pension, making Res F employment less attractive to Reg F members who are eligible to receive an annuity. Res F personnel who work part-time (Class A) and receive an annuity can work full-time (Class B) for temporary periods not exceeding six months.

[117] Air Reserves. Current Status and Future Direction, Primer for Air Board, dated November 17, 2015.

To address that broader issue, the RCAF is in the process of creating a "Res F-only" occupation standard to recruit and employ junior personnel. The new Air Operations Support Technician occupation will employ personnel in critical, non-technical tasks in support of SAR, Aircraft Maintenance and Force Protection roles. The RCAF remains hopeful that approval for interim actions will be approved in time to allow the initial hiring of personnel at select wings for 2017. The scope of this occupation is being carefully developed to enable personnel to be easily trained to fulfill responsibilities on important jobs that are limited in nature and which can be performed part-time, complementing existing full-time Reg F personnel. The expectation is that employment in this occupation may lead some personnel to eventually transfer to the Reg F or other more advanced Res F responsibilities.

While the initiatives to stabilize the Air Reserve are encouraging, it is too early to determine if they will be sufficient to close the long-term gap in Res F personnel strength. Consequently, the RCAF should focus on ensuring the sustainability of Reg F personnel and remain cautious about leveraging the Air Reserve to mitigate RCAF personnel deficiencies. Without structural changes in the Air Reserve's ability to recruit, train, and employ personnel, their ability to attain target strength will remain at risk.

ADM(RS) Recommendation

9. The RCAF continue to evolve the Air Reserve to enable personnel to be trained and employed to perform relevant tasks in support of RCAF requirements. Reg F occupation management should include oversight of Res F positions to ensure holistic and optimal employment of military personnel resources.

OPI: Comd RCAF
OCI: CMP

2.4.4.2 Performance Measure: Extent to which training (individual and collective) is sufficient to meet readiness requirements

RCAF training, as with other CAF training, is comprised of professional military education, individual training, and collective training. RCAF Professional Military Education is delivered by a variety of RCAF and CAF institutions, and individual training for RCAF military occupations is primarily provided by 2 CAD HQ and its supporting wings.

Key Finding 12: ATF collective training has significantly improved and effectively supports Air Force readiness requirements. However, alignment of collective training exercises with FP&R requirements is not always readily apparent.

Individual Training

In the RCAF, aircrew and air maintenance technicians are considered 'ready' when they are qualified within their military occupation classification and have completed their type-specific aircraft training. The majority of technicians and aircrew are then employed within operational squadrons. Unlike the Canadian Army, there is no phased road-to-high-readiness or post-

operations reconstitution because the RCAF is conducting flying operations continuously, whether for operational training or the conduct of operations and exercises. Thus the RCAF is essentially always in 'operational mode' and any occupation-qualified RCAF personnel could potentially be deployed on operations. Further, because RCAF trained personnel are successfully able to support recurring operations, exercises and tasks, this suggests that Individual Training is generally sufficient.

Nevertheless, there are some training equipment deficiencies that are currently limiting training effectiveness and completeness. Some occupations, such as Airborne Electronic Sensor Operators and Aerospace Control Operators require specialized training equipment to fully meet their training requirements. For example, the evaluation was advised that the Airborne Electronic Sensor Operator training is limited to 40 percent of the training syllabus until the acquisition of a new electro-optics sensor simulation system is completed. Similarly, there are projects underway to address simulation equipment deficiencies that are currently limiting aerospace control officer and aerospace control operator training in handling air traffic control scenarios. Other simulation equipment to maintain aerospace controller proficiencies are also planned but have not been addressed to-date. The training of RCAF explosive ordnance disposal[118] personnel is also an issue. While the RCAF requirement to deploy explosive ordnance disposal trained personnel has been met, pressures exist because there are not enough trained personnel to meet both domestic needs and deployment needs concurrently.

In the case of the pilot occupation, the major current individual training issues are primarily due to the throughput of new wing graduates. As discussed in the Section 2.4.4.1, initial pilot training is contracted and has capacity limitations. In addition, DND/CAF funding reductions in FY 2013/14 and FY 2014/15 resulted in cuts to some pilot training contracts and some aircrew individual training courses being cancelled. While these funding issues appear to have been largely resolved with increases in the past two fiscal years, it will take considerable time for the system to work through the impact of the past training cuts due to current training contract capacity limits.

Collective Training

Collective training is the means by which the RCAF takes a full complement of qualified air and ground crew to produce competent, cohesive, and disciplined force elements and air component task forces that are operationally deployable within realistic readiness time lines. While RCAF personnel are considered 'ready' when qualified to military occupation classification standards and type-specific aircraft training has been completed, wing commanders are responsible for setting FG requirements and providing OPRED declarations for operational force elements. Beyond that, RCAF collective readiness training is primarily focused on ATF command and control, and joint training with other service elements, government agencies, or other nations. In total, the RCAF participates in about 30 exercises annually which include collective training exercises, NORAD exercises, and other joint or international exercises. In support of this, the

[118] RCAF Domestic EOD capability is sustained by four person teams at the following six wings (Bagotville, Cold Lake, Trenton, Greenwood, Winnipeg, and Comox). The limited force structure and lengthy training require further attention to sustain this capability.

RCAF MRP provides the means to coordinate ATF and other annual collective training exercises,[119] in addition to rotating high readiness ATFs and RCAF force elements on an annual basis.

A key 1 CAD organization supporting RCAF readiness training is the AFERSET. The AFERSET facilitates pan-RCAF readiness through the standardization and evaluation of common individual readiness training.[120] However, its main focus is to ensure the collective training/validation of the ATF and the AEW, and in so doing act as independent assessors for the OPRED declaration process. The AFERSET also provides on-line courses for theatre-specific training. The AFERSET maintains the Wing Readiness Standards and the Air Force Expeditionary Training Standards, which provide the essential tasks and standards for RCAF collective expeditionary training.

In 2014, the RCAF recognized a need for improved collective training as the RCAF was unable to accomplish most key RCAF collective training objectives using Exercise Maple Resolve.[121] While the RCAF still participates in that exercise, Comd 1 CAD initiated a separate collective training exercise focussing on the ATF framework and the responsibilities of ATF commanders and key personnel from the ATF mounting wing, mission support elements, operations support elements, and air detachments. Rather than committing ATF resources for 96 days of training, the RCAF ATF collective training exercise is more focussed on air readiness requirements and now only takes 14 days. When operational deployments are planned, theatre-specific training is also included. Two such ATF validation exercises are conducted annually, corresponding to the revised six month MRP cycle to meet the mission specific requirements of Op IMPACT. 2 Wing trains the ATF personnel during the validation exercise[122] and AFERSET staff arrive for the final phase to observe and assess. An AFERSET recommendation of OPRED for the ATF is forwarded to Comd 1 CAD for validation/endorsement, and is then sent to Comd RCAF for approval and forwarding to CJOC.

As a result of lessons learned during ATF training and deployments, 1 CAD and CFAWC have developed additional training courses to reinforce RCAF ATF expertise. To that end, AFERSET provides the Tactical Command and Control Course, and CFAWC provides the Operational Command and Control Course and Senior Command and Control Course. These courses ensure commanders and key personnel are exposed to and refreshed with an understanding of ATF HQ functions. The courses are a prerequisite for the ATF collective training and have been mandatory since Rotation 2 of Op IMPACT. CFAWC also provides a one week Combined Air Operations Course, to teach personnel how to work within a Combined Air Operations Center. To further reinforce ATF knowledge within the RCAF officer ranks, CFAWC produced an

[119] Includes exercises such as Maple Resolve, Maple Flag, Unified Resolve, and Amalgam Dart.
[120] Individual readiness training is delivered to RCAF personnel through a network of Wing Readiness Training Flights located at 13 wings. AFERSET evaluations are conducted during Operational Standardization Visits carried out at regular intervals at all RCAF wings.
[121] Exercise Maple Resolve continues to provide appropriate training for RCAF tactical aviation assets.
[122] The key enabler for ATF training is the 2 Wing Expeditionary Readiness Centre, which provides the training through Observer Controller Trainers.

updated doctrine note[123] and has recently initiated changes to individual training to increase junior officer understanding of ATF doctrine, in preparation for their involvement in ATFs and future leadership roles.[124] Another emerging RCAF collective training initiative involves the use of simulation. In an attempt to improve collective training, CFAWC introduced an annual virtual mission training exercise which uses both virtual and constructive simulation.[125] Such simulation exercises are assessed as providing an efficient and economical means for ATF and operational staff to rehearse the command and control of air assets under various simulated mission scenarios.

To assess the ATF collective training and practice, CFAWC and 1 CAD are currently reviewing lessons learned. For example, prior to the establishment of the AEW concept and ATF collective training, command and control procedures, especially when part of a joint or allied operation, lacked comprehensive standard operating procedures and ATFs were largely a learning experience for RCAF personnel, instead of being productive from the start. However, based on recent CJOC and ATF after action reports, CFAWC is no longer identifying command and control as a major issue, but collective preparation and training of personnel still need improvement. In addition to the aforementioned command and control courses, a new RCAF initiative that may help subordinate personnel address this deficiency is the Wing Restructure Project, which plans to reorganize domestic wings to emulate the AEW structure, thereby facilitating personnel transition to deployed AEWs.

Another RCAF challenge is staff to plan and control collective training exercises. Unlike the Canadian Army, the RCAF does not have a Canadian Manoeuvre Training Centre[126] type of organization responsible for planning and conducting the exercise control function. According to stakeholder interviews, the current RCAF exercise control organization is somewhat ad hoc. At present, Comd 1 CAD appoints a lead planner and 1 CAD A7 appoints a deputy lead planner. Those two individuals form the core of the planning team which reports to the 1 CAD chain of command. This ensures the planning team is meeting the Comd 1 CAD intent. Lessons Learned are added to the Comd 1 CAD critical topic list and thus feed into the next exercise planning cycle.

Apart from the NORAD exercises, it is unclear how RCAF exercises align with the FP&R to ensure that all required force element capabilities are regularly exercised and evaluated. Interviewees mentioned the lack of training and preparedness for some existing capabilities, or

[123] Canadian Armed Forces Air Doctrine Note 14/01 – Royal Canadian Air Force Air Task Force Commander Definitions, Roles and Responsibilities, dated May 28, 2014.
[124] A five week Airpower Operations Course has been developed for junior officers to begin during Fall 2016.
[125] CFAWC and 1 CAD now plan this exercise collaboratively. A goal of "Exercise Virtual 15" was to link all RCAF simulation assets into an integrated training system to support individual and collective training. Virtual simulations, or real people operating simulated systems, included four pilots flying CF-188 Hornet simulators, two forward air controllers using a FAC simulator, and a CAOC operating out of CFAWC. Other participants included air weapons controllers from 22 Wing North Bay, pilots flying six CH-146 Griffon simulators and HMCS Calgary participating via the Navy's Distributed Mission Operations Centre in Halifax.
[126] The Canadian Manoeuvre Training Centre facilitates the design and execution of immersive collective training opportunities for the Canadian Army/CAF to provide a realistic full spectrum, contemporary operating environment for designated high readiness forces.

the unknown requirements for other capabilities. For example, the requirements to develop and sustain the capability for cargo air drop were noted by the Air Mobility community as a task that is not documented in an FE concept document or in the FP&R. Some operational after action reports also indicate the inadequate preparedness and training of air force elements taking on newly assigned roles or introducing new equipment.[127] While advance planning is not always possible, especially with new capabilities or equipment, such cases should be the exception. As much as possible, required capabilities should be clearly defined, and the RCAF training and exercise program should contribute to FP&R requirements by ensuring adequate and regular readiness development and exercise of required RCAF force elements and capabilities.

Without an alignment of the RCAF exercise program to the FP&R, the RCAF cannot make an accurate assessment of the effectiveness of its collective training program, and whether all of its force elements and collective task forces are being sufficiently trained and exercised. Reporting along these lines should be a component of the RCAF PMF. As mentioned by the RCAF in its simulation strategy, "The RCAF participates in a great number of live exercises, but the exact purpose of them, how they support OPRED of the air detachments, or even which specific RCAF assets should participate in each exercise and why is not readily discerned."

ADM(RS) Recommendation

10. The RCAF align collective training plans to RCAF FP&R missions to ensure each air force element regularly demonstrates required readiness through a defined validation activity.

OPI: Comd RCAF

2.4.4.3 Performance Measure: Extent to which the AFEC has the necessary resources (personnel/equipment/ materiel) to satisfy readiness requirements

Key Finding 13: The RCAF expeditionary capability has reached an effective initial operating status but is constrained by equipment and infrastructure deficiencies which are expected to be addressed by the AFEC Capital Program.

In 2007, the RCAF introduced the AFEC initiative, to address expeditionary Air Force structure shortcomings highlighted by operational lessons learned. This initiative sought to improve the effectiveness and efficiency of the Air Force expeditionary force structure in the areas of command, operations and mission support, and to provide high readiness training capabilities in order to increase RCAF expeditionary capacity and its ability to operate world-wide from well-found or austere locations. Limited progress on the AFEC initiative occurred until June 2012, when the RCAF established 2 Wing as a high-readiness expeditionary capability comprised of an operational, command and control, logistical, and support structure, making the RCAF self-sustainable and potentially able to deploy anywhere in the world.

[127] Examples include the initial use of new weapons for the CF-188 in past operations and the introduction of the CP140 beyond line of sight communications equipment.

Since then, 2 Wing has successfully achieved initial operating capability and, through its AFAST and Expeditionary Readiness Center,[128] is now actively involved in every RCAF deployment and every collective training exercise. That being said, 2 Wing still has several personnel, infrastructure, and equipment issues limiting its full potential.

With respect to personnel, 2 Wing was established and staffed with about 250 personnel, and 8 Air Communication and Control Squadron and 4 Construction Engineering Squadron were later moved under 2 Wing, adding about 75 more personnel to the wing total. Interviews with 2 Wing staff indicated that the organization has largely stabilized, and they now have a signed and approved FE concept document. 2 Wing still has some staffing issues to resolve which are waiting for the approval of its Master Implementation Plan so that establishment changes can be completed. This issue is being addressed and the Master Implementation Plan approval is expected in 2017. The unit has also staffed a request to be declared as a high tempo unit to ensure the personnel posted to 2 Wing meet deployment readiness standards. [redacted]

[redacted][129]

[redacted] The plan is for the $325 million AFEC Program to deliver the permanent infrastructure facilities and the operational and training suites of equipment required

[128] 2 Expeditionary Readiness Center provides collective training standardization and performs LoO 1 ATF confirmation (supported by AFERSET).

[129] Miscellaneous Requirements are minor capital projects which can procure materiel but not spare parts or contracted repair services.

to support the 2 Wing mandate, [redacted][130] [redacted]

2.4.5 Intermediate Outcome – The RCAF provides and sustains suitable Air Force readiness.

To assess this intermediate outcome, the following performance measure was used:

- the extent to which RCAF force elements met readiness expectations when assigned to operational missions or defence services.

Findings are based on evidence assessed from the program's immediate outcomes in addition to key informant interviews with staff from the RCAF, 1 CAD HQ, and CJOC.

2.4.5.1 Performance Measure: Extent to which RCAF force elements met readiness expectations when assigned to operational missions or defence services

Key Finding 14: The Air Force Readiness Program hs demonstrated its effectiveness across the full spectrum of operations.

Notwithstanding the previously identified areas to improve the readiness management of the Air Force, the Air Force Readiness Program has regularly delivered well-trained and prepared RCAF force elements to force employers, as evidenced in recent operations. As the RCAF FP&R defines the readiness requirements and identifies the force elements to meet those demands, the appropriate management of equipment, units and personnel, infrastructure and enabling systems has all contributed toward effective RCAF force element prioritization and preparation.

With the recent development of the AFEC and supporting constructs, RCAF readiness has improved significantly. With the implementation of the RCAF MRP, ATF HQs have been appropriately trained and prepared for operational missions. Staff interviews also noted effective coordination between CJOC staff and the Joint Forces Air Component Command team to bring forward viable force element options, even when RCAF resources were constrained by concurrent operational demands.

Although the RCAF has demonstrated a strong record for maintaining force element readiness to respond to FE tasks, the evaluation noted areas for improvement which have previously contributed to issues during operational missions. Prior to several operations, the RCAF has accelerated equipment changes to deploy and employ new systems. Often these systems have been in some stage of the lengthy capability development process, but were accelerated to respond to an imminent operational need. These changes can be viewed as a demonstration of

[130] AFEC Program Senior Review Board Presentation, dated June 30, 2016.

RCAF agility to implement a new capability in a "just-in-time" manner. [redacted] These problems were all eventually resolved, much to the credit of RCAF pilots and ground crew, [redacted]

Other RCAF fleets have experienced significant change during operations. The introduction of the CH-147D Chinooks in Op ATHENA in Afghanistan and the equipping of the CH-146 Griffons to conduct the air escort role were a deliberate plan to change force element capabilities to meet new mission requirements. The effort to deliver these capabilities was a significant success, [redacted][131] [redacted]

In a broader context, the evaluation noted the dichotomy of the RCAF having significant limitations of personnel and equipment, yet being able to consistently achieve success in operations. This apparent conflict is explained by the way the strategic assessment process is

[131] This was a hastily planned and executed project which did not fully appreciate the complexities of the operation's communications infrastructure.

conducted. Strategic consultations with the RCAF during the initial stages of the operational planning process ensure that potential courses of action and the associated capability requirements are all feasible. The selection of one of these feasible courses of action, in combination with operational primacy and commitment (sometimes at the expense of FG and other activities), helps explain why RCAF equipment and personnel limitations are typically not issues impeding operations. It follows that operations are likely to be successful since the RCAF achieves what it indicated it could do. Thus, operational success may not be a very useful or revealing metric in itself. Rather, minimum force element baselines should be established, which take into account force element availability for a minimum set of concurrent missions and, ideally, RCAF readiness would be assessed accordingly.

2.5 Performance—Demonstration of Efficiency and Economy

To determine whether the Air Force Readiness Program demonstrates efficiency and economy, the evaluation addressed the following evaluation questions, using associated Performance measures:

- Has the Air Force Readiness Program used resources efficiently?
- Has the Air Force Readiness Program used resources economically?

To determine whether the RCAF used resources efficiently to produce outputs and achieve results, the following Performance measures were used:

- Trends in cost of readiness training;
- Trends in cost of equipment sustainment;
- Trends in cost of infrastructure sustainment;
- Trends in cost of governance;
- Use of business information to optimize resource efficiency; and
- Alternatives to achieve outcomes using fewer resources.

Findings were derived using data from multiple sources including DRMIS, the Human Resource Management System, and a comparative analysis of select allied nations. Interviews were conducted with DGAEPM staff and RCAF staff at 1 CAD HQ and NDHQ.

2.5.1 Has the Air Force Readiness Program used resources efficiently?

2.5.1.1 Performance Measure: Trends in cost of readiness training

Key Finding 15: RCAF collective training costs are not being captured in a way that allows overall cost awareness and efficient management.

The evaluation had intended to assess the trends of RCAF collective training and exercise costs over the past five years. As mentioned earlier in this report, the RCAF annually conducts several collective training events and a large number of exercises in support of readiness objectives. However, changes to the PAA structure in FY 2014/15 complicate analysis of attributed training costs over the reporting period. Further, while 1 CAD is responsible for FG and collective

readiness training, it is difficult to determine the yearly collective training costs because the associated 1 CAD expenditures are often not separately identified or consolidated, but included among other expenditures. Moreover, financial records in DRMIS are not structured to enable oversight at the RCAF strategic level without having subordinate levels extract costs that have been recorded against a variety of general ledger or internal orders. As well, collective training costs cannot be readily derived from financial records based on organizational reporting. Discussions with the RCAF staff have confirmed that RCAF collective training costs are not being captured in a way that allows overall cost awareness and management. However, it is assessed that such fundamental information should be part of the RCAF PMF and would be consistent with the SJS initiative to quantify the cost of readiness. Such oversight would also permit the RCAF to evaluate, monitor, and optimize the cost-effectiveness of its exercises and other collective training in support of readiness, and allow the RCAF to better assess the value of these activities relative to other current and future cost pressures.

ADM(RS) Recommendation

11. The RCAF develop the capability to strategically monitor and manage readiness training costs. This should include the costs of all force element training exercises and other collective training events in support of Air Force readiness.

OPI: Comd RCAF

2.5.1.2 Performance Measure: Trends in cost of equipment sustainment

Key Finding 16: The RCAF materiel sustainment cost trend is rising and will continue to increase as older fleets incur more costly maintenance and as increased flying of new fleets increases contracted service costs.

Table 5 outlines the YFR and NP data for the RCAF operational aircraft fleets[132] over the past five years. The YFR flown has remained relatively stable over the period, dipping in FY 2012/13 and FY 2013/14 as a result of DND funding cuts, but recovering to support a more suitable level of FG and FE in the last two years, for an overall increase of about 6 percent.

	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
YFR Flown (hours)	|||||	|||||	|||||	|||||	|||||
NP Expended ($)	|||||||||	|||||||||	|||||||||	|||||||||	|||||||||
Ratio: NP/YFR Flown	||||	||||	||||	||||	|||||

Table 5. RCAF YFR and NP Expended. This table provides the YFR flown, NP expended for operational aircraft fleets, and the ratio of NP to YFR flown, from FY 2011/12 to FY 2015/16.[133]

[132] YFR data includes all RCAF aircraft fleets, excluding the CC144, multi-engine utility flight aircraft, CT114, and other training fleets.
[133] The YFR and NP data are from ADM(Mat)/DGAEPM.

However, as Table 5 illustrates, during that same period NP support costs have increased significantly, by approximately 37 percent. As a result, the NP to YFR ratio has grown substantially; indicating sustainment is becoming relatively more expensive per flying hour. This is attributable to the costs of maintaining aging legacy fleets as well as the direct usage-to-expenditure costs of ISSCF maintenance contracts associated with the new CC-130J, CH-147F, and CC177 fleets.[134] While costly, the ISSCF contracts include a wide range of services that are performed by industry rather than military personnel to support these additional capabilities. In comparison, NP costs for legacy fleets do not include the labour costs for all of the services performed by military personnel. The move to ISSCF support structures is based on the premise that performance-based contracts will better motivate industry to optimize support structures, providing the RCAF with assured levels of mission ready aircraft. This approach also understands that modern aircraft are increasing in technological complexity which can have an inflationary effect on costs. These costs can be partially mitigated through economies of scale by combining allied fleets (of the same aircraft type) under a common integrated logistics system.

NP costs will continue to increase for the foreseeable future, as the legacy fleets continue to age and as the contract costs for the new fleets continue to increase in conjunction with their increasing in-service usage. These issues are recognized by DGAEPM, which reports that increasing obsolescence costs and the transition of new fleets contributes a significant amount of uncertainty in the NP funding forecasts.[135] In order to increase cost effectiveness and mitigate NP cost increases, DGAEPM has been optimizing ISSCF contracts and rationalizing the preventive maintenance programs of several fleets.[136] Overall, DGAEPM assesses that NP funding will be manageable with no significant sustainability risks until FY 2019/20, at which point NP allocations would be marginally sufficient to support the aircraft fleets but insufficient to support other major equipment, including air defence systems and air traffic management systems.

While this analysis has focussed on the significant growth in NP, a portion of that growth can be attributed to to the introduction of new capabilities and increased scope of the ISSCF contracts. These contracts include supply chain activities that may offset costs that would otherwise have been incurred by the DND/CAF as additional O&M and personnel costs. Therefore, the overall impact on the DND/CAF may not be as significant as the NP increases may suggest. However, as noted by the OAG in their review of ISSCF contracts, this impact is difficult to assess because DND does not not monitor its total support costs, including personnel, operating, and maintenance costs.[137] To better understand cost trends and the benefits of ISCCF contracts, a detailed study of holistic RCAF sustainment costs would be beneficial.

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[134] The high costs of the ISSCF contracts are also highlighted in the 2016 OAG report on Operating and Maintenance Support for Military Equipment. For example, the report indicates that the CH148 support costs are about three times that of the CH124 it is replacing, and the support costs of the CC130J are $18,000 per flying hour versus $11,000 per flying hour for the CC130H.
[135] AMC 2016 Executive Report, dated June 15, 2016.
[136] As indicated in the 2016 OAG report on Operating and Maintenance Support for Military Equipment, as a result of incorrect assumptions, DND had significantly overestimated the usage of the CC130J and CH147 fleets and was therefore paying much more for a higher level of service than it actually used. As a result, in 2015, the CC130J contract was renegotiated to improve its value for money.
[137] 2016 OAG Report on Operating and Maintenance Support for Military Equipment.

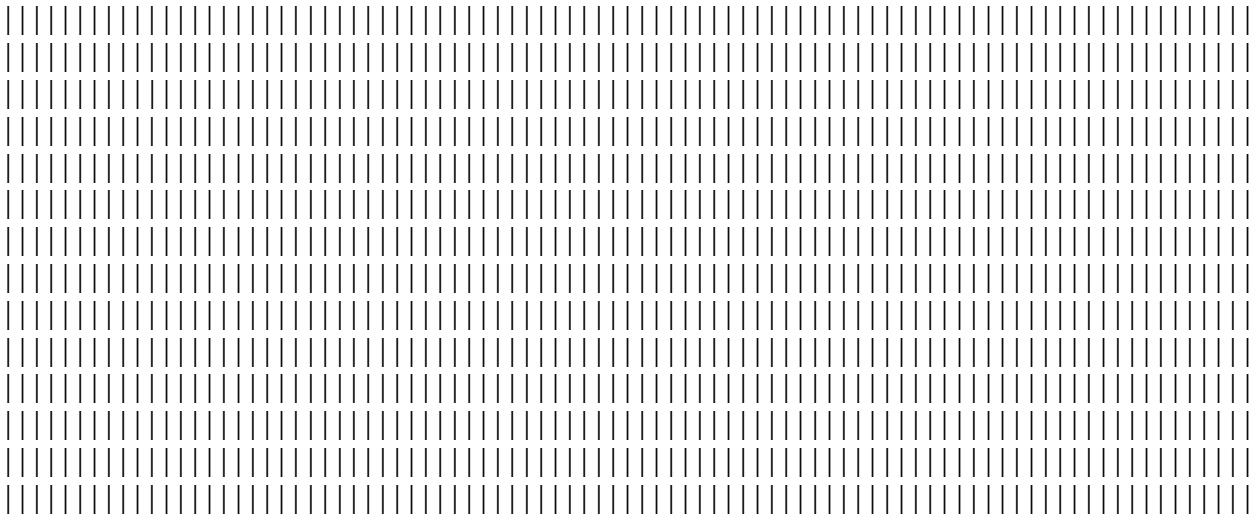
2.5.1.3 Performance Measure: Trends in cost of infrastructure sustainment

Key Finding 17: While the RCAF infrastructure portfolio has been increasing, RCAF investment in maintenance and repair has been below established targets.

The DND model for real property funding requirements is based on the Real Property Replacement Costs (RPRC). The CFDS and the ADM(IE) Functional Planning Guidance established required rates of 1.4 percent of RPRC for maintenance and repair and 2.5 percent of RPRC for recapitalization for each of the department's organizations, as the minimum to maintain capital infrastructure. From 2010 to 2015, RCAF spending was significantly below the maintenance and repair targets, even though its total RPRC was increasing as a result of major additional capabilities, such as the CC177 and the CC130J. Table 6 compares the 1 CAD RPRC to the investment in maintenance and repair. As the table shows, on average, the RCAF funded about 45 percent of the target infrastructure maintenance and repair requirement. While RPRC data for FY 2015/16 was unavailable from 1 CAD HQ, the RCAF infrastructure maintenance funding allocation of $31 million was consistent with that of previous years. [138]

	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15
1 CAD RPRC ($)	$5,332,776	$5,656,382	$6,042,194	$6,373,210	$7,278,591
Target: 1.4% of RPRC ($)	$74,659	$79,189	$84,591	$89,225	$101,900
1 CAD Infrastructure Maintenance and Repair Expenditures ($)	$34,949	$49,446	$43,222	$35,558	$29,690
% of Target Funded	46.8%	62.4%	51.1%	39.9%	29.1%

Table 6. 1 CAD Maintenance and Repair Funding. This table compares the 1 CAD infrastructure maintenance and repair expenditures to the required target of 1.4 percent of RPRC, from FY 2010/11 to FY 2014/15.[139]



[138] RCAF BP FY 2015/16, dated December 2014.
[139] Financial data provided from 1 CAD HQ Winnipeg.

2.5.1.4 Performance Measure: Trends in cost of governance

Key Finding 18: The cost of the RCAF governance of the Air Force Readiness Program has remained relatively stable.

The evaluation examined the numbers of RCAF HQ staff over the evaluation period to determine trends in cost of governance. Table 7 lists the numbers of HQ staff over the period, and the percentage of the RCAF personnel that these represent. CFAWC has been included as part of the total HQ staff. As the table indicates, the Air Staff and 2 CAD HQ has increased slightly whereas the 1 CAD HQ has decreased significantly. Overall, the total numbers of HQ staff have been relatively stable, but now represent a slightly larger percentage of personnel due the drop in total RCAF numbers. Reasons for the decrease in RCAF personnel were discussed in Section 2.4.4. In summary, over the past six years RCAF HQ personnel averaged less than 6.5 percent of total RCAF personnel in RCAF units.

	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
RCAF[140]	19853	19511	18893	18730	17560	17671
NDHQ /Air Staff	323	344	342	338	349	363
1 CAD HQ	696	717	682	667	644	647
2 CAD HQ	67	70	71	70	78	80
CFAWC	122	125	118	106	112	117
Total HQ	1208	1256	1213	1181	1183	1207
% of HQ Personnel in the RCAF	6.1%	6.4%	6.4%	6.3%	6.7%	6.8%

Table 7. RCAF HQ Personnel Numbers. This table provides the number of personnel in RCAF HQ units, and the percentage this represents in the RCAF from FY 2010/11 to FY 2015/16.[141]

2.5.1.5 Performance Measure: Use of business information to optimize resource efficiency

Key Finding 19: The RCAF collects a broad range of information and data to support resource decisions, but internal use of its PMF and LLP has been limited.

The evaluation examined the RCAF's use of performance data to inform its business decisions. While data is collected and reported on a quarterly or semi-annual basis, interviews indicate that

[140] RCAF numbers include Reg F, civilians and Re sF in RCAF units, and the Air Force staff at NDHQ.
[141] The personnel data is from HRMS.

this is primarily a reporting requirement versus a management tool. Two types of reports are provided: performance reports to the VCDS / Chief of Program and readiness reports to SJS. Within the RCAF HQ, the SJS readiness reports are staffed through Comd RCAF, and are included in the monthly Commander's Update Briefs when appropriate. Another key focus of the Commander's Update Briefs has been personnel. As discussed previously in this report, monitoring personnel strength is a key issue for the RCAF for a number of occupations, especially aircrew. Metrics and forecasts for every RCAF occupation are also reviewed in detail at annual AMOR meetings. The evaluation was advised that Comd RCAF has placed a priority on reinvigorating the RCAF PMF to ensure the PMF information is relevant to his command team. Using the RCAF Campaign Plan as the structure for reporting, RCAF PMF measurements will take place on a variable basis (quarterly, semi-annually or annually), as required, using a business intelligence reporting tool database.

Another mechanism to make use of business information is the RCAF LLP. The RCAF formally introduced its LLP in 2012 to capture, analyze and address issues from exercises and operations; however, the RCAF LLP is still maturing.[142] Based on interviews with operational staff and CFAWC (the RCAF lessons learned center of excellence) implementing the LLP has been a challenge across much of the RCAF, because poor software tools and inadequate staffing of lessons learned positions has not matched the intent of the program. A major stumbling block was the initial expectation that all resources (personnel, funding, and equipment) had to come from existing capacities. As a result, many wings had no dedicated lessons learned officer, and therefore pan-RCAF collection, analysis, and reporting of lessons was minimal. Further, operational staff has difficulty inputting and extracting useful lessons learned using the available knowledge management software. As a result, while some best practices were being retained and lessons being learned, collection from across the RCAF was not as effective as it could have been, and analysis and incorporation of lessons learned was limited. In order to address some of these issues, CFAWC updated the LLP manual and produced a handbook, and Comd RCAF established a number of new Res F positions at each wing and at CFAWC in support of the LLP. Training for designated lessons learned personnel is also being developed. These are good first steps, and the RCAF should continue these efforts to fully implement a vibrant and functional LLP.

ADM(RS) Recommendation

12. The RCAF continue to improve its LLP and further develop and integrate its PMF into its decision making processes.

OPI: Comd RCAF

2.5.1.6 Performance Measure: Alternatives to achieve outcomes using fewer resources

This performance measure is similar to Performance Measure 2.5.1.5, but this one focusses on alternative methods to achieving similar results using fewer resources.

[142] Implementation directives towards operationalizing the RCAF LLP were issued by Comd RCAF and Comd 1 CAD in December 2011 and April 2012 respectively.

Key Finding 20: The RCAF has initiated a plan to further invest in simulation for FG of select fleets. This is expected to reduce the relative cost of FG YFR.

Within the RCAF, increased investment and use of simulation is expected to potentially replace and even enhance some aspects of aircrew training while reducing FG flight hours and the associated aircraft NP and O&M costs. According to the United States National Training and Simulation Association, the operating cost of flight simulators is estimated to be between 5 and 20 percent of the cost of the equivalent training on aircraft.[143] For this reason and other associated benefits (mentioned below), the United States Department of Defense already conducts a significant portion of its aircrew training using simulation and plans to increase this further in the coming years.[144] The RCAF estimates that, over all of its fleets, increased simulation could potentially reduce YFR by about 10,000 hours, mitigating YFR, NP, and O&M increases required as a result of adding new fleets. Other potential benefits of simulation include more efficient training (reduced time and resources), improved access to realistic training, more frequent joint and coalition training, reduced resources to achieve and maintain readiness, and extension of fleet life. Increasing the number of simulators within Canada would also increase the operational availability of aircrew by reducing their time away, increase the availability of simulator training to more aircrew, and preserve aircraft for operations. With these benefits in mind, the RCAF published a simulation strategy to significantly increase its use of simulation by 2025.[145] One of the first initiatives of the RCAF Simulation Strategy is the Weapon System Trainer (WST) Project, a $290 million project to procure new simulators for the CC177, CH149, and CC150. This project is currently in the Options Analysis phase with FOC expected in 2023.[146]

Overall, the evaluation considers the RCAF simulation strategy to be achievable but ambitious. It will require significant capital investment and long term support resources to be successful. Nevertheless, even if the full extent of the RCAF simulation strategy is not achieved by 2025, increased use of simulation would still be worthwhile and provide many benefits.

2.5.2 Has the Air Force Readiness Program used resources economically?

To determine whether the Air Force Readiness Program resources have been utilized in the most economical way to produce outputs and achieve results, the following Performance measures were used:

- trends in the cost of the Air Force Readiness Program;
- comparison of budget versus demand and actual cost;
- demonstrated efforts to reduce or stabilize input resources;
- adequacy of input resources to produce operational effects (i.e.; Are they appropriate, sustainable and affordable?); and
- benchmarking to allied air forces.

[143] http://www.trainingsystems.org/publications/simulation/roi_effici.cfm, consulted October 25, 2016.
[144] http://www.govexec.com/gbc/going_virtual_for_new_defense_era/, consulted October 25, 2016.
[145] The RCAF Simulation Strategy 2025, dated June 2014.
[146] Defence Acquisition Guide 2016 (http://www.forces.gc.ca/en/business-defence-acquisition-guide-2016/aerospace-systems-939.page), consulted October 10, 2016.

The following findings for the Air Force Readiness Program were derived using data from the appropriate RCAF organizational budgets. A trend in expenditures using PAA data was not possible due to changes in the PAA structure and attribution, which precluded comparative analysis over the previous five years.

Key Finding 21: The Air Force Readiness Program is economical and fiscally well-managed.

Key Finding 22: The RCAF's introduction of new capabilities in conjunction with decreased overall funding levels is threatening the future viability of the Air Force Readiness Program.

2.5.2.1 Performance Measure: Trends in the cost of the Air Force Readiness program

As a result of the PAA changes in FY 2014/15, it is difficult to compare the costs and trends of the Air Force Readiness Program because the new readiness program data cannot be correlated with the former PAA program data. As an alternative, the evaluation examined the trend of 1 CAD total expenditures, since the primary purpose of 1 CAD is the generation of air power. As Table 8 illustrates, 1 CAD expenditures have been trending downward since FY 2011/12, and in FY 2014/15 were 15 percent less than in FY 2010/11. To obtain a more complete picture of air power FG costs, NP expenditures and 1 CAD Reg F personnel costs are also provided. Reg F personnel costs have risen only slightly, with the drop in personnel numbers nearly offsetting the cost of inflation. However, NP costs have risen by nearly 15 percent, as explained in section 2.5.1. The net result is that the total cost to generate and sustain air power readiness[147] is estimated to have risen only by about 2.4 percent since FY 2010/11, which is much less than the 10.4 percent inflation over the same time period.[148] This could be considered an efficient use of funds; however the issues raised earlier in this report suggest there has been an insufficient investment in air power FG. This is also reflected in the fact that while Comd RCAF has an annual budget of about $1 billion, his residual flexibility is less than $50 million once YFR commitments and fixed operating costs have been accounted for.[149] This illustrates that the RCAF has very little flexibility to reduce funding without adversely affecting FG or domestic operations. By comparison, Table 8 also shows that DND expenditures have dropped by about 9 percent during the same time period. Consequently, the percentage of DND expenditures spent on air power FG and sustainment has increased slightly, primarily due to the increases in NP costs necessary to sustain aging aircraft and the more expensive ISSCF support contracts associated with the new fleets. Although not without some issues, the Air Force Readiness Program is assessed as economical since it generates and sustains a basic air power readiness capability for a relatively small portion of the DND/CAF budget, an overall expenditure of approximately 12 percent.

[147] This does not include all RCAF costs, since 2 CAD HQ costs are not included.
[148] http://www.bankofcanada.ca/rates/related/inflation-calculator/, consulted October 30, 2016.
[149] RCAF L1 BP FY 2015/16, dated December 2014.

	FY 2010/11[150]	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15
1 CAD Expenditures[151] (000's)	$651,289	$824,039	$673,454	$616,621	$551,539
Reg F Personnel Cost[152] (000's)	$765,023	$762,884	$774,269	$780,918	$800,017
NP Expenditures[153] (000's)	$803,194	$916,720	$951,800	$976,787	$921,446
Total 1 CAD FG and Sustainment Cost (000's)	$2,219,506	$2,503,643	$2,399,523	$2,374,326	$2,273,001
Total DND/CAF Expenditures[154] (000's)	$20,298,257	$20,218,758	$19,978,190	$18,764,374	$18,453,938
% of DND/CAF Expenditures	10.9%	12.4%	12.0%	12.7%	12.3%

Table 8. 1 CAD FG and Sustainment Costs. This table provides 1 CAD expenditures, associated Reg F personnel costs and NP expenditures, the total I CAD FG and sustainment cost, total DND/CAF expenditures and the percentage of DND expenditures, from FY 2010/11 to FY 2014/15.

*Note: Totals may not add up due to rounding.

2.5.2.2 Performance Measure: Management of funding and YFR

In order to examine how efficiently resources are managed, the evaluation compared the 1 CAD budget to actual expenditures since FY 2010/11. As Table 9 shows, expenditures closely match the allocated funding. The slightly greater divergence in FY 2012/13 and FY 2013/14 is likely due to budget cuts in those years having greater impacts than anticipated and insufficient time to spend in-year re-allocations. The high percentage of the budget expended indicates that funds are being closely managed for maximum benefit, with regular financial reporting and use of budgeting tools such as over-planning.

[150] While the evaluation period began in FY 2011/12, FY 2010/11 was added to provide five years of data, because DND expenditures for FY 2015/16 were not available.
[151] The financial data is from 1 CAD HQ and includes civilian and Res F personnel costs but excludes Reg F personnel costs.
[152] Estimated cost based on the number of 1 CAD Reg F personnel in HRMS for each year, and the average yearly Reg F pay from the DND Cost Factors Manuals.
[153] The data is from the AMC 2016 Executive Report, dated June 15, 2016. It includes all DGAEPM NP expenditures.
[154] Figures are from annual DND Departmental Performance Reports.

	FY 2010/11[155]	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
1 CAD Budget	$645,719	$828,589	$685,992	$636,778	$551,454	$555,672
1 CAD Expenditures	$651,289	$824,039	$673,454	$616,621	$551,539	$556,975
% of Budget Expended	100.9%	99.5%	98.2%	96.8%	100.0%	100.2%

Table 9. 1 CAD Budgets and Expenditures. This table compares the 1 CAD budget and expenditures, and calculates the percentage of the budget expended for each year from FY 2010/11 to FY 2015/16.[156]

As discussed in section 2.4.1.1, a key RCAF metric is the YFR. Table 10 compares the planned YFR to the actual YFR achieved. Unlike funding, YFR is a less directly controllable measure, such that a slightly greater divergence is to be expected. Unforecasted operations can increase in-year YFR requirements, and issues with aircraft, spares, or aircrew availability can occasionally reduce flying rates below what was planned. FY 2014/15 was an example of the former when flying hours increased as a result of Op IMPACT. FY 2015/16 was an example of the latter, due to the slower than anticipated phase-in of the CH-147 and CH-148 which reduced their YFR output. Complicating matters slightly is that the planned YFR shifted from a notional FP&R-based target to a more realistic, executable target[157] beginning in FY 2014/15. Once the issues with the new fleets have been resolved, this change should improve the accuracy of future forecasts for O&M and NP, thereby improving RCAF and DGAEPM planning and management.

	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
YFR Planned (hours)		|||||||	|||||||	|||||||	|||||||	|||||||
YFR Achieved (hours)	|||||||	|||||||	|||||||	|||||||	|||||||	|||||||
YFR Achieved as a % of YFR Planned	||||||	||||||	||||||	||||||	||||||	||||||

Table 10. YFR Planned and Achieved. This table compares the YFR planned against the YFR achieved, and notes the difference of the YFR achieved as a percentage of the YFR planned from FY 2010/11 to FY 2015/16.[158]

Similarly, Table 11 compares the DGAEPM NP demand, allocation, and expenditures. While DGAEPM estimates NP demand based on fleet histories and the planned YFR. The actual allocation it receives is typically less than the full NP demand. As a result, the discrepancy between the NP allocation and expenditures is less pronounced than it would otherwise have

[155] FY 2010/11 was included to provide a more representative financial history before the onset of DND cuts beginning in FY 2012/13.
[156] The financial data is from 1 CAD HQ Winnipeg.
[157] This takes into consideration the RCAF ability to execute the YFR and the NP ability to support it.
[158] The YFR data is from DGAEPM. The data does not include the CC144, multi-engine utility flight aircraft, CT114 and other training fleets.

been. The high percentage of the allocation expended indicates that funds are being closely managed for maximum benefit, using appropriate financial tools and tracking mechanisms.

	FY 2010/11	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
NP Demand	$943,735	$955,992	$1,086,514	$1,153,517	$1,003,448	$1,134,381
NP Allocation[159]	$830,775	$914,121	$1,001,612	$1,070,870	$926,664	$1,144,585
NP Expenditures	$803,194	$916,720	$951,800	$976,787	$921,446	$1,085,478
Expenditures as a % of NP Allocation	96.7%	100.3%	95.0%	91.2%	99.4%	94.8%
Expenditures as a % of NP Demand	85.1%	95.9%	87.6%	84.7%	91.8%	95.7%

Table 11. DGAEPM NP Demand, Allocation, and Expenditures. This table provides the NP demand, NP allocation, NP expenditures, and the expenditures as a percentage of NP allocation and expenditures as a percentage of NP demand from FY 2010/11 to FY 2015/16.[160]

Since NP demand is based on the planned YFR, the discrepancies between NP demand and expended NP would be expected to be similar to those between planned YFR and actual YFR. This is graphically illustrated in Figure 3, below, which shows the percentage of both metrics achieved. Both were tracked quite closely until FY 2013/14 and FY 2014/15, when DND budget cuts resulted in correspondingly greater NP reductions than YFR reductions. Interviews with RCAF and DGAEPM staff indicate that they were able to sustain flying operations for those two years by using pre-existing spares and removing parts from other aircraft[161] when necessary, but such NP reductions would not have been sustainable for much longer without significantly impacting FG and flying operations. As the figure suggests, the reverse happened in FY 2015/16. The increases in DND funding allowed a correspondingly greater investment in NP as compared to YFR. This was necessary to re-stock spares, conduct delayed maintenance, and re-establish deferred support contracts.

[159] NP allocation includes allowed over-planning.
[160] The financial data is from the AMC 2016 Executive Report, dated June 15, 2016.
[161] While occasionally necessary for operational reasons, this is a very inefficient maintenance practice since it first requires removing a serviceable part already installed on another aircraft (which is unserviceable for other reasons) and eventually reinstalling a replacement part on that "robbed" aircraft.

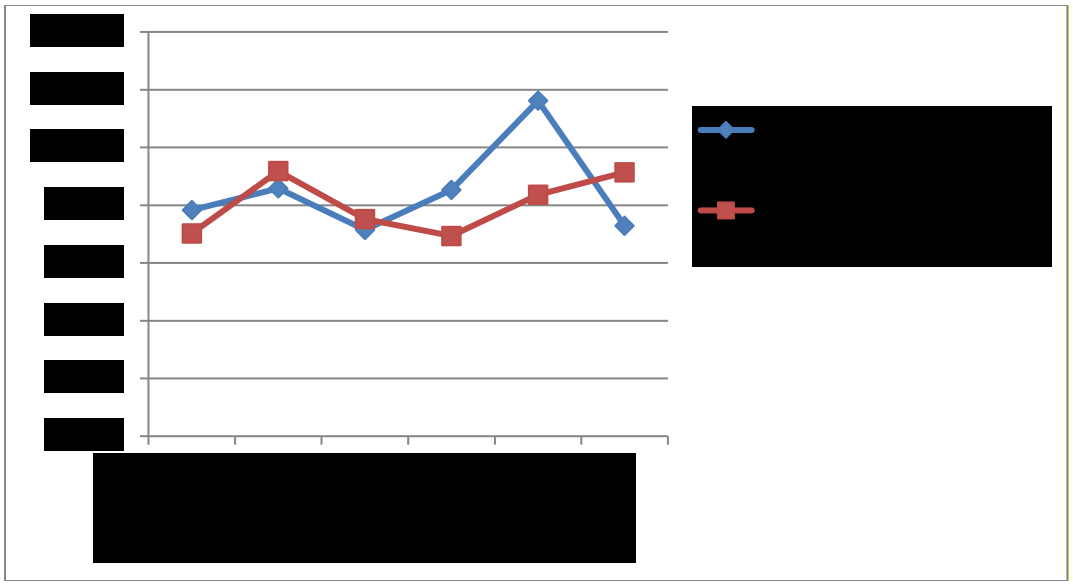


Figure 3. Percentage of Planned YFR and NP Demand Expended. This graph illustrates the percentage of NP demand expended in comparison with the percentage of planned YFR flown from FY 2010/11 to FY 2015/16.

2.5.2.3 Performance Measure: Comparison of notional budget versus demand

As Table 11 indicates, NP allocations have usually been less than the NP demand. This was a reasonable approach when the NP demand was based on notional fleet YFR targets, but such a disparity may no longer be sufficient with more accurate NP forecasts (based on realistic YFRs since FY 2014/15). Based on AMC 2016 forecasts[162], the notional NP allocations for the next three years should more closely match the NP demand than in previous years, but there is still a shortage of about $42 million in the FY 2018/19 and FY 2019/20 planning allocations to ensure support requirements would be fully met. Future demand forecasts and allocations are expected to be adjusted and refined by the AMC over the coming years as timeline issues regarding legacy fleet obsolescence and the transition to new fleets are resolved.

Table 12 compares the 1 CAD funding demands against its budget and expenditures. The demand has been estimated by adding the allocation and pressures[163] documented in the 1 CAD Business Plans. As the table indicates, from FY 2011/12 to FY 2013/14, some of the pressures were alleviated by budget increases. However, the reverse can also happen, as shown in the two subsequent years. In general, 1 CAD allocations and expenditures have been trending downward since FY 2011/12 and consequently the gap between demand and expenditures has been growing to about 20 percent in FY 2014/15 and FY 2015/16. Given the increasing air power capabilities of the RCAF and the increasing YFR requirements, the decreased level of 1 CAD funding and the significant funding gap is a concern.

[162] 2016 Executive Report of the Aerospace Management Committee, dated June 15, 2016.
[163] Pressures are unfunded business plan requirements. Additional in-year funding could address some of these.

	FY 2011/12	FY 2012/13	FY 2013/14	FY 2014/15	FY 2015/16
1 CAD Initial Allocation	$671,499	$665,522	$618,963	$599,996	$562,908
1 CAD Pressures	$111,900	$120,000	$86,600	$92,845	$127,179
1 CAD Total Demand[164]	$783,399	$785,522	$705,563	$692,841	$690,087
1 CAD Final Budget	$828,589	$685,993	$636,778	$551,454	$555,672
Budget as % of Demand	105.8%	87.3%	90.3%	79.6%	80.5%
1 CAD Expenditures	$824,039	$673,454	$616,621	$551,539	$556,975
Expenditures as a % of Demand	105.2%	85.7%	87.4%	79.6%	80.7%

Table 12. 1 CAD Allocations, Pressures, and Expenditures. This table provides the 1 CAD initial allocations, pressures, total demand, final budget, budget as a perenctage of demand, expenditures, and expenditures as a percentage of demand from FY 2011/12 to FY 2015/16.[165]

The 1 CAD Business Plan[166] details the significant O&M, aviation fuel, training and infrastructure pressures involved in supporting a growing RCAF program with decreased funding. Business plan statements such as "challenges to preserving the operational viability of the RCAF" and "current funding levels are no longer sufficient to maintain the extant FP&R mandates" emphasize the general readiness impacts if more appropriate funding is not provided or if capabilities are not correspondingly reduced.

2.5.2.4 Performance Measure: Demonstrated efforts to reduce or stabilize input resources

Key Finding 23: The RCAF is pursuing initiatives to mitigate funding and personnel pressures.

The evaluation noted some RCAF initiatives to reduce or stabilize its personnel and financial resources. Key examples include the use of simulation for aircrew training and collective training. The RCAF strategic intent is to increase its investment in simulation in order to stabilize its need for YFR. This would also stabilize the associated operational, maintenance and sustainment resources required to support the YFR. Another example of resource optimization is the planned improvement to the aircrew selection process to increase the aircrew training success rate while also increasing the pool of recruits available for other occupations.

However, the evaluation has also noted the fact that RCAF capabilities have increased significantly[167] without overall increases in personnel or baseline funding. This was driven by

[164] Total demand is the total of the initial funding allocation and financial pressures.
[165] Financial data provided from 1 CAD HQ Winnipeg.
[166] 1 CAD Level 2 Business Plan FY 2015/16.
[167] These capability increases include the establishment of 2 Wing, and the addition of the CC-177, CC-130J and CH-147 fleets.

the need to increase air power capabilities even though total personnel numbers were essentially fixed and funding was decreasing. While this can be considered efficient, it has created many difficulties and it strains the existing establishment and its personnel. This situation is likely unsustainable in the medium to long term.

2.5.2.5 Performance Measure: Adequacy of input resources to produce operational effects (i.e.; Are they appropriate, sustainable and affordable?)

Evidence indicates that the RCAF has been able to achieve the desired operational effect within its allocated funding and personnel resources. Nevertheless, recent 1 CAD and RCAF business plans emphasize the inadequacy of current funding to support FP&R requirements, and the need to reduce capabilities if adequate funding is not provided. Future Air Force readiness is expected to be increasingly challenged by constrained financial and personnel resources and increasing training, equipment, and infrastructure costs. These cost increases are associated with maintenance, operations, sustainment, and recapitalization/acquisition requirements, in addition to inflation.

2.5.2.6 Performance Measure: Benchmarking to allied Air Forces

Key Finding 24: Using data from Janes Online, the Air Force Readiness Program is economical in comparison with select allies, although aspects of the program (overall budget, procurement, and O&M) appear to be relatively underfunded.

Benchmarking was conducted against several allied Air Forces using the following indicators for comparison:

- cost per military member;
- cost per operational aircraft;
- number of personnel per aircraft;
- procurement expenditures as a percentage of the Air Force budget;
- O&M expenditures as a percentage of the Air Force budget; and
- Personnel expenditures as a percentage of the Air Force budget.

Data was collected and analyzed using Jane's online sources, as referenced in Table 13, to assess the relative efficiency and economy of the Air Force Readiness Program with that of the USA and comparable allies within the Five Eyes community. For the purpose of this comparison, New Zealand was replaced by Spain because the latter's population and Air Force is more similar to that of Canada than the former, which has a very small Air Force with no fighter aircraft. For the purposes of data standardization and ease of comparison, the Jane's data was used for all of the nations, including Canada.

It should be noted that, unlike Canada, the other compared countries also employ army and naval aviation force elements in addition to those within their Air Force. However, these were not included in the comparison because the costs associated with those particular aviation elements could not be readily determined.

Indicator: Cost per military member

The Air Force budget provided for each nation includes all costs attributable to its Air Force, including pay, procurement and O&M. Based on this data, the RCAF appears to be economical in terms of the cost per Reg F personnel and cost per military member. Its cost per member is comparable to that of Spain; a country whose gross domestic product per capita is much less than that of Canada. While Canada's costs per member seem only slightly less than those of the USA, this is because the United States Air Force has extremely large Reserve and National Guard forces that reduce its cost per member. When compared to the United Kingdom (UK) and Australia, Canada's costs per member are much less primarily due to its low budget. While all the countries spend roughly 30 percent of their defence budget on their Air Force, the defence budgets of Australia and the UK are more than double that of Canada relative to gross domestic product and therefore their cost per military personnel is much higher. Much of this extra funding results in a greater percentage of investments in procurement and O&M as compared to Canada, as shown in Table 13.

Indicator: Cost per operational aircraft

Similarly, the RCAF's total cost per operational aircraft is among the lowest, second only to Spain. This is due to its relatively low Air Force budget given its number of aircraft, and at first glance the RCAF seems to be relatively efficient and economical. However, the fact that the USA, UK and Australia have ratios that are more than double that of the RCAF suggests that the RCAF may be significantly underspending. This is also suggested by the fact that Canada's defence budget is the lowest in terms of gross domestic product, and by the fact that the RCAF's O&M costs per aircraft are also among the lowest, with the USA, Australia and the UK spending three to five times more on O&M per aircraft.

Indicator: Number of personnel per aircraft

The RCAF has one of the lowest ratios of Air Force personnel to operational aircraft among the nations in the table. By comparison, the USA, UK and Australia have nearly double the personnel that Canada has. One reason for this is the fact that several of the RCAF aircraft fleets are maintained by contractors,[168] thereby reducing the number of military personnel required to operate those fleets. While such a practice is not unique to Canada, it may be more prevalent than in the other nations. However, as identified in this report, the RCAF has added several new aircraft fleets without concomitant increases in its personnel establishment. As a result of this and inadequate recruitment, the RCAF has significant personnel deficiencies in many of its occupations, as well as in its Res F, which is straining its current personnel establishment.

Indicator: Procurement expenditures as a percentage of the Air Force budget

Procurement expenditures can vary significantly on a yearly basis depending on the timing of major acquisitions. In 2015, Canada's procurement expenditures as a percentage of its Air Force budget were the lowest among the compared countries. While most of the other nations were only slightly higher than Canada, Australia's percentage was nearly double. In recent years, that

[168] These include the CH-147, CH-148, CH-149, CC-130J, and CC-177.

country has spent considerably more on procuring several new fleets, including combat aircraft, transport aircraft and maritime patrol aircraft. However, the RCAF has not been idle in the past five years, completing the acquisition of the CC130J transport aircraft in 2012 and the CH-147 helicopter in 2014, and acquiring a fifth CC-177 transport aircraft in 2015. In addition, upgrades to the CP-140 maritime patrol aircraft are nearing completion and deliveries of CH-148 maritime helicopters have begun. The RCAF procurement ratio should increase as new fighter aircraft and other planned procurements commence in the coming years.

Indicator: O&M expenditures as a percentage of the Air Force budget

RCAF O&M expenditures as a percentage of the budget are the lowest of all the Air Forces under comparison. This is consistent with the decreased level of 1 CAD funding and the associated funding pressures identified earlier in this report. These pressures and the proportion of O&M expenditures in the RCAF budget suggest a need to either increase the RCAF budget or use other RCAF resources more efficiently in order to increase O&M funding.

Indicator: Personnel expenditures as a percentage of the Air Force budget

The RCAF spends a higher percentage of its budget on pay and benefits than all of the compared countries. Although this could be interpreted as the RCAF being less economical, it actually reflects the relatively low budget of the RCAF for both O&M and procurement. In the RCAF, these two account for about 40 percentof the budget, whereas in the USA, Australia, and the UK, these account for over 60 percent. This suggests that personnel, procurement, and O&M are not as well balanced in the RCAF as in the other compared nations, all of which have air power capabilities similar to that of the RCAF.

Category	Canada	USA	Australia	UK	Spain
Country Population (millions)[169]	35.10	321.37	22.75	64.09	48.15
Gross Domestic Product ($ billion USD)	$1,531	$18,268	$1,154	$2,852	$1,136
****Gross Domestic Product per capita**	$43,628	$56,845	$50,763	$44,506	$23,601
Defence Budget ($ billion USD)	$14.563	$605.625	$27.445	$60.662	$10.991
****Defence Budget as % of Gross Domestic Product**	0.95%	3.32%	2.38%	2.13%	0.97%
Air Force Budget ($ billion USD)	$5.024	$164.548	$8.172	$16.743	$4.286
****Air Force Budget as % of Defence Budget**	34.5%	27.2%	29.8%	27.6%	39.0%
Regular Air Force Personnel	13,400	315,800	14,200	31,000	11,150

[169] The World Factbook. https://www.cia.gov/library/publications/the-world-factbook/geos/sp.html, consulted September 20, 2016.

Reserve Air Force Personnel	2,000	173,100[170]	3,100	1,800	2,200[171]
****Air Force Budget per Regular Air Force Personnel (USD)**	$374,925	$521,051	$575,493	$540,097	$384,395
****Air Force Budget per Military Member[172] (USD)**	$326,234	$336,568	$472,370	$510,457	$321,049
Operational Aircraft[173]	283	4234	164	356	280
****Air Force Budget per Operational Aircraft (USD)**	$17,752,650	$38,863,486	$49,829,268	$47,030,899	$15,307,143
****Personnel per Operational Aircraft**	54.42	115.47	105.49	92.13	47.68
Air Force Procurement ($ billion USD)	$0.955	$41.236	$2.942	$4.018	$0.986
****Procurement as % of Air Force Budget**	19.0%	25.1%	36.0%	24.0%	23.0%
Air Force O&M[174] ($ billion USD)	$1.075	$58.777	$2.333	$7.199	$0.986
****O&M as % of Air Force Budget**	21.4%	35.7%	28.5%	43.0%	23.0%
****O&M Expenditures per Operational Aircraft (USD)**	$3,798,587	$13,882,145	$14,225,610	$20,221,910	$3,521,429
Air Force Personnel Costs[175] ($ billion USD)	$2.849	$37.139	$2.529	$3.851	$2.143
****Personnel Expenditures as % of Total Air Force Budget**	56.7%	22.6%	30.9%	23.0%	50.0%
NOTE: "**"denotes a data calculation					

Table 13. Comparison of Allied Air Forces. This table compares key metrics of Canada and some allied countries, including Air Force budgets, numbers of Air Force personnel and operational aircraft, and Air Force procurement and O&M expenditures.[176]

[170] The number includes Reserve and National Guard personnel.
[171] The information was not available in Janes, so the data is from: The Military Balance 2015, by the International Institute for Strategic Studies, dated February 2015.
[172] "Military member" is the total of Regular and Reserve Air Force personnel.
[173] Includes all the Air Force fixed wing and rotary wing aircraft conducting various operational roles, such as combat, transport, surveillance, SAR, utility, etc. It does not include training aircraft.
[174] The Janes O&M figures include equipment support, stock consumption, property management, movements (transport), accommodation and utilities, professional fees, fuel, hospitality and entertainment, information technology and communications.
[175] Jane's includes all expenditures associated with pay and benefits. The exact breakdown is unknown.
[176] Personnel and aircraft numbers are from Jane's Online, World Air Forces, https://janes.ihs.com/WorldAirForces/Reference#, consulted September 12, 2016. Gross domestic product, budget, procurement and O&M figures are from Jane's Online, Defence Budgets. https://janes.ihs.com/CustomPages/Janes/Jdb/JdbHome.aspx, consulted September 15, 2016.

Annex A—Management Action Plan

Comd RCAF's Preamble

The Comd RCAF needs resources to fly in support of the mission tasks he is assigned, as well for training to meet these objectives. It is impossible to divide out FG and FE costs as the nature of flying operations is that you are operating the minute the engine is started. FE missions are required for the advancement of crew qualifications as FG missions are taken advantage of by various users for their own purposes. Attempting to define and measure FE and FG leads to an inept and incomplete picture that ill informs strategic decisions on resource management. The Comd RCAF has instituted a number of control mechanisms to ensure corporate responsibility and clear and continued oversight of the precious resources. Through the Investment Resource Management Committee and the monthly Commander's Update Brief processes, he monitors the YFR outputs and readiness levels by fleet and capability. He does this in concert with DGAEPM from ADM(Mat).

The RCAF is an innovative, dynamically changing, and technologically demanding organization. Its workforce needs to be agile and responsive to these demands. Through re-invigorated personnel governance in the Air Human Resources Committee and a demanding monthly Commander's Update Brief process, he monitors and adjusts the manning of his organization to respond to this demand, looking holistically across the four components of his workforce, namely Reg F, Res F, civilian and contractors. He has demanded and will receive a future outlook to morph the RCAF personnel occupation structure and to respond to the needs of tomorrow by meeting many of the items identified in this report.

Air Force readiness is maintained on a daily basis through operations and training seamlessly conducted from the same main operating b ases. We fight from our air Wings. The typical Canadian Army paradigm of readiness is directly linked to collective training however, that does not reflect the reality of how the RCAF trains. The integrated nature of training and operations from the operational down to the tactical level, indicative of the fundamental characteristics of air power, and the continuous nature of our training and operations regimen, means it is not as simply defined, nor tracked.

ADM(RS) Recommendation

1. The RCAF continue to develop the RCAF FP&R Directive to ensure all missions are well developed. The directive should explicitly include assumptions, risks, and supporting capabilities, or reference other documents which may be needed to adequately define the parameters of the mission to be met.

Management Action

The RCAF FP&R Directive is updated annually with each new version of the CDS FP&R. The next version of the RCAF FP&R annex will include categories to document key assumptions, major concurrency risks, and key risks pertaining to supporting capabilities, to more fully document capability expectations and relationships with other tasks.

OPI: Comd RCAF
Target Date: March 2018

ADM(RS) Recommendation

2. The RCAF document the planning process that generates FG YFR and annually update the variables leading to that allocation for each RCAF fleet.

Management Action

The RCAF has modified the AMC governance and will produce an updated Air Force Order on the AMC process for YFR funding by September, 2017. This process feeds the National Procurement Oversight Committee which is the L0 governance for YFR jointly presented by DGAEPM and the RCAF.

The RCAF is currently producing a FE concept document for each aircraft fleet. These will document how the annual aircraft fleet YFR is determined, more specifically what the major limiting/determining factors are. This will be revised on a cyclical basis of multiple years (most likely 3-5 years).

As part of the annual business planning process, the key variables that determine that YFR will also be noted.

OPI: Comd RCAF
Target Date: March 2019

ADM(RS) Recommendation

3. The RCAF regularly review and update the MRP. The MRP should include enhanced direction based on recent operations and better defined air detachment unit and sub-unit readiness requirements.

Management Action

MRP review and amendment is in progress. The next approved and published version will include a section defining a regular review cycle for this document. Unlike Canadian Army units who must deploy to the field to test readiness, RCAF air detachment command and control and support readiness is proven via a Wing's capability to conduct air operations daily. Specific capability readiness is captured in normal crew readiness compulsory flying sequences and currencies. These are maintained during routine training and operations for all fleets and verified via a complex system of standards and upgrades ordered in the Flight Operations Manuals and monitored by Standards and Evaluation Teams. 1 CAD will be tasked to review these as well on a cyclical basis.

OPI: Comd RCAF
Target Date: June 2017

ADM(RS) Recommendation

4. The SJS work with the RCAF and ADM(Mat) to evolve the TARM process to both plan and report performance. This process should demonstrate how all requests for air effects are met by RCAF capabilities or by other means. It would also permit the DND/CAF to identify RCAF capability or capacity gaps and evaluate the cost-effectiveness of contracted air resources.

Management Action

SJS will work in coordination with RCAF (Directorate of Air Readiness) to develop a reporting process that includes a performance measurement framework to contrast and compare the initial TARM apportionment with actual execution. This process will include information from ADM(Mat) and L1s on contracted solutions that were used to offset or augment RCAF capabilities. End state to be achieved is an annual report that identifies the total CAF aerospace requirements in a given fiscal year. The RCAF will also attempt to advance the planning time of the TARM process to produce a realistic planning prediction earlier. This will be introduced in a phased approach with a completion target for TARM is FY 2019/20. To execute this for FY 2018/19 would mean to modify the process before Fall 2017 which is not feasible.

OPI: DOS SJS
OCI: Comd RCAF, ADM(Mat)
Target Date: May 2019

ADM(RS) Recommendation

5. The RCAF reassess FP&R aircraft and equipment requirements and documents the current materiel deficiencies. The RCAF must strive to ensure the quantity of aircraft and equipment in major capital equipment acquisition activities reflects those requirements.

Management Action

The RCAF FP&R Directive is updated annually with each new version of the CDS FP&R. With the next version of the RCAF FP&R, the RCAF will use the CFD Capability Based Plan as a guideline to identifying which of the concurrency risk tasks will be identified for resolution within the RCAF's Force Development plan. Since the Capability Based Plan will then inform future versions of the FP&R, this will then be aligned by the VCDS / Chief of Force Development. The RCAF will produce an annex that will summarize the major components of the concurrency risk and any materiel deficiencies associated with that.

OPI: Comd RCAF
Target Date: December 2018

ADM(RS) Recommendation

6. The RCAF review the ELE change process to ensure the supportability of legacy systems is not negatively impacted. To avoid capability gaps, legacy capabilities and associated ELEs should be sustained until replacement capabilities reach full operating capability.

Management Action

Review of RCAF and ADM(Mat) ELE validation and change processes is underway. Work continues to ensure common understanding and alignment between ADM(Mat) AF9000+ and RCAF Air Force orders related to ELE. Implementation of tools to support enhanced tracking in extant governance processes (Air Force Development Committee) and an update of air force orders will serve to: define stakeholder responsibilities including reporting and tracking; establish critical timelines; and eliminate capability gaps resulting from a delay in ELE validation and change activities.

OPI: Comd RCAF
OCI: OCI: VCDS, CFO and ADM(Mat)
Target Date: December 2017

ADM(RS) Recommendation

7. The RCAF conduct an independent review to study RCAF manning issues and assess aircrew requirements from a cross-occupational perspective to verify the aircrew occupation sizes in advance of the Future Aircrew Training Project.

Management Action

An independent review is deemed unnecessary at this time due to the need to factor in classified material associated with interim fighter demands and pre-Departmental Performance Report factors to consider. The Director Air Personnel Strategy has commenced a detailed analysis of manning by capability across the Reg F, Res F and civilian workforce. This analysis will be compared to the extant establishment and will inform the Comd RCAF about the priority areas that need to be resourced in this constrained environment. The analysis includes a baseline review of PML to ensure that chronically short occupations (e.g., pilot) are not carrying unnecessary generic positions.

The Director Air Personnel Strategy and Director Aircrew Simulation and Training have completed an assessment with 2 CAD to ensure that Future Aircrew Training has the info it needs to meet the needs of the hard operator occupations (pilot, air combat systems officer, airborne electronic sensor operator) based on future roles and required occupation PMLs. This will be reviewed annually. The Comd RCAF has directed a contractual mechanism to allow for this capability to be modified, thereby expanding or contracting the requirement.

Simultaneously, the RCAF is conducting a comprehensive review of the structure of all RCAF operational occupations (non-commissioned member and officer) in order to have a relevant force structure and workforce for the challenges of 2030. This review will propose a holistic look

at what hard piloting/operator skills are required and where. It will also look at the generic Air Force requirements for command and control required in Wing Operations Centers, the CAOC, Air Component Coordination Elements, and NORAD etc. When combined with the skilled qualifications and currencies required by future unmanned air vehicles, cyber and space thrown into this mix, the future occupational structure will provide a vision and roadmap to the responsive workforce required to meet the technological and operational demands of 2030. An information brief was conducted during the Air Board April 19, 2017. A decision brief is planned to be given to the Air Board in Fall 2017. Working with Director General Military Research and Analysis, CFAWC, Chief of Force Development, Chief of Programme, and other DND subject matter experts, this will be an iterative process over years that will evolve our establishment and occupational structure to become more agile and responsive.

OPI: Comd RCAF
Target Date: December 2018

ADM(RS) Recommendation

8. The RCAF conduct an independent establishment review to validate human resources requirements for all RCAF capabilities so that the RCAF personnel baseline can be re-established and re-balanced.

Management Action

An independent review is deemed unnecessary at this time due to the need to factor in classified material associated with interim fighter demands and pre-Departmental Performance Report factors to consider. In addition, the CAF Multi-Year Employment Plan process will be expanded to validate Reg F and Res F requirements, as well as some Alternate Service Delivery options analysis, in terms of re-balancing the personnel baseline in a constrained environment as new capabilities are introduced.

The RCAF has approached this requirement along two lines of operation. First, within the annual multi-year employment plan cycle, the RCAF has re-invigorated the Air Human Resources Committee, a Tier 3 governance meeting within the overarching RCAF governance structure. The RCAF will issue an Air Force order documenting this evolution of Air Human Resources Committee by October 2017. The Air Human Resources Committee will now meet twice per year. The Air Human Resources Committee looks at the holistic establishment and manning status of the RCAF personnel team (Reg F, Res F and civilian). The Air Human Resources Committee will feed Tier 1 governance to include the Air Board and the other personnel management boards to obtain blessings on long term establishment movements. The Air Human Resources Committee and the monthly Commander's Update Briefs are used now to issue operational level guidance to L2's and the staff concerning the management of the current manning of RCAF structures. This includes a continuous assessment of the workforce and how best to fill the operational requirements, to perhaps include contracted support. Decision briefs prepared for the Comd RCAF are synchronized with L0 governance and based upon the complexity of each issue. The Commander's Update Brief direction includes shaping our demand signal (not sure who the audience is for this report and whether they will have clear knowledge about what these terms mean, but "demand signal" in the context of this sentence, is

not clear to me. for the Strategic Intake Plan to include the flavor of the intake (again, not sure what is meant by this term "flavor of the intake." Recommend using plain language in keeping with TBS communications policy. I would offer suggestions but I do not know what is the intended meaning) by occupation. Commander's Update Brief direction modifies the focus of training in 2 CAD and how to maximize training resources. Air Human Resources Committee direction scopes(Recommend the word "scope" be removed. It is not clear. Not sure what is meant here but perhaps "focuses on" posting guidance for RCAF units to the Director Military Careers to ensure manning is aligned with critical capability requirements.

Second, the RCAF is also conducting a comprehensive review of the structure of all RCAF operational occupations (non-commissioned member and officer) in order to have a relevant force structure and workforce for the challenges of 2030. This review will propose a holistic look at what hard piloting / operator skills are required and where. It will also look at the generic Air Force requirements for command and control required in Wing Operations Centers, the CAOC, Air Component Coordination Elements, and NORAD etc. When combined with the skilled qualifications and currencies required by future unmanned air vehicles, and with cyber and space thrown into this mix, the future occupational structure will provide a vision and roadmap to the responsive workforce required to meet the technological and operational demands of 2030. An Information Brief was conducted during the Air Board on April 19, 2017. A Decision Brief is planned to be given to the Air Board in the Fall of 2017. Working with Director General Military Research and Analysis, CFAWC, Chief of Force Development, Chief of Programme, and other DND subject matter experts, this will be an iterative process which will take several years to evolve our establishment and occupational structure to become more agile and responsive.

OPI: Comd RCAF
Target Date: December 2018

ADM(RS) Recommendation

9. The RCAF continues to evolve the Air Reserve so that personnel are trained and employed to perform relevant tasks in support of RCAF requirements. Reg F occupation management should include oversight of Res F positions to ensure holistic and optimal employment of military personnel resources.

Management Action

RCAF Reserve Strategy 2025 is the recent program to deliver a sustainable Res F. The centralized occupation structure and management for the Res F and Reg F together is not reflective of the unique qualities and amorphous reality of the RCAF Primary Reserve. Since the nature of the RCAF reserve is a force based upon highly technical skill sets that take years of full time service to acquire, the vast majority of reservists in the RCAF have previous Reg F service where they acquired their skills. Interface with civilian industry human resource experts tell us that the best way to manage a workforce is through a flexible and adaptable system that meets dynamically changing demands. The Reg F occupation structure does not fit that mold. However, the flexible and agile system of the RCAF Res F does allow for this. It allows for the structure of the workforce to change based on the operational requirements of the RCAF and the availability of personnel resources for the Reserves' FE. Reg F occupation management is predicated upon a

fixed establishment and predictive career gates. This negates the geographic reality of the vast majority of the RCAF Reserves and ties the RCAF to a fixed Res F structure, which is not our intent.

RCAF has reinvigorated the Reserve recruiting program while initiating an ongoing reorganization of positions to focus on priority capabilities and introduce a new trade/employment program that brings younger Canadians into the force. This has already allowed the RCAF to grow the Res F to the highest level in years. Diversification of the intake will balance personnel numbers and stabilize the Reserve workforce. This is monitored monthly at the RCAF Commander's Update Brief. But this needs to be followed up with decentralized authorities and flexibility in the structure of the workforce. The 10-year program is encapsulated in the RCAF Reserve Strategy 2025, which was released in December 2016.

OPI: Comd RCAF
OCI: CMP
Target Date: December 2019

ADM(RS) Recommendation

10. The RCAF align collective training plans with RCAF FP&R missions to ensure each Air Force element regularly demonstrates required readiness through a defined validation activity.

Management Action

RCAF forces provide defined readiness through daily operations and, for certain force elements, collective training events. The RCAF MRP dictates how the RCAF Command and Control (ATF structure based) and mission support elements from within the MRP generated or 2 AEW generated forces will deploy to support ATFs. However, the premise that each air detachment needs a collective training event to be operationally ready is a Canadian Army paradigm that only really applies to 1 Wing (Tactical Aviation) within the RCAF MRP at the detachment level. Unlike Canadian Army units which must deploy to the field to test readiness, RCAF air detachment command and control and support readiness is proven via three mechanisms; first is 2 AEW's readiness, second is the MRP mandate for the Operational Support Squadron/Mission Support Squadron and finally, at the air detachment level, a Wing's capability to conduct air operations daily. Indeed, many ATFs that deploy worldwide do so independent of a full ATF HQ (unlike Canadian Army forces). Specific capability readiness is captured in normal crew readiness compulsory flying sequences and currencies. These are maintained during routine training and operations for all fleets and verified via a complex system of standards and upgrades ordered in the Flight Operations Manual and monitored by Standards and Evaluation Teams. Also, 1 CAD will be tasked to review these as well on a cyclical basis.

Therefore the RCAF will work with the SJS in attempting to quantify and measure through the FP&R cycle the specific readiness of the RCAF. The RCAF will include in the next iteration of the FP&R an annex that lays out this paradigm and how RCAF readiness is maintained via this tiered system.

OPI: Comd RCAF
Target Date: March 2018

ADM(RS) Recommendation

11. The RCAF develop the capability to strategically monitor and manage readiness training costs. This should include the costs of all force element training exercises and other collective training events in support of Air Force readiness.

Management Action

The paradigm presented here is that we can divide out that which is readiness training and that which is the conduct of operations in support of a user. However, in the RCAF, these are mutually supporting and not exclusive concepts that cannot be divided. A new aircrew member does need a certain amount of readiness training. However much of this is accrued while providing real time operational support to a user. As well, one would never upgrade an individual who has never conducted an operational mission to aircraft commander. In the Canadian Army it is possible to allow someone to command a section, platoon or company even if they have never lead a lower organization in combat before. The RCAF fights from its Air Wings. On a daily basis the operational budget of an Air Wing is conducting simultaneously readiness training and operations. This paradigm, as explained above, propagates right down to the aircraft and individual level. One cannot divide out that which is FG versus that which is FE. Indeed on each collective training event it is equally impossible to divide out that which is being done for another user versus that which is being done for purely readiness ends.

The premise is that you can measure the readiness output of the RCAF and compare it to the resources allocated to measure that output independent of the operations conducted. However the reality is that it takes a certain amount of resources to field any capability, whether it is in support of a user or not, and this does not change that the RCAF must fly a certain amount to maintain its regulatory currency requirements. Indeed cancelling a user support task may indeed have significant readiness implications to the RCAF which would necessitate them to lay on additional training trips.

Therefore the RCAF will work with the SJS in attempting to quantify and measure through the PMF costs pertaining to training. However will not be able to break out with any level of fidelity the pure readiness costs without quoting the majority of the operating budget of 1 CAD and the NP budget of DGAEPM as they are intimately linked.

OPI: Comd RCAF
Target Date: March 2019

ADM(RS) Recommendation

12. The RCAF continue to improve its LLP and further develop and integrate its PMF into its decision making processes.

Management Action

The RCAF is in the process of increasing the resources supporting the LLP and updating how it is governed. The LLP implementation order will be updated accordingly. Commanders will then be reinforcing the importance of integrating this process into on-going performance management.

OPI: Comd RCAF
Target Date: March 2018

Annex B—Evaluation Methodology and Limitations

1.0 Methodology

The evaluation of the Air Force Readiness Program considered multiple lines of evidence to assess the program's relevance and performance. The methodology established a consistent approach in the collection and analysis of data to help ensure the reliability of the evaluation process. Quantitative and qualitative data collection methods were used and included document review, financial data review, key informant interviews and site visits. Qualitative information was used to establish the program profile and context as well as to interpret the significance of numerical data that was analysed. Comparison of both qualitative and quantitative assessments was used to validate the overall analysis and to develop the evaluation findings and recommendations.

1.2 Details on Data Collection Methods

1.2.1 Literature and Document Review

A review of program and related departmental documents was conducted in the initial phase of the evaluation to establish a general understanding of the Air Force Readiness Program. This initial review informed the scope of the evaluation and supported the development of the logic model and evaluation questions. These documents included previous evaluations and audits, including audits by the Office of the Auditor General, and other strategic documents and reports FP&R documentation, RPPs and DPRs, RCAF business plans. A more comprehensive document review was subsequently conducted to collect evidence against performance measures for relevance and performance. Reviewed documents included GC policy documents, departmental RPPs and DPRs, CDS and RCAF FP&R directives, RCAF strategic documents, business plans, project and committee reports and presentations, DRDC reports, and lessons learned reports. Relevant external research documentation was considered where pertinent.

1.2.2 Financial Data Review

Financial data was reviewed to assess the efficiency and economy of the program and trends in resource utilization and operational costs associated with Air Force readiness. Financial data was retrieved from DRMIS, RCAF and 1 CAD business plans, RCAF and 1 CAD comptroller financial reports and departmental financial reports.

1.2.3 Key Informant Interviews and Site Visits

Interviews were conducted with subject-matter experts, program stakeholders and DND/CAF personnel in key positions relevant to the Air Force Readiness Program. Initial discussions were held with the Directorate of Air Readiness Staff to inform the evaluation scope and identify specific issues for the evaluation. Subsequent interviews were also conducted with other Air Force staff. These interviews focused on providing context for observations derived from the document review, collecting expert opinion and supplementing data not available by other sources. In addition to interviews with RCAF staff at NDHQ, interviews were conducted with

key staff at 1 CAD HQ, 2 CAD HQ, select RCAF Wings, DGAEPM and CFAWC. Outside of the RCAF, interviews were conducted with SJS and CJOC readiness staff.

To provide the evaluation team with operational context for Air Force readiness, site visits were conducted concurrently with key informant interviews. Site visits were conducted at: 1 CAD HQ and 2 CAD HQ in Winnipeg, Manitoba; at 8 Wing and CFAWC in Trenton, Ontario; and 2 Wing and 3 Wing in Bagotville, Quebec.

2.0 Data Analysis

Data from each of the sources was compiled against performance measures and indicators for program relevance and performance. Resources and activities necessary for readiness generation (e.g., personnel, training, equipment, maintenance, infrastructure, and governance) were assessed against performance indicators and used to analyze the effectiveness of the immediate and intermediate outcomes. Resource utilization and trend analysis of input and output costs was used to analyze the efficiency and economy of the program, focusing primarily on personnel, maintenance, infrastructure, and training resources. Observed trends in resource utilization were contextualized using qualitative data.

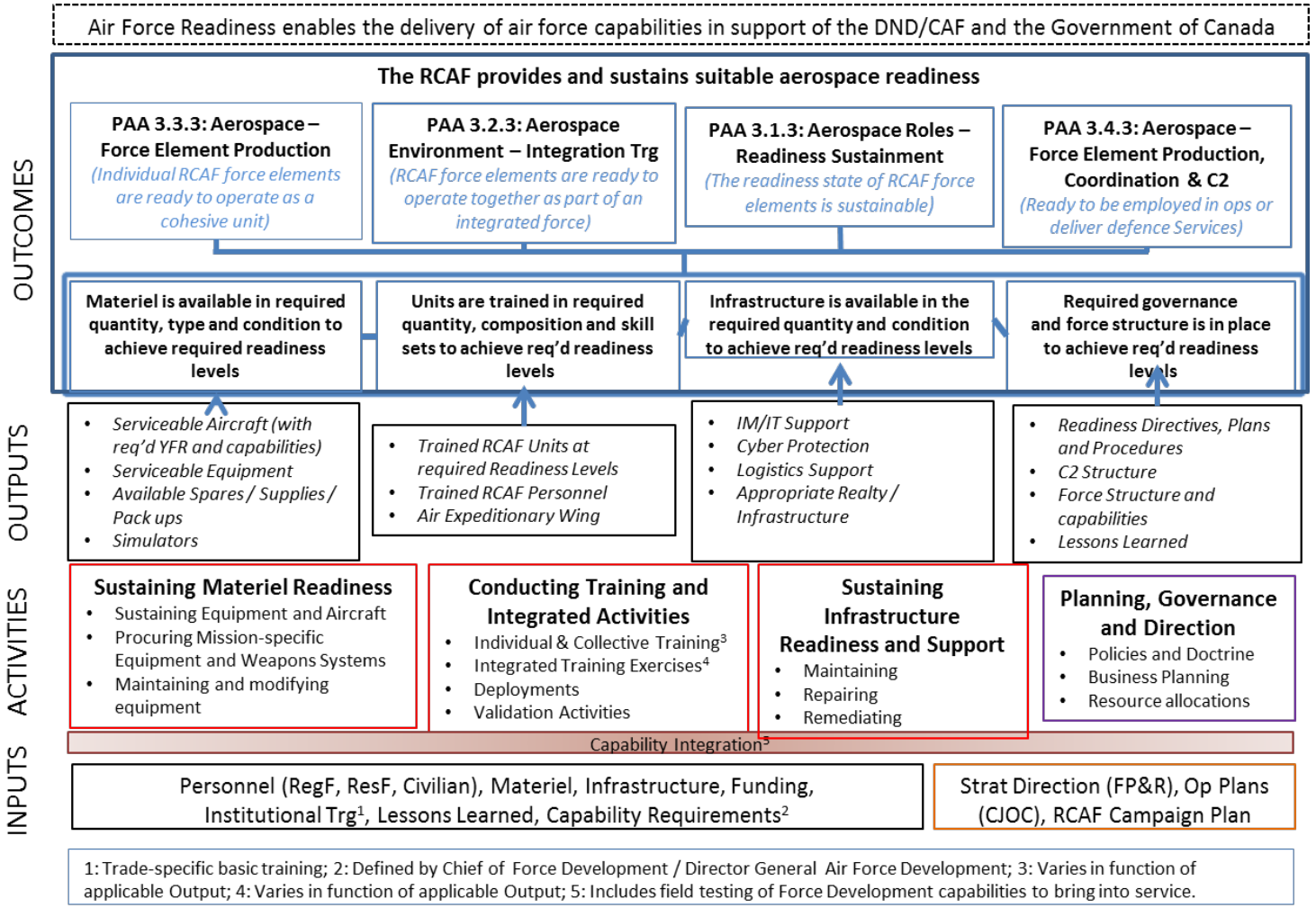
3.0 Limitations

The following table shows the limitations related to the data sources and methodologies used in the assessment of the Air Force Readiness Program and the mitigation strategies applied to them.

Limitation	Mitigation Strategy
Limited activity-based costing data to assess program efficiency and economy, and inconsistent reporting of program data due to PAA changes	Performance data and funding expenditures were obtained from relevant RCAF and ADM(Mat) organizations and available program documentation.
Direct assessment of the ultimate program outcome.	Focus was placed on measuring the activities and outputs of the immediate and intermediate outcomes to establish findings. Deductions were made from these findings to assess achievement of the long term outcome.
Possibility of interviewees providing biased information.	A comparison was made between interview evidence, and other information sources (e.g., program documentation and other interviewees) and considered in proportion to the evidence.
Lack of benchmarking information to assess program economy and efficiency.	Limited high level benchmarking to some allied nations was completed using a common external source (Janes) to avoid country biases.

Table B-1. Evaluation Limitations and Mitigation Strategies. This table lists the limitations of the evaluation and the corresponding mitigation strategies.

Annex C—Logic Model



FigureC- 1. Logic Model for the Air Force Readiness Program. This chart shows the relationship between the program activities, outputs and expected outcomes.

Annex D—Evaluation Matrix

Evaluation Matrix—Relevance				
Evaluation Issues/Questions	**Performance Measures**	**Program Data**	**Document Review**	**Key Informant Interviews**
2.1 To what extent does the Aerospace Readiness Program address a continued need?	2.1.1 Evidence of past engagement of Air Force readiness over the past five years	No	Yes	Yes (CJOC, RCAF)
2.2 Does the Aerospace Readiness Program align with federal roles and responsibilities?	2.2.1 Alignment with government acts, legislation and strategic direction 2.2.2 The extent to which the RCAF conducts activities that support the responsibilities of other government departments, other levels of government or the private sector	No	Yes	No
2.3 Does the Aerospace Readiness Program align with federal government priorities and Defence strategic outcomes (DND/ CAF priorities)?	2.3.1 Alignment with or inclusion of Air Force readiness in stated government priorities 2.3.2 Alignment with or inclusion of Air Force readiness in DND/CAF priorities or strategic outcomes	No	Yes	Yes (CJOC, RCAF)

Table D-1. Evaluation Matrix—Relevance. This table presents the evaluation issues/questions and corresponding data collection methods that were used to assess the relevance of the Air Force Readiness Program.

Evaluation Matrix—Performance: Achievement of Expected Outcomes (Effectiveness)					
Evaluation Issue/ Question/Outcome	**Performance Measures**	**Program Data**	**Document Review**	**Questionnaire**	**Key Informant Interviews**
2.4.1 Required governance and force structure are in place to achieve required readiness levels.	2.4.1.1 Extent to which appropriate RCAF governance is in place to effectively incorporate readiness planning, prioritizing and decision making	Yes	Yes	No	Yes (SJS, CJOC, RCAF)
2.4.2 Aircraft and materiel are available in required quantity, type and condition to achieve required readiness levels.	2.4.2.1 Extent to which RCAF aircraft and other equipment is available (in required quantity, type and condition) to meet readiness requirements	Yes	Yes	No	Yes (CJOC, RCAF, DGAEPM)
	2.4.2.2 Extent to which materiel (in required quantity and condition) is available to meet readiness requirements (i.e., sparing)	Yes	Yes	No	Yes (CJOC. RCAF, DGAEPM)
2.4.3 Infrastructure and information systems are available in the required quantity and condition to achieve required readiness levels.	2.4.3.1 Extent to which RCAF infrastructure, information systems, and support elements are available to meet readiness requirements	Yes	Yes	No	Yes (RCAF)

2.4.4 Units and personnel are trained in required quantity, composition and skill sets to achieve required readiness levels.	2.4.4.1 Sufficiently trained personnel (in required quantity and type) to support current and future RCAF readiness requirements (RCAF FP&R)	Yes	Yes	No	Yes (RCAF)
	2.4.4.2 Extent to which training (individual and collective) is sufficient to meet readiness requirements	Yes	Yes	No	Yes (RCAF)
	2.4.4.3 Extent to which the AFEC has the necessary resources (personnel / equipment / materiel) to satisfy readiness requirements.	Yes	Yes	No	Yes (CJOC, RCAF)
2.4.5 The RCAF provides and sustains suitable Air Force readiness	2.4.5.1 Extent to which RCAF force elements met readiness expectations when assigned to operational missions or defence services	No	Yes	No	Yes (CJOC, RCAF)

Table D-2. **Evaluation Matrix—Performance (Effectiveness).** This table presents the evaluation issues/questions and corresponding data collection methods used to assess the Air Force Readiness Program's achievement of outcomes (effectiveness). .

Evaluation Matrix—Performance: Demonstration of Efficiency and Economy				
Evaluation Issues/ Questions	**Performance Measures**	**Program Administrative and Finance Data**	**Document Review/ Benchmarking**	**Key Informant Interviews**
2.5.1 Has the Air Force Readiness Program used resources efficiently?	2.5.1.1 Trends in readiness training costs	Yes	Yes	Yes (RCAF)
	2.5.1.2 Trends in equipment sustainment	Yes	Yes	Yes (RCAF)
	2.5.1.3 Trends in cost of infrastructure sustainment	Yes	Yes	Yes (RCAF)
	2.5.1.4 Trends in cost of governance	Yes	Yes	No
	2.5.1.5 Use of business information to optimize resource efficiency	Yes	Yes	Yes (RCAF)
	2.5.1.6 Alternatives to achieve outcomes using fewer resources	Yes	Yes	Yes (RCAF)
2.5.2 Has the Air Force Readiness Program used resources economically?	2.5.2.1 Trends in the cost of the Air Force Readiness Program	Yes	Yes	No
	2.5.2.2 Management and funding of YFR	Yes	Yes	Yes (RCAF)
	2.5.2.3 Comparison of notional budget versus demand	Yes	Yes	Yes (RCAF)
	2.5.2.4 Demonstrated efforts to reduce or stabilize input resources	Yes	Yes	Yes (RCAF)

	2.5.2.5 Adequacy of input resources to produce operational effects (i.e., Are they appropriate, sustainable and affordable?)	Yes	Yes	Yes (RCAF)
	2.5.2.6 Benchmarking to allied Air Forces	Yes	Yes	No

Table D-3. Evaluation Matrix—Performance (Efficiency and Economy). This table presents the evaluation issues/questions and data collection methods used to assess the Air Force Readiness Program's efficiency and economy.