National Defence / Défense nationale

B-GA-402-003/FP-001

Royal Canadian Air Force Doctrine:

Force Sustainment

Issued on authority of the Commander Royal Canadian Air Force

Custodian: Royal Canadian Air Force Aerospace Warfare Centre
Air and Space Power Development Centre

2024-04-26

Canada

LETTER OF PROMULGATION

3020-1 (Comd 1 CAD)

Date in signature block

ROYAL CANADIAN AIR FORCE (RCAF)
DOCTRINE: FORCE SUSTAINMENT

1. Support and sustainment are essential elements in conducting air and space power operations. Support is the administrative and logistic aid provided to a formation, unit, other element or individual. It is conducted throughout the Canadian Armed Forces (CAF) and the Department of National Defence (DND) as well as at all levels of command. Sustainment is the ability to provide support for the maintenance of effective military power and is dependent on processes that ensure sufficient capability in terms of personnel, equipment, facilities and consumables necessary for the force to complete its operational tasks.

2. The RCAF's ability to support and sustain air and space forces relies on access to secure facilities that are in the right locations with adequate infrastructure and utilities, have the right mix of essential personnel and can provide required services.

3. This Force Sustainment publication replaces B-GA-402-003/FP-001, *Royal Canadian Air Force Doctrine: Force Sustainment*, 2nd Edition, July 2017.

2024-04-26

X

MGen I.S. Huddleston
Commander 1 Canadian Air Division
Signed by: DOYLE, PAUL 973

I. S. Huddleston
Major-General
Commander 1 Canadian Air Division

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFACE

This publication provides the operational-level doctrine for the support and sustainment of the Royal Canadian Air Force (RCAF).

While intended primarily for the operational level, this manual also describes fundamentals applicable at the strategic and tactical levels and has been designed for use by

a. all RCAF leadership and command teams;

b. all project-management staff working on RCAF equipment acquisitions;

c. CAF schools and academies involved in the training, education and development of personnel in the support of air and space operations;

d. line and staff organizations that plan and provide support to air and space operations; and

e. external agencies and forces that may provide support to RCAF air and space operations.

This doctrine is presented in five chapters:

a. Chapter 1 – **Fundamentals of Support** provides an introduction to the concept and components of support as well as the principles of support that guide planning and conducting support and sustainment operations. It concludes by examining the relationship between the levels of sustainment and lines of support.

b. Chapter 2 – **The DND/CAF Support Framework** examines the national and international organizations that make up the framework that supports the RCAF.

c. Chapter 3 – **Support Functions within the RCAF** focuses on supporting elements (operations support, aircraft-weapon-system maintenance, mission support and specialist support) and support service-delivery options (military assets and contract services, host-nation support [HNS][1] and cooperation with other nations).

d. Chapter 4 – **Planning Support for Operations** introduces the CAF operations planning process (OPP); provides an overview of support planning, the support estimate and its planning factors; and discusses support planning during operations and considerations for reconstitution.

e. Chapter 5 – **Support to Air and Space Operations** discusses unique support situations (e.g., support to tactical aviation and maritime air), theatre

support, how wings support operations and how RCAF operations in North America are supported.

This publication is harmonized with CAF joint support doctrine, supersedes B-GA-402-003/FP-001, *Royal Canadian Air Force Doctrine: Force Sustainment*, 2nd Edition, July 2017, and is to be used in conjunction with the following:

a. B-GA-400-000/FP-001, *Royal Canadian Air Force Doctrine*;

b. B-GA-401-002/FP-001, *Royal Canadian Air Force Doctrine: Intelligence, Surveillance and Reconnaissance*;

c. B-GA-401-004/FP-001, *Royal Canadian Air Force Doctrine: Air Mobility*;

d. B-GA-402-001/FP-001, *Royal Canadian Air Force Doctrine: Command and Control*;

e. B-GA-402-002/FP-001, *Royal Canadian Air Force Doctrine: Force Protection*, 1st Edition (August 2021);

f. B-GA-403-000/FP-001, *Canadian Forces Aerospace Shape Doctrine*;

g. B-GA-407-001/FP-001, *Royal Canadian Air Force Doctrine: Personnel*;

h. B-GL-005-400/FP-001, Canadian Forces Joint Publication (CFJP) 4-0, *Support*, 2nd Edition (June 30, 2021);

i. NATO, Allied Joint Publication (AJP)-4, *Allied Joint Logistic Doctrine*, Edition A, Version 1 (October 15, 2010);

j. NATO, AJP-6, *Allied Joint Doctrine for Communications and Information Systems*, Edition A, Version 1 (February 28, 2017); and

k. USAF, *Air Force Doctrine Publication (AFDP) 4-0*, *Combat Support*, Edition 5 (January 2020).

Suggestions and recommendations for improvement to the doctrine are welcome and should be forwarded to the Royal Canadian Air Force Aerospace Warfare Centre, attention: Doctrine Development Branch.

KEYNOTES

These keynotes are the fundamental beliefs upon which this doctrine publication is built.

- "Air [and space power require] a high level of technical and logistical support that must be provided from a support base of operations.[2]

- The RCAF conducts routine and contingency operations, both domestic and international, from wings. To fulfil the responsibilities assigned to the RCAF, wings must be capable of continuing to generate forces as well as launching, sustaining, and recovering air capabilities at all times.

- The RCAF uses the integrated CAF support framework, including automated materiel management and other support information management (IM) systems.

- In today's operating environment, operational support is the interdependency of logistics, communications and engineering, supported by health services (HS) and force protection (FP).

- The RCAF is required to comply with unique legislative and regulatory instruments such as the Aeronautics Act. This is implemented through the DND/CAF Airworthiness Program, which obliges the RCAF to conduct training to provide specific levels of oversight with clear accountability and to conduct maintenance and materiel support activities in accordance with applicable airworthiness instruments.[3]

- Support planning must be fully integrated in all phases of the planning process.

CHAPTER 1
FUNDAMENTALS OF SUPPORT

SECTION 1 – INTRODUCTION

Support is defined as the "administrative and logistics aid provided to a formation, unit, other element, or individual"[1] and must be focused on ensuring the success of an operation. The RCAF is, and will continue to be, called upon to operate in widely varied domestic and international theatres of operations, deploying a spectrum of air force capabilities as a single service but most often within joint or multinational forces.

Sustainment is defined as "the ability of a state, or a force, to maintain effective military power to create desired effects."[2] The sustainment of air and space power comprises complex activities that generally take place under the umbrella of the integrated DND/CAF support framework and are operated using corporate-enterprise IM systems, such as the Enterprise Resource Planning software.[3] Some aspects of support to the RCAF, such as aircraft maintenance and flight feeding, are unique but are subsets within the DND/CAF framework.

The purpose of support is to sustain the operational readiness of the RCAF for deployment and employment of forces. As such, support is fundamental to every RCAF activity, whether that activity is a part of a war, a military operation other than war or a training activity.

SECTION 2 – COMPONENTS OF SUPPORT

Support involves the provision of the following range of services, which are primarily delivered through CAF-wide support systems (RCAF-specific aspects are discussed in Chapter 3):

a. Logistics services, including air transportation and movements; materiel[4] management and distribution; ammunition and explosives; laundry and bath; finance; contracts management; food; and postal services;

b. Aircraft maintenance;

c. Vehicle and equipment maintenance services;

d. Military engineering services, including mobility, counter-mobility, survivability, sustainment engineering and geospatial-engineering support;

e. Communication and information system (CIS), which refers to "an assembly of equipment, processes, procedures and personnel organized to accomplish specific information conveyance and processing functions";[5]

f. Military police (MP) services, including law-enforcement operations, security

operations, custody operations, mobility-support operations, close-protection operations and force protection (FP) operations;

g. HS, including medical, psychological and dental support;

h. Personnel-support services, including personnel management; administration; mortuary services and the repatriation of human remains; honours and awards; administrative investigations; historical reporting; morale and welfare support; and chaplain services;

i. Contracting, which is a force multiplier that enables the long-term sustainment of operations. Contracting can be an effective and efficient means of expanding capacity, mitigating over-tasked CAF resources and filling support capability gaps; and

j. Specialist services, which may include legal, diplomatic, policy advice and public affairs (PA).

SECTION 3 – PRINCIPLES OF SUPPORT

The principles of support are guidelines for planning and conducting support and sustainment operations. They provide a basis upon which to measure the soundness of a plan. The following are the principles of support:[6]

a. **Foresight**. Foresight is the ability to predict and manage critical support factors that might constrain the force commander's freedom of action and is essential in support planning and execution. Support commanders and planners must assess the probable course of future operations and forecast the likely requirement for personnel, materiel, equipment and support services. Foresight rests not only on the ability to anticipate future operations, but also to identify, accumulate and maintain support assets, capabilities, and information. It can be improved through the following:

(1) Close liaison between operations and support staff. As support requirements will often have a direct impact on strategic-level, operational-level and tactical-level activities, both operations staff and support staff should ensure that future support plans and operational plans are fully integrated.

(2) A detailed understanding by the support staff of available resources (logistics, engineering, CIS, MP, HS, and personnel-support services) and movement assets, the intended location of deploying an RCAF air task force (ATF) and anticipated environmental conditions. This will assist in providing the right resources at the right time and in the right place to meet operational requirements.

(3) Access to intelligence and operations (J2 and J3)[7] information to assist in predicting the outcome of an adversary's manoeuvres and engagements. During operations, foresight may become increasingly dependent on predicting an opponent's plans rather than determining support requirements based solely on those of friendly forces.

b. **Economy**. Economy of effort requires that minimum means and resources be expended or employed in areas other than where the main effort is intended to take place. As support resources are typically in short supply, commanders must always consider economy in their allocation while ensuring that mission accomplishment is not jeopardized. The efficient employment of support resources is often best accomplished by centralizing the control of these resources; however, this must be balanced with the requirements of the operational plan. Staff at all levels must continually monitor and take action against unnecessary redundancy.

c. **Flexibility**. Flexibility refers to the ability to adapt structures, functions and procedures to changing situations. Flexibility may be achieved through foresight on the part of the support staff, the establishment of reserve stocks of critical materiel, or through the use of all available types of support resources, such as contracting, HNS or that which may be provided through national or international governments and civilian organizations.

d. **Simplicity**. To ensure that support arrangements are robust and readily understood, they should be simple, both in their conception and execution. Simplicity of support processes and procedures facilitates flexibility and is enhanced by doing the following:

(1) Establishing a robust command and control (C2) framework that provides delegated authority and allows mission command to enable commanders to resolve support complexity.

(2) Using common support processes among joint task force (JTF) components or component commands, allies and other organizations when deployed as part of an ATF, JTF or multinational force. Where systems are incompatible, liaison and user-interfaces should be established.

(3) Maintaining control along the strategic lines of communication (SLOC) and in the theatre of operations to ensure freedom of action.

(4) Ensuring that future platform/system developments are consistent with the principle of simplicity by the coherent development of support solutions.

e. **Cooperation**. Cooperation among staff at all levels of command and with

other governmental and civilian agencies (both national and international) greatly enhances the effectiveness of the support provided. Liaison officers provide a way to develop mutual confidence and, in turn, cooperation. Cooperation may also be enhanced through the standardization of doctrine, international exchange programmes and participation in multinational exercises. Force elements must be able to rely on their support staffs and organizations. It is the responsibility of commanders and staffs at all levels to ensure this close cooperation is planned and coordinated. Cooperation is particularly important in multinational and joint operations in which national or component interests have the potential to undermine relationships.

f. **Self-sufficiency**. Self-sufficiency means that a force initially has at its disposal all essential resources to conduct operations for a predetermined period.

g. **Visibility**. The ability of commanders to control, allocate or coordinate support will be significantly impaired if they lack visibility of force assets, inbound materiel and the means to allocate priorities. Visibility is a form of situational awareness that is attained when the commander is provided with timely and relevant information regarding emerging support requirements and available support resources.

h. **Responsiveness**. Staff must provide the right support when and where it is needed. Responsiveness is characterized by the speed of response to the needs of the military force.

i. **Survivability**. Survivability refers to “the ability of the support system to ensure the continuity of specified functions during and after exposure to abnormal conditions” such as natural disasters, climatic events or combat. Survivability and protection of assets are critical factors in creating a support plan. For this reason, support plans must be integrated with FP plans.[8]

Sustaining RCAF capabilities consists of maintaining the capability at the desired level of readiness. This is accomplished through continuation training and maintaining equipment, using fixed Canadian operating locations (RCAF wings) with permanent infrastructure. From wings, the RCAF derives its capacity to generate and sustain the full spectrum of air and space power capabilities it is expected to deliver. The majority of RCAF operational capabilities can be found at one of seven primary wings responsible for generating forces that require significant sustainment: Greenwood and Shearwater, Nova Scotia; Bagotville, Quebec; Trenton, Ontario; Winnipeg, Manitoba; Cold Lake, Alberta; and Comox, British Columbia.[9]

Wings have the following two primary purposes:

a. **Force generation (FG)**. Wings conduct the training (from individual skills to team integration) required to maintain operational readiness. FG also

includes generating equipment and personnel for an ATF when designated "high readiness (HR)" on a rotational basis.

b. **Force employment (FE)**. Wings execute assigned tasks using allocated forces.

LEVELS OF SUSTAINMENT

Each level of sustainment[10] is defined by the outcome intended and not by the level of command or the size of the element involved. Although the levels of sustainment form a hierarchy, there is a significant degree of overlap between them:

a. **Strategic level of sustainment**. Strategic sustainment is primarily concerned with mobilization, national acquisition, force posture and readiness, FG, force projection, and force sustainment.

b. **Operational level of sustainment**. This level of sustainment is concerned with sustaining a military force within a theatre of operations and thus links the strategic and tactical levels of sustainment. It is primarily within this level that operational support is provided.

c. **Tactical level of sustainment**. The tactical level is concerned with providing the necessary materiel and services to military forces. This task is accomplished through the performance of a variety of support tasks, including replenishment, infrastructure construction and repair, HS, materiel management and personnel administration.

LINES OF SUPPORT

The CAF support framework constitutes a continuum that stretches from national resources such as infrastructure and industry to the individual war fighter at sea, on land and in the air. Support capabilities along this continuum are organized into layers that are commonly referred to as lines of support.[11] Although this system is generally linear (i.e., one line of support flows to the next), it is also flexible, allowing the bypassing of lines of support where and when appropriate.

The allocation of support capabilities within each line conforms to the degree of need, the threat and the requirement for mobility and FP. The grouping of capabilities into lines of support ensures that each level of command is effectively supported. A line of support may contain a number and variety of support units.

Elements assigned to a given line of support have the capabilities required to support the needs of the operation. This is based on the premise of centralized control and decentralized execution, which allows for flexibility in the distribution process and facilitates rapid redistribution.

There are four lines of support:

a. **First-line support** refers to support capabilities that are organic to a ship, unit or squadron;

b. **Second-line support** refers to support capabilities that are organic to a formation, such as an RCAF wing;

c. **Third-line support** refers to support capabilities provided to a military force within a theatre of operations or at installations established along the SLOC, such as operational support hubs (OS Hubs).[12] It is not uncommon for second and third lines of support to be meshed together due to the size of the mission; and

d. **Fourth-line support** refers to support capabilities provided by strategic-level resources, such as national depots, contractors or industry.

RELATIONSHIP BETWEEN LEVELS OF SUSTAINMENT AND LINES OF SUPPORT

There is a close relationship between levels of sustainment and lines of support[13] as depicted in Figure 1-1. While the former describes the level of effort involved, the latter indicates where support assets are grouped within the military command structure.

Equally important is the fact that the levels of sustainment and lines of support overlap each other.

a. A level of sustainment may encompass elements of more than one line of support. An example of this is tactical-level sustainment, which incorporates first-, second- and third-line support.

b. A line of support may correlate to more than one level of sustainment. For example, third-line support may be found at both the operational and tactical levels of sustainment.

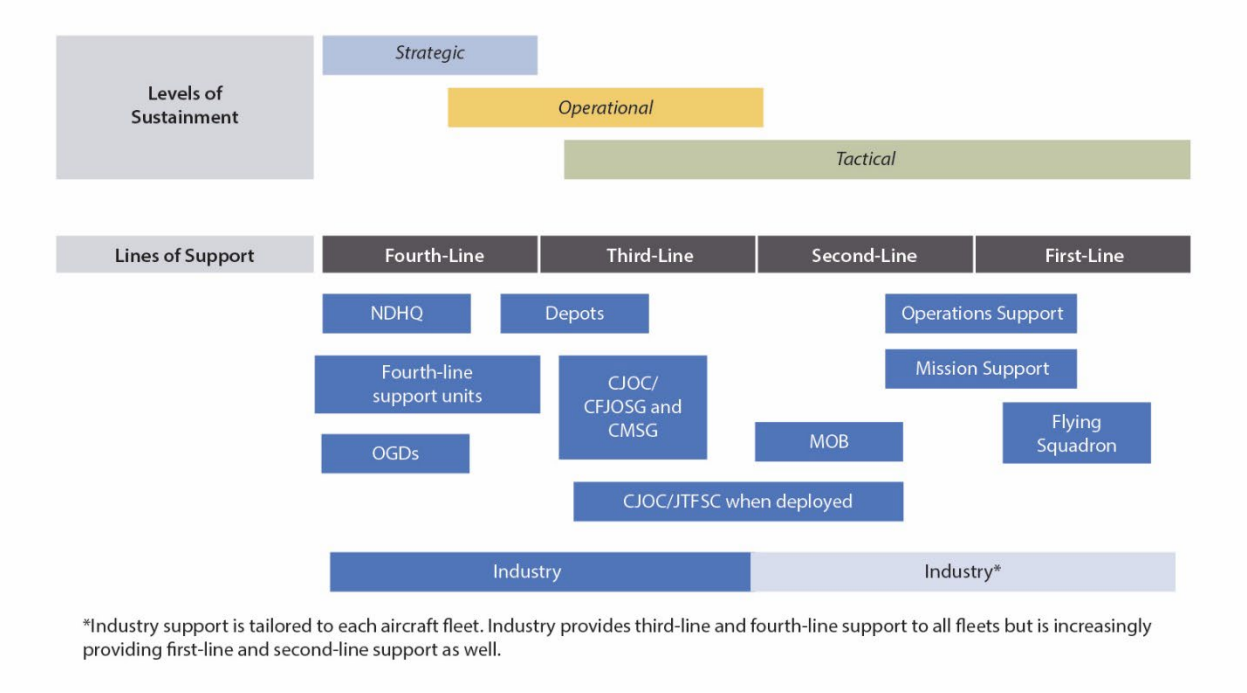

Figure 1-1. Levels of sustainment and lines of support

A more complete description of the levels of sustainment and lines of support for the maintenance of RCAF air assets is outlined in Chapter 3.

CHAPTER 2
THE DND/CAF SUPPORT FRAMEWORK

SECTION 1 – GENERAL

As the Canadian military is unified, support and sustainment of the RCAF take place under the umbrella of the DND/CAF support framework. This framework consists of interrelated levels of sustainment and lines of support, within which commanders and staffs operate to deliver effective support. This military structure works with other entities within the comprehensive approach,[1] such as other government departments and agencies (OGDA), multinational military forces (e.g., NATO) and international organizations (e.g., the United Nations), to span the support spectrum from civilian service providers to end users.

The support network comprises the following three main parts:

a. **National support**. The capabilities required to project and sustain a force.

b. **SLOC**. The conduit through which forces are deployed and sustained.

c. **Theatre support**. Capabilities that sustain forces within a theatre of operations.

SLOC and theatre support are described in Chapter 5, Support to RCAF Operations.

SECTION 2 – NATIONAL SUPPORT

National support comprises military and civilian organizations and capabilities that support domestic and deployed military operations, training and FG activities. While national support is focused at the strategic level, it also involves certain elements at the operational level, such as support to campaign planning. National support includes the environmental command support staff (e.g., Comd RCAF staff); fourth-line support units; national infrastructure and industry; international agreements and arrangements; and OGDA. National support provides third-line and fourth-line support capabilities. RCAF units access national support through 1 Canadian Air Division (1 CLDN Air Div) staff working with the appropriate assistant deputy minister (ADM) and, when deployed, through Canadian Joint Operations Command (CJOC) staff who work with the ADMs.

NATIONAL DEFENCE HEADQUARTERS

There are a number of organizations within National Defence Headquarters (NDHQ) that are critical to the provision of national support. For a full description of their roles and responsibilities, refer to B-GL-005-400/FP-001, CFJP 4-0, *Support*, Section II: “National Support.”

NDHQ group principals provide departmental-wide support to enable the CAF to

conduct operations and serve as the CAF's conduit to civilian industry. The group principals commonly involved in supporting CAF operations are the following:

a. **Assistant Deputy Minister (Materiel) [ADM(Mat)]** is responsible for the procurement of goods and services from industry, materiel life-cycle management and materiel-related support for the CAF. It is through ADM(Mat) that the RCAF obtains the aircraft, vehicles, ammunition, food, clothing and supplies required to conduct operations. As the functional authority, ADM(Mat) sets the materiel management and distribution policies, procedures and business processes for the CAF.[2]

b. **Assistant Deputy Minister (Infrastructure and Environment) [ADM(IE)]** is the DND/CAF functional authority for engineering, including infrastructure realty services, architecture and engineering, the environment, nuclear safety, and fire services.[3]

c. **Assistant Deputy Minister (Finance) [ADM(Fin)]** provides financial and corporate services, including financial advice and support to operations; military pay and benefits; audit services; and financial-policy development.

d. **Assistant Deputy Minister Information Management (ADM[IM])** is responsible for the coordinated delivery of IM and information technology (IT) capabilities to DND/CAF.[4] ADM(IM) also oversees the Defence Major Capital Program for digital and digitally enabled capabilities, including space and C2 capabilities.

e. **Chief of Military Personnel (CMP)** is also the Commander of Military Personnel Command, which provides health care, spiritual services and individual training. CMP also includes Canadian Forces Health Services Group (CF H Svcs Gp), which coordinates the provision of medical and dental services to the CAF. CF H Svcs Gp commands deployable medical elements such as field ambulance units.

f. **Canadian Forces Provost Marshal** holds the appointment as Commander of the Canadian Forces Military Police Group, exercising C2 over all MP units involved in law enforcement and criminal-investigative duties.

In support of the Chief of the Defence Staff (CDS), the Strategic Joint Staff (SJS) provides military analysis and decision support to the CDS. The Strategic J4[5] conducts strategic-level planning, coordination and delivery of support for CAF operations. The Strategic J4 also manages the following DND/CAF functional authorities:[6] transportation, food services, fuels and lubricants, ammunition program performance, postal services policy, and CAF Road and Vehicle Safety Program.[7] The Strategic J4 staff works with the Royal Canadian Navy (RCN), Canadian Army (CA), RCAF, CJOC, Canadian Special Operations Forces Command (CANSOFCOM), Canadian Forces Intelligence Command (CFINTCOM), allied nations, NDHQ group principals and OGDA.

RCAF support and sustainment subject matter experts (SMEs) exist within many levels of NDHQ. Their responsibilities include the definition and management of RCAF-specific support requirements, the development and execution of RCAF-specific support policies and plans as well as the management of RCAF-specific equipment and infrastructure. The RCAF command staff interacts with several support organizations, including the SJS, the FE commands and NDHQ group principals.

SECTION 3 – FORCE EMPLOYMENT COMMANDS

There are two CAF joint force operational commanders (Comd CJOC and Comd CANSOFCOM) as well as one combined-force commander (Comd North American Aerospace Defence Command [NORAD]) that are supported by the RCAF. Comd CJOC has operational command of all CAF operations in Canada (except for those conducted under the NORAD Agreement) and of all CAF expeditionary operations (except for those conducted by CANSOFCOM). Comd 1 Cdn Air Div is the joint force air component commander (JFACC) for the CAF and is double hatted as the Comd Canadian NORAD Region (CANR), accountable to Commander NORAD (CDRNORAD) to exercise operational control over all forces assigned or made available for aerospace control in Canada. Comd 1 Cdn Air Div provides assigned forces to CJOC, CANSOFCOM and CANR for FE. The JFACC is accountable to the designated CAF-supported commander for FE of air assets and provides each regional JTF with air component coordination element air staff. Comd 3 Canadian Space Division (3 CSD) is also the joint force space component commander (JFSCC) for CJOC and CANSOFCOM.

CJOC and CANSOFCOM employ naval, land, air, space and special-operations forces to execute CAF operations. Their support staffs deal with the SJS, the staff of the RCN, CA and RCAF as well as the headquarters (HQ) of task forces (TFs) placed under their operational command to coordinate the sustainment of the allocated forces. NORAD is a unique[8] binational military command responsible for aerospace warning, aerospace control and maritime warning that employs assigned assets in the defence of North America. Standing resources are allocated to NORAD by the CAF, and augmentation occurs as increases in airspace control levels are declared. Unique aspects of NORAD sustainment are identified in Chapter 5.

CJOC conducts the majority of CAF FE operations except for those assigned to NORAD or CANSOFCOM. CJOC comprises a headquarters, TFs, C2, intelligence and support nodes. Its operational-support formations include the Canadian Forces Joint Operational Support Group (CFJOSG) and the Canadian Materiel Support Group (CMSG).[9] CFJOSG provides the following third-line functions: movement control services, supply support, postal services, CIS, military engineering as well as third-line and some fourth-line MP functions unrelated to law enforcement. CMSG provides third-line materiel management services through its supply and ammunition depots and provides dedicated DND/CAF customs support.

SECTION 4 – FOURTH-LINE SUPPORT UNITS

Fourth-line support units such as 202 Workshop Depot and the Mapping and Charting Establishment play an important role in providing national support to operations. They are coordinated through ADM(Mat) and CFINTCOM respectively.

SECTION 5 – OTHER GOVERNMENT DEPARTMENTS AND AGENCIES

OGDA, within the whole-of-government approach (WoG approach),[10] play an important part in the CAF support framework. For example, Public Services and Procurement Canada (PSPC)[11] is an essential element in the military procurement process, which includes materiel purchases, maintenance contracts and commercial airlift, while Global Affairs Canada (GAC), through its embassies and consulates, plays an important role in facilitating communication with HNS agencies for operations outside Canada. Assistant Deputy Minister (Policy) [ADM(Pol)] is the official conduit between the CAF and OGDA.

SECTION 6 – NATIONAL INFRASTRUCTURE AND INDUSTRY

“National infrastructure and industry play a crucial part in the CAF support framework. Infrastructure such as ports, airports, railways, roads, communications systems, and other fixed installations may be used by military forces to facilitate strategic mobility and sustainability, while industry’s principal role is the manufacture or provision of goods and services required by the CAF to conduct operations.”[12] Industry support to RCAF weapon systems may range from fourth-line to first-line support, depending on the weapon systems and platforms.

SECTION 7 – INTERNATIONAL AGREEMENTS AND ARRANGEMENTS

Transactions for support between the CAF and foreign military organizations are generally covered by government-to-government or military-to-military agreements and arrangements. An agreement generally has the status of a diplomatic treaty and is governed by international law. Examples include the Canada-United States (US) Integrated Lines of Communications (ILOC) agreement and the NATO Status of Forces Agreement (SOFA). A key type of support arrangement that is frequently used during operations would be the mutual logistics support arrangements (MLSAs) that Canada currently has in place with a number of nations, including the US, the United Kingdom, France and Australia. Highly flexible, MLSAs are designed to facilitate the reciprocal provision of logistics support, supplies and services between cooperating defence forces. As the DND/CAF functional authority, ADM(Mat) is responsible for the negotiation of MLSAs.[13]

The type of MLSA most frequently used during RCAF operations is an acquisition and cross-servicing agreement (ACSA). An ACSA is a bilateral agreement between Canada and another country that allows for the provisioning of the most common types of support, such as food, accommodations, vehicles and ground fuel. Note that unless

explicitly stated, the provision of aircraft spares and aircraft refuelling may not be included in an ACSA. While Canada has a number of ACSAs in place, the ACSA with the US is the most often employed, particularly during NORAD operations. Implementing arrangements for individual exercises or operations when a US unit or individual(s) deploys to a specific Canadian location may be negotiated and implemented directly by the responsible commanders or their authorized delegate. Conversely, an ACSA may also be used in the same manner when a Canadian unit or individual(s) deploys to a specific US location to conduct an exercise or operation.

CHAPTER 3
SUPPORT FUNCTIONS WITHIN THE RCAF

SECTION 1 – INTRODUCTION

As mentioned in Chapter 1, many support functions (materiel management and distribution, financial services, personnel-support services, postal services, transportation and food services) are common across all DND/CAF operations. Only the aspects that are unique to the RCAF (e.g., air movements, considerations for materiel management, flight feeding) will be discussed in this chapter. A similar approach will be taken for communications and information services, vehicle and equipment maintenance, and specialist support functions such as HS.

The RCAF's ability to deliver, support and sustain air and space power relies on assured and continued access to secure facilities that are in the right locations, have adequate infrastructure, utilities, the right mix of essential personnel and that are capable of providing the required services. Most RCAF support resources are devoted to supporting operations from main operating bases (MOBs) and the many FG and FE activities at RCAF wings. A central tenet of RCAF operations is that units regularly fulfil FG and FE objectives during a single mission to maintain HR forces capable of supporting CAF objectives with required air and space power capabilities. Thus, a large percentage of RCAF personnel are employed in operations-support, aircraft-maintenance and mission-support organizations to ensure all units maintain maximum readiness to conduct their assigned missions daily.

Although missions and operations conducted from wings are vital to the defence of Canada, the RCAF must be capable of projecting air and space power around the world. This means that air and space operations need to be sustained in deployed locations where many of the resources normally found at a wing may not be available. Deployed operating bases (DOBs), including forward operating bases (FOBs)[1] and forward operating locations (FOLs),[2] may lack some infrastructure, have limited equipment and services and may be subject to extreme weather. 2 Wing Bagotville is the RCAF's principal expeditionary wing; it constitutes the core of a permanent deployable force that is on HR.[3]

SECTION 2 – SUPPORT ACTIVITIES

Figure 3-1 illustrates air and space power's four supporting activities: operations support, aircraft-weapon-systems maintenance, mission support and specialist support.

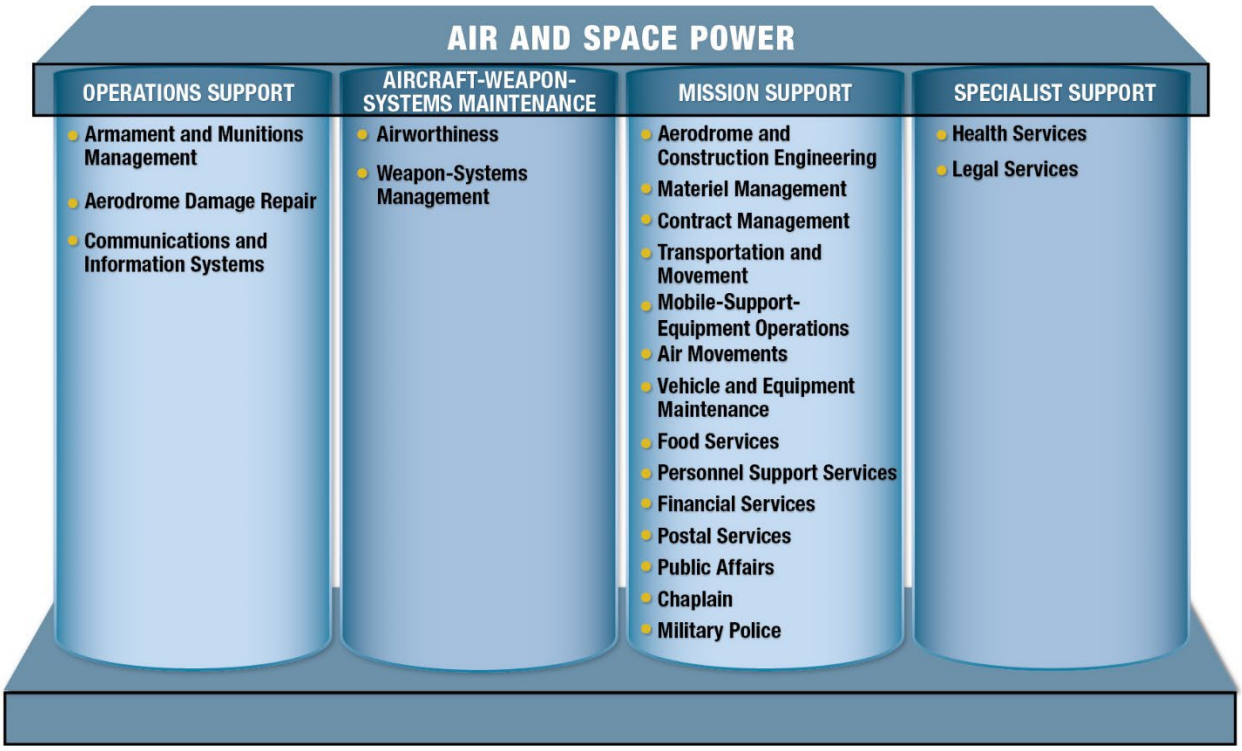

Figure 3-1. Support activities

SECTION 3 – OPERATIONS SUPPORT

Operations support is the provision of assistance that directly enables air and space operations. Operations-support units, namely operations-support elements (OSEs), primarily provide those personnel and services essential for conducting flying operations at MOBs and DOBs. The role of the OSE is to provide the enablers that allow operations to be conducted safely and effectively.

The operations-support force-sustainment capabilities include armament and munitions management, aerodrome damage repair and CIS. At smaller MOBs and DOBs, it is not uncommon for aircraft-maintenance and engineering capabilities to be included under the operations-support units.

ARMAMENT AND MUNITIONS MANAGEMENT

Effective armament and munitions management include an ammunition and explosives (A&E) safety program and an air-weapons-handling program. The A&E safety program addresses the management, transportation, storage and surveillance of A&E, whereas the air-weapons-handling program deals with the assembly and preparation of air weapons, the (un)loading/(de)arming of air weapons on an aircraft, and the safe parking of aircraft loaded with air weapons or explosive cargo. The following are necessary aspects of a recommended, combined A&E safety and air-weapons-handling program:

a. **Transportation**. Early communication and pre-planning are crucial to coordinate the movement of A&E from an explosive storage area at a wing or from a Canadian Forces Ammunition Depot to an operation's location.

b. **Storage**. All A&E shall be stored in a licensed location where there is sufficient safety distance from the A&E to the surrounding infrastructure and personnel. This aspect requires extensive pre-planning to determine a minimum safety zone based on the amount of net explosives quantity (NEQ) of the A&E being stored for the operation.

c. **A&E surveillance program**. The CAF implements an A&E surveillance program on all inventoried A&E to ensure items remain safe to store, transport and handle throughout their service life. While A&E is deployed, the continuation of the surveillance program is critical to ensure the temporary storage conditions do not adversely affect the explosive composition or weapon electronics.

d. **Breakout and assembly**. A&E that is being deployed is transported in a storage configuration; however, the majority of RCAF armament requires assembly and testing before being issued to an operational user. The assembly process requires a dedicated explosive workshop to provide a safe location for handling A&E. This location needs to protect the remainder of the A&E storage in the event of an inadvertent detonation during the assembly process. Once the A&E is assembled or transitioned from its storage condition to its ready-use state, it becomes an air weapon.

e. **Explosives-loaded aircraft parking**. All aircraft loaded with air weapons or explosive cargo (or having these items unloaded) shall be parked in a designated area that provides sufficient, safe distance to the surrounding infrastructure, personnel and aircraft. This requirement entails extensive pre-planning to determine a minimum safety zone, usually within limited ramp space.

Due to the inherent risks involved with munitions operations, a large footprint and significant pre-planning are required for safety reasons to minimize casualties, destruction and loss of mission capability in the event of an inadvertent detonation or sabotage.

Explosive ordnance disposal (EOD) specialists are required to provide an emergency response capability to any aircraft that contains air weapons, explosive cargo and/or integrated explosives for aircraft survival (ejection seats, explosively jettisoned canopies, cartridge actuated devices and propellant actuated devices as well as any pressurized containment vessels).

AERODROME DAMAGE REPAIR

To conduct safe and effective air and space operations, the RCAF requires aerodromes and facilities that are free from hazards and are in a good state of repair. A maintenance service team, which normally resides within the construction engineers, assesses the aerodrome and repairs damage in the event of accidents or hostile action.

During operations, aerodrome-engineering activities centre on four major areas:

a. damage definition and assessment—inspecting and assessing damage;

b. EOD—reconnaissance and clearance of unexploded ordnance;[4]

c. repair of aircraft operating surfaces; and

d. repair of essential services and facilities.

COMMUNICATION AND INFORMATION SYSTEMS

Properly used and protected, modern CIS offer the RCAF significant advantages in information sharing, situational awareness and C2 execution. CIS in the operations-support context is the use of electronic devices and the electromagnetic spectrum for the acquisition, transfer, storage, processing, analysis and display of information. It excludes communications accomplished by devices associated exclusively with airborne weapons platforms and land-based electromechanical devices. CIS is the primary means by which commanders exercise C2 over air and space operations; as a result, it should be integral to the organization it supports.[5]

To ensure the availability of communication services when they are required, the services should be owned, whenever possible, by the CAF and should be controlled and maintained by trained personnel under the command of the force commander. RCAF CIS are aligned with NATO Standard AJP-6*, Allied Joint Doctrine for Communications and Information Systems* to ensure interoperability with our key allies.

Communications are provided by terrestrial or space-based electronic devices that can be static, portable or mobile. To achieve force multiplication through CIS, commanders require real-time services. Communications equipment is categorized by the function performed and includes radio, telephony, radar, facsimile and telemetry. Many systems rely heavily on software to allow the user to interface with the system and to process data. The transmission of data can be achieved either through a wire, such as coaxial cable or fibre-optic cable, or wirelessly through the electromagnetic spectrum, such as radio communications, microwave communications and satellite communications. The communications equipment may stand alone or be arranged into facilities that are connected as networks to form C2 systems. Distributed networks of facilities and equipment form systems which can be categorized as strategic, tactical and non-tactical according to use. In addition to communications, all RCAF platform-modernization projects or new platform initiatives will likely involve capabilities that require

communications and electronics skill sets and support.

When equipment is combined with personnel resources, capabilities such as command centres, control towers and sensor sites are derived. Hardware and software are required to integrate equipment into a useable capability. Distributed networks of facilities and equipment form systems that can be categorized as strategic, tactical and non-tactical according to the use.

IM is a discipline that directs and supports the handling of information throughout its life cycle, ensuring it becomes the right information, at the right time, in the right form and of adequate quality to satisfy the demands of an organization.[6] DND/CAF information, regardless of its medium or format, must be managed in accordance with DAOD 6001-1, Information Management Programme, and other relevant references to ensure accountability; transparency and availability; integrity, protection, retention and disposition; and compliance. An IM plan describes how information is to be managed both internally and externally to meet the business and operational requirements of organizations. It assigns responsibilities to specific staff, describes information requirements and provides command guidance for information currency requirements and information-protection needs. The IM plan prescribes exactly *what* the information needs are, while the communications plan focuses on *how* the information needs are to be achieved.

Communications support must be able to continue functioning when conducting operations under adverse conditions. Considerations are as follows:

a. Electronic warfare (EW).

(1) The adversary will use EW to attempt to exploit or deny the use of the electromagnetic spectrum. By intercepting and analysing signals radiated by communications, the adversary can assemble a database that describes the friendly C2 system and thereby have easy access to the parameters needed to disrupt it. Facilities and procedures must include highly classified war reserve modes that are not used during training but that can be implemented during operations. Good emission control (EMCON) will minimize the time available to the enemy to capture signal parameters.

(2) Once the adversary obtains a signal's parameters, that signal may be jammed or infiltrated with deceptive information. The location of allied communications equipment may be determined and then attacked by the adversary with conventional or directed-beam weapons. Developments in science and technology have resulted in equipment that can provide automatic authentication and whose signals are resistant to jamming. Alternatively, authentication and EMCON by users decrease the risks of unprotected equipment. Air-defence systems are traditional targets for EW, as they rely heavily on the use

of the electromagnetic spectrum through its radar and electro-optics. As well, because many corporate-enterprise-resource-management systems used in the support and sustainment of the RCAF are hosted on unclassified servers, these systems may be particularly vulnerable to disruption.

b. Mobile tactical-communications facilities should be capable of interoperability with other agencies and providing secure communications at aerodromes or any other locations where required. Mobile tactical-communications facilities should be capable of operating in all conditions of light, weather and EW degradation as well as in all chemical, biological, radiological and nuclear (CBRN) states. The capabilities provided by mobile tactical communications include air traffic control services, navigation aids, aerodrome facilities, mobile-operations shelters, medium- and long-range multiple-frequency communications, satellite communications and other associated communications.

c. IT converts the vast quantities of information received from many different sources into a useable form that can provide commanders with information superiority over an adversary. Creating and modifying systems by connecting various facilities can be performed much more quickly than acquiring new equipment, provided technical expertise in network interconnection and software support exists. IT can provide essential information superiority for command-centre personnel. Battle-management information systems and simulators utilizing this technology require ongoing software support.

d. Communications security.[7]

   (1) The vulnerability of communications to exploitation by enemy forces must be reduced to the lowest level possible through the vigilant application of communications security (COMSEC) equipment and procedures. The five COMSEC measures are transmission security, cryptographic security, emission security, physical security and personnel security.

   (2) The communications support organizations at all levels should play an active role in continuously monitoring the COMSEC posture of all air and space operations. All personnel must be reminded of the importance of COMSEC through educational-awareness programmes.

The integrated communications effect is the combination of all the efforts associated with CIS to provide a fusion centre of effect for the Comd RCAF. These efforts include the following:

a. air-defence C2;

b. C2 services;

c. cyber security;

d. joint intelligence, surveillance and reconnaissance;

e. consultation and command networks;

f. service support and business application services (including National Enterprise programs);

g. support to exercises and operations; and

h. delivery of the digital workplace.

SECTION 4 – AIRCRAFT-WEAPON-SYSTEMS MAINTENANCE

AIRWORTHINESS

Airworthiness is “the fit and safe state for flight that is achieved when an aeronautical product conforms with its approved type design, is manufactured and maintained in compliance with standards and is operated within its design limits.”[8] It forms the basis for all aircraft-weapon-systems maintenance for the RCAF. The authoritative document for both civil and military aviation safety in Canada is the Aeronautics Act. As a statute of Canada, the Act is a law that places upon the Minister of Transport, the Minister of National Defence (MND) and the CDS—under the direction of the MND—the responsibility for developing and regulating aeronautics and supervising all matters related to aeronautics. Implementation of its provisions is not optional; it is a legal responsibility of DND and the RCAF. The MND has directed that DND and the RCAF develop and implement an airworthiness program to fulfil this obligation.

The DND/CAF Airworthiness Program, depicted in Figure 3-2, contributes to aviation safety by mandating standards for aeronautical products and their operation. The DND/CAF Airworthiness Program consists of an entire range of aviation activities, which includes design, manufacture, maintenance, materiel support, facilities, personnel and operations. The operations staff is responsible for the operation of aerodromes, navigational equipment and support equipment; operator, controller and maintainer training and proficiency; and the conduct of flying operations (including aerospace control, aircraft utilization and aviation weather). Furthermore, the operations staff ensures that all facilities, personnel and operations comply with airworthiness policies, regulations, orders and standards. Similarly, the technical staff is responsible for the design, manufacture, maintenance and materiel support of aeronautical products; development and maintenance of facilities; and training and qualification of technical personnel. Accordingly, the DND/CAF Airworthiness Program has been similarly split into operational and technical areas of responsibility. This division of responsibility has given rise to the Operational Airworthiness Program and Technical Airworthiness Program. The Airworthiness Investigative Program has been added to monitor the DND/CAF Airworthiness Program and to investigate aviation safety–related issues and

occurrences.

Figure 3-2. DND/CAF Airworthiness Program

Pursuant to the direction of the MND, the CDS has designated the officers holding the following positions as members of the DND/CAF Airworthiness Program:

a. **Authorities**.

(1) **Airworthiness Authority (AA)** is assigned to the officer holding the position of the Comd RCAF.

(2) **Operational Airworthiness Authority (OAA)** is assigned to the officer holding the position of Comd 1 Canadian Air Division.

(3) **Technical Airworthiness Authority (TAA)** is assigned to the officer holding the position of Director General Aerospace Equipment Program Management (DGAEPM), within the ADM(Mat) organization. Day-to-day management, implementation and evolution of the Technical Airworthiness Program is delegated to the Director of Technical Airworthiness and Engineering Support (DTAES). From that organization, a subset of responsibilities is further delegated to the weapon-systems manager (WSM) for each aircraft fleet and select individuals in various accredited organizations.

(4) **Airworthiness Investigative Authority** is assigned to the officer holding

the position of Director Flight Safety within the Comd RCAF organization.

b. **Advisors**. The Comd RCAF, as the AA for DND/CAF, has identified the following staff advisors to assist in the execution of the AA's responsibilities to ensure that the Airworthiness Program meets the aviation safety objectives of the Aeronautics Act:

(1) **Aerospace Medical Authority** (AMA) is responsible for ensuring that all activities associated with the aerospace medicine capabilities of the DND/CAF are conducted appropriately, safely and by qualified and authorized personnel. The RCAF Surgeon is typically assigned this authority.

(2) **Flight Test Authority** is responsible to ensure that all developmental test and evaluation (DT&E) and engineering test and evaluation (ET&E) performed by or on behalf of DND and the CAF are conducted safely and by qualified and authorized personnel. The Commanding Officer Aerospace Engineering and Test Establishment (AETE) is typically assigned this authority.

WEAPON-SYSTEMS MANAGEMENT

The effective management of each aircraft fleet requires HQ organizations that are responsible for maintenance policy, airworthiness, fatigue management, configuration control, management of repairable items and financial-resource management. The management of each fleet is delegated to the WSMs working in DGAEPM, a part of ADM(Mat). For their fleet, the WSM must address coordination and prioritization of requirements related to equipment-failure resolution, supply, equipment/facilities availability, software support, technical publications, quality assurance as well as personnel qualification and availability.

When an aircraft weapon system is brought into service, maintenance plans are developed, covering servicing and calibration as well as corrective and preventive maintenance.[9] This maintenance concept, derived by the WSM from the approved concept of operations, is developed to cover the lifespan of the system, including disposal. It is required for defining and implementing procedures, tasks, techniques, training standards, tools and equipment to establish a capability and improve the effectiveness of aircraft maintenance. These maintenance programs require constant review and updating to meet the evolving needs of operations and the platform. Modifications to, or role-change of, an aircraft weapon system will necessitate changes to the maintenance plan.

The WSM further provides an engineering capability to support the maintenance function of all aircraft weapon systems or related equipment-acquisition programmes. The engineering effort is primarily focused on assessing the need for, and the development of, modifications, life-extension studies, technical investigations,

nonstandard repairs, and engineering studies in various fields.

INTEGRATED LOGISTIC SUPPORT

Most RCAF equipment and systems are complex, requiring integrated logistic support (ILS) from design through to acquisition and, ultimately, disposal. ILS applies technical and management processes and activities throughout the life cycle of a defence system ensuring that

a. mission requirements are met;

b. operational capabilities are maximized; and

c. the support system is optimized and cost-effective throughout the life cycle.[10]

An ILS plan is critical in ensuring the logistics resources needed to carry out the maintenance plans are available when required. Most WSMs employ civilian contractors to provide ILS services to their fleet. It is common practice to have aspects of the ILS and maintenance plans included in the contract that introduces a new aircraft weapon-system fleet. The combination of these plans results in a coherent maintenance programme that details the work that must be accomplished to achieve the objectives and principles of aircraft-weapon-systems maintenance.

Maintenance objectives. The following fundamental maintenance objectives, according to airworthiness guidelines, in their descending order of priority are

a. to ensure the realization of the inherent safety and reliability levels of the aircraft;

b. to restore safety and reliability to their inherent levels when deterioration has occurred;

c. to obtain the information necessary for design improvement of items with reliability concerns; and

d. to accomplish these goals at a minimum total cost, including maintenance costs and the projected costs of resulting failures.

Maintenance principles. In association with the four fundamental maintenance objectives, the following principles are the foundation of aircraft-weapon-systems maintenance:

a. Maintenance of aircraft weapon systems shall be performed in accordance with airworthiness policies, directives and instructions.

b. Maintenance shall be based on the principle of personal accountability, in that personnel shall be responsible for and certify all work that they have

undertaken in any aspect of that maintenance and for which they have been trained and are qualified to necessary standards.

c. Maintenance shall be responsive to the approved operational requirements and shall be organized in a manner which will provide a smooth transition from wing to deployed operations.

d. Operations and maintenance of a modern aircraft weapon system are so interrelated that it is counterproductive to consider each as a separate, isolated element. Flying and maintenance schedules are developed using inputs from both operations and maintenance staff, to achieve the optimum sustainable capability with the available resources.

e. When assigning the level of maintenance to be accomplished by each maintenance organization, operational requirements and the economical use of resources are to be considered.

f. Standards and procedures are established, monitored and enforced to ensure optimum quality and efficiency in the performance of all maintenance tasks, the health and safety of personnel as well as the safety of equipment.

Lines of maintenance. To accomplish the different levels of support for aircraft there are only three levels of maintenance activities. The organizations that perform the work on behalf of the RCAF are defined in terms of “lines of maintenance,” which differ slightly with the lines of support described in Chapter 1. The following are the lines of maintenance that the RCAF conducts on aircraft:

a. **First-line maintenance**. First-line maintenance refers to maintenance resources of a squadron organization, military or civilian, which performs aircraft and armament servicing, first-level preventive maintenance and minor fault diagnostics / corrective maintenance.

b. **Second-line maintenance**. Wing maintenance organizations, or civilian contractors, provide level-two maintenance support (including preventive and corrective maintenance) and, when required, assist squadron maintenance organizations on deployed operations.

c. **Third-line maintenance**. Third-line maintenance organizations (solely civilian industry) perform level-three maintenance activities, which are major maintenance activities. These include rebuilds, equipment overhauls and life-extension programmes. These major activities require a significant footprint of equipment and personnel in Canada and generally cannot be moved/deployed.

WING MAINTENANCE SUPPORT

Aircraft-weapon-systems maintenance organizations at wings are capable of all first-line and some second-line maintenance. The capabilities of squadron and wing maintenance organizations are determined by the test equipment, tools, qualified personnel and maintenance facilities available. The proximity and quantity of spares as well as the ability to move repairable equipment are key elements in establishing the necessary aircraft-maintenance support.

DEPLOYED-AIRCRAFT-MAINTENANCE SUPPORT

During deployed operations, aircraft-maintenance resources are integral to squadrons or air detachments (air dets). The OSE to the DOB should have an air-maintenance staff officer to advise the commander and coordinate maintenance activities. Depending on the size of the ATF and the number of air dets, there may also be an A4 Maintenance staff officer within the ATF HQ.

SPECIALIZED MAINTENANCE UNITS

Some maintenance activities may require the formation of specialized units in which functional control is exercised by a maintenance HQ. These units provide a variety of engineering and maintenance research, experimentation, development, software support and limited production services.

ROUTINE AND EMERGENCY MAINTENANCE

During periods of high-intensity deployed operations, inspections and repair procedures[11] may be authorized by the WSM. These types of activities form the Contingency Aircraft Maintenance Program (CAMP). Rapid repair techniques, including aircraft-battle-damage repair and other abbreviated maintenance schedules may be available for older fleets during emergencies when the time available precludes the use of standard maintenance procedures. The intent is to provide the best repair possible in the time available and make an aircraft safe and capable of performing, as a minimum, one additional mission.

CAMP is intended to provide maintenance authorities and operational commanders at all levels with sufficient flexibility to respond to rapidly changing circumstances. Most newly acquired fleets do not have such programs in place. If the on-site authority has the time and resources to complete more thorough inspections and repairs, then additional tasks to increase aircraft serviceability and availability should be performed. Since emergency maintenance procedures introduce an element of airworthiness or economic risk, they should only be applied in exceptional circumstances, with the approval of the fleet WSM.

MAINTENANCE FACILITIES

Sufficient infrastructure must be provided for air-maintenance organizations to support

each aircraft fleet in accordance with the requirements of the operational role. Required infrastructure includes hangars, shops, laboratories, offices, deployable shelters/tents and tarmac areas as well as their associated utilities, industrial services and communications services.

SUSTAINABILITY

Sustainability is predicated on

a. sufficiently large aircraft fleets to absorb predicted losses yet continue to fight;

b. the ability to repair damaged aircraft and return them to service;

c. the ability to maintain aircraft under austere conditions;

d. adequate stocks of logistics supplies and the ability to replenish these stocks; and

e. trained and authorized personnel to replace casualties.

STANDARDIZATION

Canada has entered into several bilateral and multilateral international agreements for collective defence. These agreements require, in part, standardization of weapon systems and procedures so that the forces of allied nations can fight effectively together. Maintenance activities should aim to achieve and maintain the most effective levels of compatibility, interoperability, interchangeability and commonality with allied forces.

LOSS-PREVENTION AND ENVIRONMENTAL PROGRAMMES

Mitigating risk through the use of loss-prevention programmes is an important component of the RCAF's loss-prevention strategy.[12] There are two main elements to preventing loss and damage: the DND/CAF safety programmes and the RCAF's Environmental Stewardship programme. Several DND/CAF and RCAF loss-prevention programmes are established to ensure that limited resources are not needlessly lost, even in high-risk situations encountered during routine training exercises and combat missions. The Airworthiness Program and subsequent Flight Safety Programme, along with the CAF's General Safety programme, all contribute to mitigating the accidental loss of RCAF resources throughout a system's life cycle.

Also, due to the potential to negatively affect the physical environment during air force training and operations, steps have been established to minimize environmental degradation. The RCAF Environment and Operational Sustainability Policy aims to lessen the impact of air force operations and activities on the environment. This initiative focuses on resolving legacy issues, ensuring compliance with environmental laws (both at home and abroad) and reducing the RCAF's environmental footprint by exploring and

implementing emerging environmental-protection and management practices.

SECTION 5 – MISSION SUPPORT

Mission support is “the provision of logistical, technical and administrative support to [air and space] operations.”[13] Mission-support force-sustainment capabilities include, but are not necessarily limited to

a. aerodrome and construction engineering (CE);

b. materiel management and distribution;

c. mobile-support-equipment operations and air movements;

d. vehicle and equipment maintenance;

e. food services;

f. personnel management;

g. financial services;

h. contracts management;

i. postal services;

j. PA; and

k. chaplain.

For air and space operations conducted in Canada, mission-support services are normally provided by a wing—one of the RCAF’s MOBs in Canada. During deployed operations, a mission-support element (MSE) is typically responsible for providing and coordinating mission-support services for the RCAF.

AERODROME AND CONSTRUCTION ENGINEERING

Wing facilities and services established to support operations at both fixed and deployed locations are provided, operated and maintained by Canadian Military Engineering units. Mobile CE units are formed to support deployed operations and to provide maintenance and minor construction capability. Engineering services provided to support operations include firefighting, crash rescue, emergency utility repair, damage assessment, maintenance and repair of aircraft operating surfaces (e.g., runways, runway lighting systems), containment and disposal of hazardous spills, repair of facilities and a limited design capability. Other services include power generation and distribution, water purification and distribution, environmental services, solid-waste management, waste-water collection and treatment, hazardous-material management

and geospatial-engineering support.

During hostilities, aerodromes are often designated as high-priority targets and subject to air or ground attack from any weapon in the enemy's arsenal. Some form of damage to an aerodrome and its facilities would inevitably result from an attack, the severity of which would depend largely upon the weapon used and the adequacy and preparedness of air and ground defences. The installation commander's post-attack priority is to restore the aerodrome to operational status should aircraft launch and recovery capabilities be denied because of damage to aerodrome infrastructure. Under combat conditions, engineering functions must be carried out by military personnel; however, in minimum-threat areas and during peacetime, civilians can be employed in a variety of engineering-support activities.

MATERIEL MANAGEMENT

Materiel management includes all activities necessary to acquire, hold, use and dispose of materiel.[14] These activities are frequently referred to as a supply chain. Within the CAF/RCAF supply chain, there are many key stakeholders, including industry contractors, OGDA, ADM(Mat), CJOC units such as supply and ammunition depots as well as wing supply organizations, squadron stores and maintenance sections. 1 Cdn Air Div A4 maintains a chart of "In-Service Support Contract Frameworks" for RCAF operational fleets; this chart depicts main contractors, responsibility for maintenance, ownership of spare parts as well as other materiel management and support functions.

Materiel replenishment with procurement planning for military equipment, stocking, forecasting and resupplying metrics must be determined for each type of equipment. For complex systems such as aircraft, requirements can change dramatically over the lifespan of equipment as new maintenance requirements occur. The resupply of components for modern military equipment, particularly high-value items, is often challenging due to limited availability from manufacturers, who are supplying other countries that have the same or similar weapon systems. For some RCAF fleets, materiel management may be included as part of in-service support contracts. The frequency and intensity of resupply will logically and proportionally increase during heightened stages of an operation. Materiel management is conducted using corporate-enterprise IM systems. RCAF HQ staff work with ADM(Mat) to ensure that RCAF-unique needs (such as the pack-up kits that 2 Wing holds in readiness for deployment) are incorporated into these systems.

In line with our major allies within CAF and the RCAF there are 10 recognized classes of supply/materiel, as listed in Table 3-1.

Class of Supply	Description
Class I – Rations and Water	Operational holdings are maintained at supply depots and wings. The RCAF does not pre-position HR holdings of Class I materiel. Both commodities can be obtained on short notice if required.
Class II – General and Technical Stores	Operational clothing, individual protective equipment and general consumable stores are available through wing supply clothing stores and local purchase order (LPO) activity.
Class III – Petroleum, Oils and Lubricants (POL)	Limited holdings of bulk and packaged POL products, including aviation fuel, are commonly held at MOBs. For expeditionary operations, maximum use of HNS and civilian contracts should be exercised where practical.
Class IV – CE and Defensive Stores	CE stores are normally available from a wing CE section or national sources. The RCAF holds limited quantities of defensive stores; when required, additional defensive stores may be obtained on short notice from national sources.
Class V – Ammunition	Ammunition is a centrally managed commodity, and the release authority is CJOC. Both small arms and aircraft-specific munitions require CJOC coordination and release.
Class VI – Amenities	Amenities and welfare items are an Assistant Chief of Military Personnel Command / Canadian Forces Morale and Welfare Services (CFMWS) responsibility. For expeditionary operations, amenities and welfare are normally planned and developed by CJOC with input from CFMWS.
Class VII – Major Equipment	Major equipment items (e.g., engines and major assemblies) are controlled stores held at third or fourth line. The release authority for major end items is normally the formation HQ's A3 Operations.
Class VIII – Medical	Medical stores are provided through a separate and independent HS supply chain. The Canadian Medical Equipment Depot (CMED) is the medical supply depot where medical stores are held, distributed from and accounted for. Due to their sensitive and technical nature, medical and dental stores require tight controls and specialized management, as their shelf life is often limited.
Class IX – Repair Parts	The types and quantities of aircraft spares are fleet specific and are held by the respective air dets and wing maintenance organizations.
Class X – Materiel Support to Non-Governmental Organizations (NGOs)	These items are used to support NGOs and humanitarian operations. The scope of items authorized to support these projects is controlled by CJOC.

Table 3-1. Recognized classes of supply/materiel

CONTRACT MANAGEMENT

Contracted support is a force multiplier, an effective and efficient means of expanding capacity, mitigating over-tasked RCAF resources and filling support capability gaps. Contracting support to the RCAF ranges from complex ILS and aircraft fuel supply managed through ADM(Mat) and PSPC, to temporary-help-services contracts managed by wing supply, to hotel rooms and rental vehicles for exercises managed by a squadron's logistics officer.

Procurement in the federal government is legislated and guided by international and national trade agreements. Acts such as the Financial Administration Act and the Federal Accountability Act as well as policies, directives and guidelines are provided by the Treasury Board of Canada Secretariat (TBS) and PSPC.[15] Certain departments such as Indigenous Services Canada (ISC) / Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Innovation, Science and Economic Development Canada are responsible for programs that also have a direct impact on procurement. ADM(Mat), as the departmental functional authority and business-process owner for procurement and contracting, is responsible for providing policy and procedures to outline how all procurement and contracting activities will be performed in DND in accordance with DAOD 3000-0, "Materiel Acquisition and Support."

Contracting in DND is decentralized and many of our services and low-dollar-value goods are purchased without having to go through PSPC. Purchases are commonly made by contracting officers through the use of standing offers, supply arrangements, and direct purchase orders for low-dollar-value requirements. A-FN-100-002/AG-006, *Delegation of Authorities for Financial Administration for the Department of National Defence (DND) and the Canadian Armed Forces (CAF)*, sets out contracting and financial authorities to aid in ensuring that regulatory and policy requirements are met. Every level of the RCAF has a contracting support framework, from the individual squadron logistics officers to wing supply, A4 Contracts and ADM(Mat) and PSPC as required. The roles and contracting and financial authorities of the contracting officers increase at each successive level. When deployed as part of a JTF, the air expeditionary wing (AEW) Comd will have access to contracting officers in the joint task force support component (JTFSC) to perform the contracting functions for the operation.

TRANSPORTATION AND MOVEMENT

An effective transportation system is essential to support the worldwide deployment and employment of RCAF forces. The transportation network must be capable of functioning and operating at every level of conflict—from strategic to tactical. The transportation network includes roads, rail, air, inland waters, sea lanes and pipelines within Canada and, as is described in the discussion of SLOC in Chapter 5, it is a vital part of the support chain for deployed military operations.

The transportation system encompasses two distinct functions: mobile-support-equipment operations and air movements, including airlift support. Corresponding staffs

exist at 1 Cdn Air Div and A4 Mobile Support Equipment, A4 Movements and the Combined Aerospace Operations Centre's Air Mobility Division. In collaboration with CJOC J4 Movements, A4 Movements is responsible for the strategic planning of air movements. To provide effective support, transportation resources are located on wings in the Transportation, Electrical and Mechanical Engineering (TEME) sections (a component of the mission support squadron [MSS]), in air movements squadrons as well as in strategic and tactical air transport squadrons (loadmasters who are employed as aircrew).

MOBILE-SUPPORT-EQUIPMENT OPERATIONS

Wing TEME is responsible for a wide variety of mobile-support-equipment capabilities and services on the wing. It provides equipment and drivers for tasks such as freight hauling, snow and ice control, runway grip testing, road/runway sweeping, aircraft refuelling and personnel transport (e.g., buses). Mobile-support-equipment safety is the component of wing TEME concerned with collision prevention through training and licensing drivers and investigating collisions. Fleet management is concerned with ensuring other organizations on the wing have sufficient mobile support equipment to complete their tasks.

AIR MOVEMENTS

Air mobility is "the ability to deliver personnel or materiel by air to, from and within a theatre of operations."[16] Air mobility resources are used to conduct airlift, aircraft refuelling, search and rescue, and personnel recovery.[17] Air movements is the specialty within the transportation domain that supports all CAF environments and ensures that the aircraft operated by the air mobility squadrons are loaded and unloaded properly and safely. The 1 Cdn Air Div Air Mobility organization provides an operationally ready airlift force and does so through the operation of air movements squadrons and air movements sections at wings/units where there is a recurring requirement for airlift support. The RCAF's air movements organizations provide airlift, process equipment and passengers, inspect cargo as well as prepare, load, unload, secure and rig all payloads including patient movement and staging (the basis of the aeromedical evacuation system). Air movements units also process incoming cargo for onward movement to its destination. Air movements squadrons are also tasked to maintain a competent mobile-air-movements capability to support 1 Cdn Air Div airlift anywhere within Canada and the world. This capability takes the form of deployable, well-trained and adequately equipped mobile-air-movements-section (MAMS) teams situated at 2 Air Movements Squadron (Trenton). Air movements sections have been established at other wings to perform functions such as loading/unloading operations in direct support of transport aircraft and rigging as well as slinging external loads and equipment maintenance in support of rotary-wing operations.[18]

Air movements plans are required to provide direction, guidance and authority for the preparation and loading of materiel, personnel and equipment. Air movements plans are developed from a bottom-up perspective and are initially based on the unit movement

staff table (UMST), which lists a unit's personnel, vehicles, major equipment, weapons, loose cargo and dangerous cargo that comprise a deploying unit's movement elements.[19] The UMSTs for all units in a TF are consolidated into a task force movement table (TFMT) that depicts the materiel and equipment by location and unit /subunit.[20] A loading plan, the TFMT identifies the composition of the TF in terms of movement elements sorted into priority for movement in accordance with the TF Comd's deployment plan. Consequently, the TFMT helps to determine the total airlift resources required to move a TF.[21]

VEHICLE AND EQUIPMENT MAINTENANCE

The effective maintenance of mobile support equipment is a critical enabler, as the RCAF requires that emergency, rescue and runway-clearance vehicles as well as flight-line and aircraft-servicing equipment be in a serviceable condition at all times. The Land Equipment Management System (LEMS) applies to all components of the CAF for the support of their land technical equipment.[22]

Using the LEMS, Royal Canadian Electrical and Mechanical Engineers (RCEME) personnel provide maintenance support to land technical equipment such as vehicle fleets, electrical, electronic and optronic equipment of the RCAF; common technical equipment used across the CAF such as small arms and gas masks; aircraft/aerodrome ground-support equipment; and land-based support equipment such as combat-support equipment.[23]

The LEMS is made up of several equipment-management processes, which are carried out across all life-cycle phases and levels of sustainment: acquisition, research and development, maintenance, modification services, planning and operational coordination, technical advice and investigative analysis, inventory control, and disposal.[24] Within the LEMS, maintenance is considered in the following categories:[25]

a. **Preventive maintenance**, which is the systematic and/or prescribed maintenance intended to reduce the probability of failure. It includes activities such as servicing and serviceability checks undertaken by users and technicians, periodic inspections, and time-based and/or condition-based maintenance.

b. **Corrective maintenance**, which is carried out after fault recognition and is intended to restore equipment to a state in which it can perform required action. Corrective maintenance includes expedient repair, the timely application of unconventional or improvised maintenance actions that will allow equipment to proceed with its mission or to enable the equipment to be moved to an appropriate location for further maintenance.

c. **Recovery**, which is the extrication of equipment and, if necessary, its removal to a place where it can be repaired or evacuated. Recovery includes extrication and righting of overturned equipment; backloading[26] and cross-

loading between land maintenance units; removal of vehicles and debris from operating areas; and support to obstacle crossings.

Unlike the maintenance of aircraft, the maintenance of land-based equipment is consistent with the four lines of support outlined in Chapter 1. The four lines of maintenance, with each line performing a progressively more complex level of maintenance, are the following:[27]

a. **First-line** maintenance organizations are generally integral to or allocated to a unit. They are normally the first maintenance organization that the user turns to. A first-line maintenance organization generally performs recovery and repairs of limited duration.

b. **Second-line** maintenance organizations are integral to a formation (e.g., a wing), and perform tasks of a longer duration than first-line organizations. They generally have access to a greater range of parts and tooling. Since most MOBs and other operating locations are immobile, a second-line organization (e.g., a wing TEME maintenance organization) usually provides level-one maintenance services to those units without integral first-line support. Wing TEME organizations may have regional responsibilities such as national recovery tasks, maintenance support and forcible entry for security containers and the conduct of Reserve-unit inspections.[28]

c. **Third-line** maintenance organizations augment second line, but generally have limited mobility and perform more specialized and/or complex maintenance tasks. The repair facilities of third-line maintenance organizations are more robust, and a significant amount of effort is devoted to reconditioning equipment and assemblies for return to the defence supply chain rather than to the original user.

d. **Fourth-line** maintenance organizations are national-level resources located primarily in Canada. Fourth-line support includes large maintenance-workshop depots such as 202 Workshop Depot, original equipment manufacturers and industry.

FOOD SERVICES

Food-services operations are essential elements in sustaining the RCAF. Planners must consider the concept of food-services support and be able to coordinate its execution. The food-services options range from meals on the economy, providing fresh or hard rations by national sources and leveraging host- or lead-nation support. The type of food-services support provided will vary with the operating environment as well as with the availability of rations, personnel and equipment. Food services are responsive to the physiological and psychological needs of RCAF personnel within a particular operational context. A high standard of food-service support contributes to personnel motivation, operational readiness and increased morale. The RCAF has unique

requirements for flight feeding. 1 Cdn Air Div A4 Logistics Food Services sets standards and procedures to ensure the health and safety of aircrew and passengers.[29]

PERSONNEL-SUPPORT SERVICES

Personnel are the centre of gravity for the RCAF. The personnel-management processes for the CAF are designed to assist the RCAF in generating and sustaining the workforce required for the successful accomplishment of the assigned missions. Properly executed, such processes will ensure that the RCAF has the personnel required, in the numbers needed and with the competencies necessary to perform current job requirements while planning and preparing for the future.[30]

The management of personnel is a shared responsibility between CMP, the member's parent environment and the environment of employment. One element unique to the RCAF is the requirement to comply with legislation such as the Aeronautics Act. This is implemented through the DND/CAF Airworthiness Program, which obliges the RCAF to conduct training to provide specific levels of oversight with clear accountability. This increases management complexity and the overhead required to administer the application of the legislation.

The RCAF groups personnel-support functions into three elements.[31] These elements cover the personnel-support spectrum of recruiting, training, sustaining, retaining and transitioning personnel from the RCAF:

a. human-capital management, including occupational health and organizational structure control;

b. human-resource management, including recruitment, training, compensation, and transition/separation; and

c. personnel administration, including tailored solutions for individuals.

Sustaining personnel includes talent management (career management, succession planning and staffing), personnel development (training and education), preparation (including the physiological, psychosocial, cognitive and spiritual domains), support and recognition. Sustainment efforts influence retention, and with limited personnel resources and the high intensity of training for many RCAF personnel, retention efforts will be key to maintaining the RCAF's operational effectiveness and sustainability.[32]

FINANCIAL SERVICES

Financial services are key elements in the sustainment of military operations, and they are closely linked to procurement and contracting. All financial activities (whether at home or abroad) are conducted following national policies and directives[33] and normally fall into two categories: public funds and non-public funds. Public funds include the pay and allowances of individuals as well as expenditures on goods and services, travel, training and operations. Non-public funds include the accounting for morale and welfare

such as unit canteens, messes and institutes.

Whether conducting operations at home or abroad, it is important that the appropriate delegation of authorities has been established and that the correct financial framework is in place to support the operation. As noted above, financial services and the delegation of authorities are directly linked to the performance of contracting activities, so authorities must be delegated early on to allow goods and services to be procured on time and in compliance with existing policies and regulations.

Aircraft commanders may need to draw an advance of public funds to support their mission/air tasking order. In these situations, advice from the pay accounting office coupled with the completion of financial-certification training should help ensure mission success while protecting both public funds and the aircraft commander.

During an operation, a senior finance officer is normally part of the formation HQ staff (the A8/J8), and they will provide financial advice/guidance to the FE Comd. The primary goal of the finance staff is to enable operational requirements while ensuring adherence to existing policies and regulations.

POSTAL SERVICES

The Canadian Forces Postal Service is responsible for providing scalable postal support, both domestically and abroad. Postal clerks are employed in mail-distribution-point support operations by receiving, dispatching and sorting incoming and outgoing mail. Military post offices are authorized retailers of Canada Post Corporation's goods and services. As such, military postal clerks are knowledgeable in domestic and international postage, expedited parcel and letter services, money orders and philately.

Postal support for deployed operations is controlled by the operational authority and CJOC J4 Postal; it is a function of the JTFSC. If postal support is established for a mission by the operational authority, it will take one of the following forms:

a. **One-way mail**. Mail that is destined for deployed operations is processed by the Canadian Forces Postal Unit and forwarded to the DOB via commercial carrier or sustainment flight. Mail only moves in one direction and cannot be sent back from theatre. This is the most common form of postal support.

b. **Two-way mail**. Mail is processed identically to one-way mail, but the presence of a postal clerk in theatre permits mail to be sent back to Canada. This type of mail service is normally reserved for long-term, large-scale operations; however, missions with one-way mail may request a postal technical assistance visit to establish temporary two-way service.

PUBLIC AFFAIRS

PA plays an important role in the successful conduct of CAF and RCAF operations and informs the public of policies, programmes, services, activities and operations. The

principle of operational security may place limits on the CAF's ability to live up to demands for complete openness; however, every effort should be made by CAF members and DND employees to be as open and transparent as possible within the law when informing the public about CAF activities during military operations.[34] Public affairs officers (PAOs) are advisors on all aspects of external and internal communications. They are skilled in developing, executing and evaluating communications approaches designed to inform the public of CAF roles, activities and work. All CAF operations shall include PAOs within their complement at a level commensurate with Canadian participation. A comprehensive and proactive PA approach will normally be used, and a PAO will usually engage the news media during the conduct of an operation. While PA policy is controlled at the strategic and operational levels, all aviators are normally authorized to speak with the media about their occupation and specific area of expertise.

CHAPLAIN

The Royal Canadian Chaplain Service (RCChS) is

> a multi-faith chaplaincy committed to developing the spiritual well-being and resilience of the members of the Defence Community [and their families] in order to support the effectiveness of the CAF. [Its mission is] to develop and offer spiritual and religious care and support to ensure the spiritual well-being and development of all members of the Defence Community while respecting the freedom of conscience and religion of each person.[35]
>
> This understanding of spirituality is one that meets the diverse needs of the Canadian population and supports the spiritual growth of everyone. CAF personnel and their families, regardless of spiritual or religious affiliation or lack thereof, have the right to spiritual and religious support. The RCChS understands spirituality to be that which gives meaning and purpose to life and which can be expressed or experienced through religion, personal philosophy, worldviews or a rule of life."[36]

The chaplain has a broad range of ministries and duties, including, but not limited to,

a. religious services (encompassing the whole military community);

b. hospital and detention ministry;

c. crisis intervention;

d. pastoral support and counselling the chain of command and personnel;

e. deployment on operations;

f. moral and ethical advisor;

g. visitation;

h. teaching ministry (ethics, marriage preparation, suicide prevention, etc.);

i. battlefield casualty identification and burial services;

j. supporting boards of inquiry;

k. providing active, personal and supportive presence within their assigned unit or as required;

l. ensuring that unit personnel have access to spiritual support and counsel;

m. sustaining the chaplaincy mission through rear-party support for chaplains that are out of area;

n. training, monitoring and supporting sentinels;

o. initiating activities to enhance morale and the well-being of the people they serve;

p. working with the leadership and other helping professionals in an interdisciplinary approach to resolve conflict;

q. supporting diversity, gender integration and equality; and

r. assisting the leadership as part of the next-of-kin notification team for personnel that were killed or injured.[37]

Chaplains will normally be assigned to units and at different levels of HQ, as it is vital they are identified as members of those units, making them more approachable and accessible to provide services and support when required. Senior chaplains' positions established at various HQ and command levels are responsible for the general supervision and administration of chaplains within all RCAF units, stations and bases.

MILITARY POLICE

The primary responsibilities of the MP are to

a. support CAF missions by providing policing and operational support;

b. investigate and report incidents involving military or criminal offences;

c. develop and apply crime-prevention measures to protect military communities

against criminal acts;

d. coordinate tasks related to persons held in custody (including military detainees and prisoners of war);

e. provide security at selected Canadian embassies around the world;

f. provide service to the community through conflict mediation, negotiation, dispute resolution, public relations and victim assistance; and

g. perform other policing duties such as traffic control, traffic-accident investigation as well as emergency response and liaison with Canadian, allied and other foreign police forces.

MP services include law-enforcement operations, security operations, custody operations, mobility-support operations, close-protection operations and FP operations.

On MOBs, MP and commissionaires comprise the wing security force (WSF). Wing auxiliary security forces, composed of military personnel from across the wing, are designed to augment the WSF by providing a trained force to meet increased personnel demands generated by abnormal operations. These additional operations could include disaster or emergency response, control of movement onto and within the wing, establishing access control cordons around a designated area or activity, protection of resources essential to mission accomplishment and assistance in bomb-threat incidents on the wing.

SECTION 6 – SPECIALIST SUPPORT

HS and legal services are considered to be specialist support. Their professional/technical authorities are the Surgeon General and the Judge Advocate General respectively. A wing commander (W Comd) may also have additional specialist staff such as a general safety officer and an environmental officer, and a deployed HQ may include a policy advisor. This section focuses on HS and legal services as the primary areas of specialist support.

HEALTH SERVICES SUPPORT

CF H Svcs Gp is a vital component in ensuring operational effectiveness through the provision of timely and reliable HS to CAF/RCAF members. The primary role of CAF HS personnel is to provide or coordinate the provision of HS to CAF members. These services include medical, dental, psychological and health protection.

HS capabilities are distributed into four tiers on a progressive basis to conduct the assessment, treatment, medical evacuation, HS logistics and other functions essential to the maintenance of health. HS is based on treatment capabilities that play a specific part in preventive medicine and dental processes, progressive treatment, hospitalization as well as the evacuation of the sick and injured. These capabilities are referred to as

roles, which are unique to HS. Each successive role includes some or all of the treatment capabilities of the previous role. The following are HS roles, as they pertain to medical services:

a. **Role 1** includes locating casualties, providing them with first aid and emergency medical care, evacuating them from the site of injury to a safer location, sorting them according to treatment precedence, stabilizing them and, if required, preparing them for evacuation.

b. **Role 2** emphasizes efficient and rapid evacuation of stabilized casualties from supported elements and en route–sustaining care. Emergency lifesaving resuscitative procedures and damage-control surgery may be performed. Casualties who require minor care may be held for short periods and returned to duty. Medical resupply may be provided to supported role 1 facilities.

c. **Role 3** provides resuscitation, damage-control surgery (if not done in a role 2 facility), post-operative care as well as short-term surgical and medical inpatient care. Diagnostic services (e.g., X-ray and laboratory) and limited-scope internal medicine and psychiatric services are available. In-theatre reception and storage of medical supplies (including blood) and distribution to supported units is provided. In addition, the repair of medical equipment within the area of operations (AO) is carried out.

d. **Role 4** includes reconstructive surgery, definitive-care hospitalization and rehabilitation. It also includes storage and distribution of national medical stocks as well as major repair or replacement of medical equipment.

During operations, the first two HS roles will normally be provided by Canadian resources in the AO. Role 3 services may also be provided by Canadian resources or through negotiations with allies or other foreign nations. Role 4 care will normally be provided by military and civilian treatment facilities in Canada. In exceptional circumstances, allied military and/or host nation (HN) definitive-care facilities in the theatre of operations may be used as a supplement.

Due to the unique requirements of the DND/CAF Airworthiness Program, the RCAF Surgeon is also appointed as the AMA. The RCAF Surgeon supervises flight surgeons (medical officers who have received specialized training in aviation medicine) assigned to wings, who provide health care to aircrew, advise on flight-safety matters and, on occasion, deploy with squadrons overseas.

LEGAL SERVICES

Canadian military law is divided into three main areas: military administrative law, operational law and military justice. The mission of the Office of the Judge Advocate General (JAG) is “to deliver client-focused, timely, options-oriented and operationally driven military legal services in support of Government of Canada, Department of

National Defence and Canadian Armed Forces priorities and objectives; and to superintend the administration of military justice in the Canadian Armed Forces while respecting the independent roles of each statutory actor within the military justice system."[38]

Legal services include but are not limited to

a. legal advice to commanders and staff on all matters of domestic, foreign, international and military law, particularly the law of armed conflict;
b. supervision of the administration of military justice;
c. legal guidance on government contracts, military personnel matters and the utilization of non-appropriated funds; and
d. advising commanders and commanding officers on military-justice matters.

Within the CAF, legal services are provided through regional offices located on selected bases/areas in each of the regions in Canada as well as the US and Germany. Through these offices, the Deputy JAG is responsible for providing general legal support to the chain of command. The senior legal officer at each level provides the advisory function to the commander and maintains close liaison with other legal officers employed throughout the RCAF and CAF.

During operations, the legal advisor's role is to facilitate the lawful conduct of operations by providing timely and accurate legal advice to the commander at the strategic, operational, and tactical levels during all phases of an operation. As CAF operations have increased in complexity and intensity, RCAF commanders must consider legal advice when planning operations, particularly when it pertains to the targeting process and selection of lawful targets.

The Director Defence Counsel Services (DDCS) provides legal services free of charge to persons subject to the Code of Service Discipline charged or liable to be charged under that Code.[39] DDCS lawyers are the defence bar of the CAF and provide their clients with the defence counsel and advisory services typically provided by criminal lawyers in the civilian practice of law. They deal directly with their clients, including assisting officers, irrespective of rank, status, unit or physical location. DDCS lawyers perform their duties and provide their services independent of the chain of command and CAF and DND disciplinary and enforcement authorities. The sole restraints on the provision of their services are those imposed by law and by professional ethics, including the requirements and constraints of solicitor-client privilege.

CHAPTER 4
PLANNING SUPPORT FOR OPERATIONS

SECTION 1 – INTRODUCTION

Planning is foundational to the successful delivery of air and space power, and support planning is an essential part of the OPP. Support planning must be complementary to the mission's/operation's aim and be fully integrated with all phases of the overall planning process at the tactical, operational and strategic levels. Support planners must be familiar with methods for estimating requirements for the personnel, materiel, infrastructure and services required to enable air and space operations. This demands a good understanding of the operation being supported as well as an appreciation that some aspects of air and space operations are rarely predictable or repeatable, and the support plan must adjust accordingly, often with great haste. As a result, this chapter introduces the CAF OPP, provides an overview of support planning, the support estimate and its planning factors and discusses support planning during operations as well as considerations for reconstitution.

SECTION 2 – THE CAF OPERATIONS PLANNING PROCESS

Air and space operations planning is based on the CAF OPP, which is a coordinated process to determine the best method of accomplishing assigned operational tasks and planning for possible future tasks. The planning process is designed to optimize logical, analytical steps of decision making in conditions of uncertainty and ambiguity, and it can be adapted to the scope, intensity and criticality of the operation. When time permits, a deliberate planning process is followed; whereas, when time is critical and information and resources are not readily available, rapid-response planning can be employed.

As depicted in Figure 4-1, the OPP consists of five steps: initiation, orientation, course of action (COA) development, plan development and plan review. At the tactical level, the first three steps are also known as the estimate process. In its full form, the CAF OPP is a sophisticated and highly structured strategic-planning tool that is intended for execution by an experienced staff that is supported with ample resources. It incorporates advanced features such as specific role assignments; detailed situational analysis; multi-option identification, analysis and evaluation; and records of decisions. The CAF OPP is not limited to large-scale planning activities, and modified forms of it can be used for planning at all levels.[1] Chapter 4 of B-GL-005-400/FP-001, CFJP 4-0, *Support*, contains detailed information on support planning. Operational planning and support planning cannot be conducted in isolation from each other. Support planners should be integrated into the OPP as early as possible to ensure that the options being developed to meet the commander's intent are sustainable, as support functions can often be important limiting factors to operations. Early integration also enables the development of support options that reflect the operational plan.

Figure 4-1. The CAF Operations Planning Process

SECTION 3 – CONDUCT OF SUPPORT PLANNING

Table 4-1 illustrates how support-planning activities fit within the steps of the OPP.

OPP Step	Major OPP Activities	Support-Planning Activities
Initiation	• Receive task • Initial assessment • Gather staff • Gather info	• Assess the directive that initiated the planning process • Activate the planning team • Gather planning tools and baseline information • Identify, where possible, essential support tasks • Initiate support estimate
Orientation	• Mission analysis • Planning guidance • Warning order	• Identify and analyse key support considerations • Identify, as early as possible, major support limitations • Assist in mission analysis • Prepare the warning order's support paragraph • Analyse tasks to determine essential, assigned and implied support tasks

OPP Step	Major OPP Activities	Support-Planning Activities
		• Conduct staff checks of the support implications while analysing the tasks

COA Development	• Develop COAs
	• Information brief
	• Refine COAs
	• Compare COAs
	• COA war game
	• Decision brief
		• Continue analysis task
		  • Staff check the supportability of the COAs being considered
		  • Produce a concept of support and an outline plan for each COA as they mature
		  • Produce individual support concepts when COAs are markedly different
		  • Develop an outline concept of support (including an estimate of force elements and resources required to support them) for each COA
		• Assess support risk for each COA
		• Evaluate support concepts during COA-comparison and war-gaming activities
		• Complete, as required, additional staff checks and/or subordinate estimates to cater to changes
		• Identify key shortfalls and issues
		• Synchronize with operations and other staff to ensure that the concept of support for each COA remains valid

OPP Step	Major OPP Activities	Support-Planning Activities
Plan Development	• Plan development • War game • Issue orders	• Resolve issues identified in the COA development step • Confirm the support and dependency matrices that link the support requirements to the operational plan in terms of time, quantities, locations and priorities • Synchronize with support formations/units to resolve outstanding issues • Complete the support estimate/plan • Refine the selected COA's concept of support into the support paragraph or annex of the operation order or develop it as a separate administrative order
Plan Review		• Continually review and update plans as required

Table 4-1. CAF OPP to support-planning activities[2]

THE SUPPORT ESTIMATE

The support-estimate process is used to verify the viability of proposed COAs and provides the basis of the support concepts for all COAs under consideration. The support estimate's development will be a cooperative endeavour conducted by the support staff and fully integrated with the planning activities conducted by the operations staff. The depth of detail and accuracy of analysis will often increase as the planning process unfolds. The support estimate may be limited to a few staff checks, or it may be a more complex process of melding several individual support estimates.

The following are the support estimate's three key activities:

a. **Analyse mission**. Mission analysis must consider the end state, assigned and implied tasks, constraints and restraints as well as the intentions of the higher commander.

b. **Evaluate factors**. The evaluation of factors must be exhaustive and each deduction thoroughly analysed for both subsequent deductions and the impact on the aim. This analysis leads to the development of different COAs.

c. **Develop and compare COAs**. The supportability of each COA is confirmed, and the support concept and plan are developed once a COA is selected by the commander at the end of the estimate process.

Military planners have identified five key factors that apply when planning the support requirements for a military operation: destination, demand, distance, duration and risk. Properly assessed, they enable planners to determine the number of personnel, quantity of materiel, type of infrastructure and variety of services required to achieve assigned objectives. These factors apply equally to operations conducted at home or abroad and for increases in operational tempo and/or severe environmental conditions. They should be formally addressed in major planning activities and taken into account even in minor planning activities.

DESTINATION

Planners must know the destination and surrounding area where operations will be conducted. Regardless of whether the destination is a well-established military facility or an austere base at which facilities and support services are limited, there are always unknowns, and if possible, a reconnaissance should occur before detailed planning begins. Some of the critical variables that must be examined as part of the destination include the following:

a. **Infrastructure**. Infrastructure encompasses many different types of facilities and capabilities such as seaports and airports. Critical factors for air operations include the runways, ramps, system for storing and distributing aviation fuel, EOD and ammunition storage areas, water sources as well as materiel-staging and materiel-storage areas.

b. **HNS and coalition partners**. For international operations, HNS and the support that can be provided by coalition partners must be considered. The range and reliability of HNS available in terms of personnel, equipment, services and resources may allow a reduction in the support footprint.

c. **Climate and terrain**. The climate and physical-geographical characteristics of the destination will likely impact the performance and safety of personnel and the functioning of equipment. These factors may affect resource-consumption rates, aircraft operations and the support footprint.

d. **Distance**. In consideration of airlift, the geographical location of a port that may be used as a hub needs to be considered with respect to the mission, duration and airframes intended for use. Fuel consumption and flight durations play a role in economy and should be accounted for. Additionally, certain countries impose flyover and other regulatory restrictions that should be researched prior to selecting a port, as they may add undue hours or distances to legs of a trip.

DEMAND

Demand is the quantity of materiel (or commodities) needed to support the operation. Typically, the demand for supplies or commodities is divided into three categories:

a. **Surge demand** is normally dictated by the timeline and operational tempo of the mission. As it is usually difficult to predict, surge demand requires rapid reaction and maximum flexibility to ensure effective maintenance of air and space power. Unpredicted, very-short-notice and contingency demands can be placed within this category.

b. **Steady-state demand** reflects continuous usage of commodities such as rations and potable water, which can be accurately predicted.

c. **Cyclical demand** represents changes in consumption rates due to changing weather or operational posture. Fuel and ammunition are examples of cyclical-demand commodities.

Although the preventive-maintenance concept that is applied to aircraft makes the demand for aircraft parts somewhat predictable, significant failure rates associated with older aircraft and the requirement to operate in unforgiving environments can also lead to surge demand.

The type of mission and its tempo will affect the demand for personnel, materiel and the type of infrastructure that is needed. For commodities, demand is influenced by destination, distance, duration and the type of air platform being employed. The operational tempo may vary from supporting a single airplane conducting one flight per day to multiple aircraft types conducting operations around the clock. Thus, the demand for personnel, materiel, infrastructure and services can vary significantly from operation to operation; therefore, it is essential that materiel and commodities are scaled appropriately.

DISTANCE

The distance to and within the theatre of operations will not only determine the length and capacity of the lines of communications (LOC) but also dictate transit times and the need to establish an OS Hub. For deployed operations, an OS Hub located close to the theatre of operations may be required to ensure an efficient flow of resources to and from the DOB. This, in turn, will affect the size and structure of the sustainment pipeline. Distance may vary as operations develop; thus, there must be sufficient sustainment resources available to readjust and extend the LOC to maintain operational freedom.

Distance could also be a factor in deciding whether to forward base other resources such as test equipment and specialized tools. Although portable automated test equipment that can be forward based may be available for a certain aircraft type, other considerations such as the capability of the wing to support local operations also must be taken into account.

Finally, it must be noted that there are several destination, demand and distance considerations when selecting between air, land and sea transportation:

a. Air transportation is the costliest, and it is generally used for high-priority

cargo and/or when movement can be blocked or delayed by surface obstructions.

b. Land transportation is the main mode of transport used domestically in support of MOBs. In a deployed scenario, land transport is generally used from the airport of debarkation (APOD) / seaport of debarkation (SPOD) to the DOB.

c. Sea transportation is of lower cost when conducting a strategic move and is primarily used for lower-priority cargo.

DURATION

The duration of any military operation, along with the variety and demand for supplies required to support it, will determine the overall volume of materiel required, the corresponding transportation requirements and, consequently, the overall extent of the sustainment task. Although a commander may give guidance concerning duration, its unpredictability places an additional demand on sustainment practitioners. Duration also determines the need to rotate or replace personnel and equipment. If the operation is of short duration at a well-established destination where local support is reliable and easily available, then it may require minimal support. Conversely, if the operation is likely to extend over several months or years, in a hostile and austere destination, the requirement for sustainment will likely include a wide range of services, necessitating substantial materiel injects that result in a larger support effort.

Long-duration operations also have a significant impact on the MOB. Although a number of aircraft with supporting elements may be deployed for several months, activities at home must continue. The tempo of wing activities may be reduced, but flying operations to support assigned objectives, as well as FG, must continue. Consequently, the RCAF must maintain a suitable sustainment capability to support such operations at home. Major activities such as aircraft-maintenance schedules (e.g., for periodic inspections) may have to be adjusted to ensure that aircraft with maximum hours and the right mission kits are available for rotation into theatre. Lengthy deployments may also require backfilling by Reservists, casual employees and contractors for deployed personnel.

RISK

The risks to sustainment include any factor that compromises the ability to provide the required support. Therefore, the level of risk to sustainment operations must be assessed so appropriate countermeasures can be put in place and requirements (e.g., infrastructure-repair capabilities and medical-treatment facilities) can be anticipated. Hostile activities can impede movement, destroy logistic stockpiles as well as close airports and seaports or affect their throughput capabilities.

The air platform itself poses a risk to sustainment due to its inherent fragility and support dependency. Aircraft are more easily damaged than other major weapon systems such

as ships and tanks, and the likelihood of loss of life due to seemingly minor sustainment problems is also greater (e.g., contaminated fuel is not likely to cause the loss of a land vehicle or ship but could readily cause an aircraft to crash). The storage and handling of complex and costly weapons, especially in a deployed context, can add additional risk to the operation. Operations are frequently tied to fixed installations that provide runways as well as maintenance and fuel facilities.

SUPPORT-ESTIMATE PLANNING FACTORS

When completing the support estimate, each of the four components of sustainment—personnel, materiel, infrastructure and services—has a series of planning factors that must be considered. For each planning factor the following are considered: requirements, availabilities, priorities, restrictions, deductions, courses open and plan. In turn, the components provide a convenient way of grouping the results of individual analysis into a concept of operations or plan. Each planning factor might be examined as a single entity but, more likely, will comprise a number of subordinate analyses. Each analysis must reflect the support requirements of the parent COA. Where multiple (or very different) COAs are under consideration, it may be necessary to conduct separate analyses by COA. In a complex operation it may be necessary to examine each planning factor by operational phase.

Though far from exhaustive, Table 4-2 provides a suggested list of planning factors and possible deductions for each component of sustainment. These planning factors should be considered in combination with the key factors of force structure and composition, destination (including infrastructure, HNS and coalition partners, and climate), demand, distance, duration and risk to ensure a thorough estimate is completed.[3]

Components of Sustainment	Planning Factors	Deductions
Personnel	• Environmental threats (disease, toxins, etc.) • Personnel administration services • Mortuary affairs • Expected intensity of operations • Duration of mission • HS/medical • Spiritual support (chaplaincy) • Morale and welfare	• Current personnel status and replacement plans • Pay and allowances and additional benefits • Honours and awards • Casualty estimate and effect on combat readiness • HS plan – medical, dental, mental health • Personnel replacement priorities and controls • Reconstitution plan and deficiencies • Morale and welfare services and issues • Enemy prisoner of war • Refugees • Evacuees

Components of Sustainment	Planning Factors	Deductions
Materiel	• Lines of communication • Theatre-level stocks • Evaluate classes of supply (I–X) • Sustainment/ replenishment cycle • Procurement authorities/policies • Food services • Enemy threat	• Overflight clearances, especially for dangerous cargo and munitions • Availability of cargo-handling equipment at the airport of embarkation (APOE) and APOD • Availability by class of supply, including reserves • Distribution methods • Mission configured loads—where and when • Emergency-resupply procedures • Reporting requirements • Reconstitution • Support from the higher formation • Fuel: current status, bulk storage requirements, bulk refuelling capability, distribution plan, allocations and risk • Ammunition: requirements versus availabilities, ammunition storage sites, restrictions and risk • Rations and water: hard or fresh rations, crew-served meals, bulk water delivery, bottled water and water points • Food Safety and Food Defence[4] • Local-, regional- and/or national-level contracting along with HNS or coalition or allied combined joint contracting (e.g., NATO)

Components of Sustainment	Planning Factors	Deductions
Infrastructure	• Infrastructure available • Communications networks and architecture • Utilities • Runways • Environmental protection	• Temporary or permanent facilities • Requirement versus availability • Power generation and electrical distribution • Water and sewage system • Availability and serviceability • Aerodrome maintenance requirements including availability of aerodrome maintenance equipment and fire services • Environmental assessment, environmental protection
Services	• Maintenance • Transportation • Laundry/bath/ decontamination • Disposal of grey/black waste • Force protection • Legal services	• Repair-parts availability • Transport requirements • Movement control • Route use and priority traffic • Traffic control • Trailer transfer points • Alternate modes available • Security of location • Aerodrome security • Custodial services for own forces, prisoners of war, others

Table 4-2. Support-estimate planning factors

THE PLANNING PROCESS

A deliberate operation consists of five operational phases—warning, preparation, deployment, employment as well as redeployment and termination. Air and space operations, whether part of a joint or multinational force, follow the same operational phases, and support planning occurs throughout all five phases.

WARNING

The warning phase is when planning staff are first made aware that a new operation (or significant change to an existing operation) is being considered and may be initiated in

the coming days or months. During this phase, the commander's intent and vision are communicated so that planning activity can commence. Support planners need to anticipate and assess potential requirements—and should start liaising with other organizations—so that other staff can also begin preparations and that C2 arrangements can be clarified. Considerable lead time may be needed to address some requirements, so as discussed earlier, planners must anticipate support needs to the greatest extent possible and support planners be engaged in the planning effort.

PREPARATION

The preparation phase of an operation may last only a few days, as in the event of an emergency response, or may extend over many months. During this phase, the CAF OPP will be followed, and the operational plan finalized; however, the main effort is on theatre-activation and theatre-opening activities. CJOC, through the CFJOSG and the JTFSC, will coordinate and execute many of the theatre-opening tasks, such as establishing theatre-level infrastructure; coordinating multinational or HNS; selecting staging areas and conducting reception, staging, onward movement and integration (RSOI) of the incoming force. The support plan will be addressed in the service-support paragraph of the operation order, and extensive detail will be found in the administration order. Work must begin to address the myriad of support details so that the deployment milestones are met on time. Specific issues that must be addressed include personnel and equipment readiness; assembly of all materiel and commodities in preparation for movement; finalization of movement priorities so that initial operating capability can be achieved as soon as possible; and finalization of contracts and other support arrangements to ensure a steady replacement of consumables. A comprehensive reconnaissance of the intended deployment location, with appropriate representation from SMEs, should be carried out early in the preparation phase. Support SMEs must be aware of the law of armed conflict and other limitations regarding the use of civilian infrastructure (schools, community centres, religious buildings, hospitals, medical clinics) for military purposes, especially during conflicts and humanitarian crises/disasters. The preparation phase normally ends with the deployment of an advance party.

DEPLOYMENT

While there will likely be overlap between the phases of an operation, deployment is normally synonymous with the activation of an airbase at a deployed location. While actual theatre activation is the purview of the CFJOSG and its theatre-activation team, the MSE as well as the air expeditionary wing activation team (AEW-AT) provide the RCAF with an activation capability.[5] The AEW-AT, a component of 2 Air Expeditionary Squadron (2 AES), helps facilitate AEW activation through experience and knowledge of the air and joint environments. When executing the deployment plan, close coordination with other stakeholders (e.g., CJOC and CFJOSG) is key to ensuring successful theatre and capability activation while avoiding duplication of effort. During theatre activation, activities may include some or all of the following:

a. activating the SLOC and establishing strategic deployment routes (these are normally CJOC's/CFJOSG's responsibilities);

b. activating the theatre (this is normally a CFJOSG responsibility);

c. deploying the force and materiel in accordance with previously determined priorities (if a joint operation, this will be a CJOC responsibility);

d. establishing the DOB and associated facilities, infrastructure and other services which will enable the deployed forces to operate;

e. conducting RSOI (coordination with JTFSC is necessary if a joint operation);

f. implementing HNS and other contracting arrangements (must be closely coordinated with JTFSC if a joint operation); and

g. establishing reachback mechanisms for support.

EMPLOYMENT

When the first elements of the force are in place and initial operating capability has been achieved, operations will commence. Proper planning will ensure that all of the required components of sustainment (personnel, materiel, infrastructure and services) are in place to enable operations. As the operation continues, adjustments will need to be made to account for changing and unanticipated circumstances. As such, the four components of sustainment (personnel, materiel, infrastructure and services) must be continually monitored to ensure the commander's objectives are met and mission success is achieved.

REDEPLOYMENT AND TERMINATION

Redeployment is "the relocation of a deployed force to a new area of operations."[6] It involves the process of preparing for and executing the relocation of units, equipment and materiel for the next operation. Redeployment activities may take place over a significantly long period and continue well after the force has left the deployment area. Restoration of sites to their original condition (and often to a state better than their original condition) may be necessary due to legal, environmental and—sometimes—political pressures. The main effort during termination is on theatre deactivation and termination activities. During termination, the effort will focus on five main activities:

a. mission closure (cessation of military operations);

b. drawdown or the graduated orderly reduction of forces and materiel from the theatre;

c. redeployment;

d. theatre deactivation; and

e. mission termination.

RECONSTITUTION

While not one of the operational phases, reconstitution is a deliberate and significant activity designed to return redeploying units to a state of operational readiness. It encompasses those activities needed to restore the desired level of combat effectiveness to units, personnel and materiel following a major operation. The main objectives of reconstitution include establishing control over resources returning from a theatre of operations, maintaining the integrity of units and formations to the greatest extent possible, maximizing asset recovery and preparing the returning forces for future operations in minimum time. Consequently, reconstitution activities normally start at the conclusion of a campaign or operation when personnel are reintegrated and materiel is repatriated.

For joint and multinational operations, some reconstitution activities will likely be coordinated by CJOC and the CFJOSG. Generally, the initial reconstitution begins in the theatre of operations under the direction of a theatre- or mission-closure team. This team will perform stock verifications and report to CJOC. Concurrently, 1 Cdn Air Div will work with air component support staff and ADM(Mat) to determine the priority of repatriation of RCAF-specific materiel and its destination in Canada (wing, depot or repair facility). The movement from the theatre, the verification and determination of the condition of the materiel and equipment as well as the return of stocks to units will normally involve the CFJOSG, CMSG, life-cycle materiel managers and 1 Cdn Air Div staff.

Wings play a significant role in reconstitution, and they must be equipped to provide a multitude of services to RCAF units and personnel redeploying. Health and personnel-support services may include honours and awards, physical and mental health care as well as assistance for reintegration into wing activities and home routines. They must also be capable of replenishing depleted commodities and repairing or replacing equipment in preparation for future operations. Depending on the condition of the returning aircraft and equipment, considerable time and effort may be required to reconstitute a unit’s capabilities, retrain its personnel and regain its full readiness capability.

A key leadership issue associated with redeployment and reconstitution is ensuring that personnel are properly reintegrated into their parent units. Ideally, personnel would deploy and redeploy as part of formed units, but the reality is that many personnel deploy as augmentees. Reintegration of augmentees brings additional challenges, and failure to consider the legitimate needs of these individuals can result in degraded morale, medical and psychological issues, lack of access to medical and other supports, and loss of operational effectiveness.

CHAPTER 5
SUPPORT TO AIR AND SPACE OPERATIONS

SECTION 1 – INTRODUCTION

While the preceding chapters examined the fundamentals of sustaining and supporting the RCAF, as well as support planning, this chapter focuses on support to operations wherever they may occur. To begin, an overview of the importance of the wing in supporting operations is given. This is followed by a brief description of support to operations that are RCAF-only or RCAF-led. Next are other theatres of operations (domestic, continental and international) and categories[1] (routine, contingency and rapid response) that the RCAF has special considerations for, and the chapter concludes with a look at NORAD operations and expeditionary operations.

SECTION 2 – OPERATIONS AT THE WING

As discussed earlier, wings are active installations with air or space operations occurring continually. A wing often supports several flying units, and consequently, the entire support capability required for a deployed operation can rarely be generated from a single wing.

Wings operate using a combination of military, civilian and contractor personnel. Because military personnel must be deployable, military planners regularly face the challenge of making the most efficient use of limited personnel resources, while ensuring that skill sets are maintained and that the necessary personnel are available to conduct operations.

Wings designated to support a deployed unit / ATF are vital to operational success. They carry the dual role of supporting operations at home and preparing the OSE, MSE and command element for expeditionary/deployed operations. The requirement to deploy military personnel can put a significant strain on wing support capabilities, and as a result, it may be necessary to increase reliance on Reserve Force members, contractors and temporary civilian personnel while concurrently sustaining a DOB. Ideally, RCAF organizations will be capable of transitioning easily between home and deployed operations.

Differences in supporting structures between wings conducting similar functions can result in reduced efficiency, flexibility and interoperability. Learning curves for transferred personnel become needlessly high, resulting in an unfavourable effect on efficiency. Thus, standardization between wings to enhance operational-support efficiency is advantageous. Therefore, wing organizations should, where possible, organize within the doctrinal principles of Royal Canadian Air Force Doctrine Note (RCAF DN) 19/01,[2] as depicted in Figure 5-1.[3] Lodger units are normally under administrative control of the W Comd and are supported by the wing support organization, but are under operational command (OPCOM) of their operational chain.

While it will never be possible to achieve complete standardization due to the unique nature of different aircraft fleets, standardization of wing organizational structures, training and operating procedures make it easier for support personnel to move between wings and operate in support of other units when deployed.

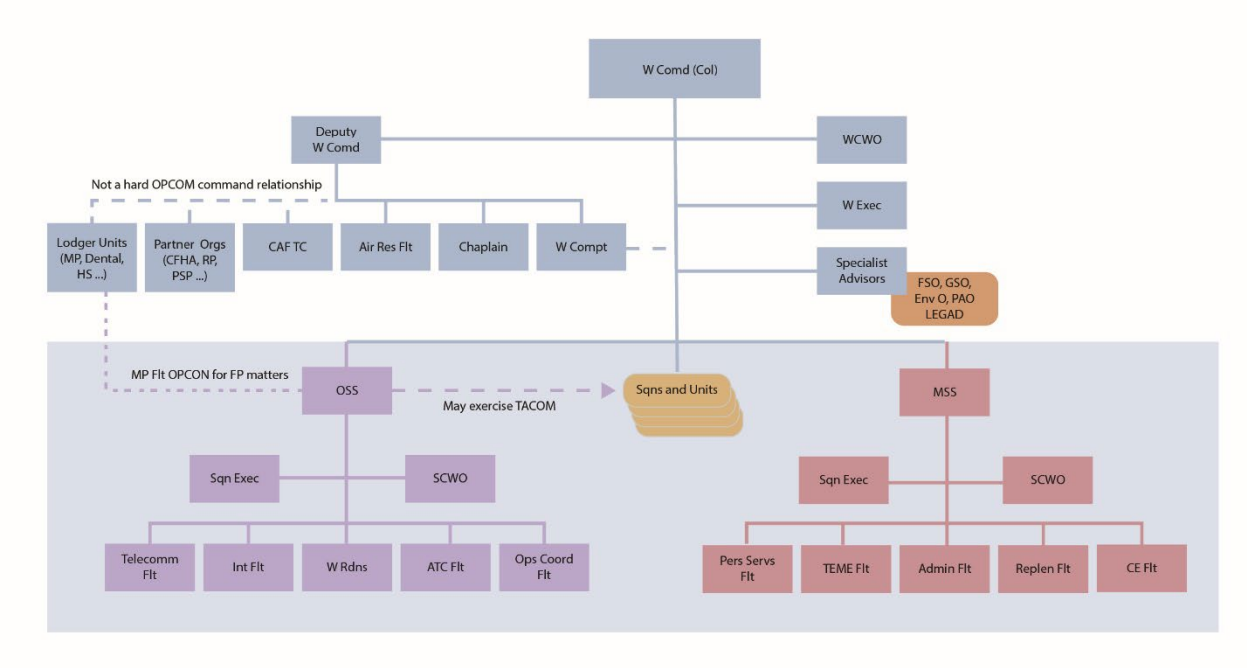

Figure 5-1. Generic 1 Cdn Air Div wing[4]

SECTION 3 – SINGLE-ENVIRONMENT OPERATIONS

There are some situations where there is a leading and predominant environment conducting the operation; these are called single-environment operations. Search and rescue operations, whether RCAF-only or joint with the RCN, are conducted under the command of Comd 1 Cdn Air Div. Other RCAF-only operations tend to be routine and occur at regular intervals, such as Operation BOXTOP, which resupplies Canadian Forces Station Alert. During RCAF operations, 1 Cdn Air Div's support staff plan, coordinate and execute the sustainment plan. This plan must include all possible support necessities, including operations-support and mission-support requirements.

While single-environment operations are often supported by a MOB, it may be necessary to activate the ATF/AEW with its OSE and MSE to support an operation from a DOB or FOL. Activating an ATF/AEW, or components of it, will depend on the circumstances or geographic region involved (e.g., when operating in the North) and the infrastructure and services available. Due to the unique geographic and cultural aspects of operations at FOLs, support for these operations is described more fully in the discussion of support to NORAD operations.

SECTION 4 – SUPPORT TO AIR MOBILITY OPERATIONS

Successful air mobility operations require operational crews and aircraft with supporting elements that must be carefully coordinated and organized. These may be required along the SLOC or within the theatre of operations before air mobility operations can be executed, or they may be part of the initial air mobility operation. An air mobility force is typically organized as either an air detachment (air det) or an ATF with a command element, an OSE and an MSE. For fixed-wing aircraft, trained mobile-air-movements personnel, deployable MAMS teams and specialized equipment are essential for the receipt, preparation, in-transit storage as well as loading and unloading. This includes the personnel and equipment necessary for airdrop delivery. Rotary-wing aircraft, while inherently more flexible, may require similar support, particularly for the management of large underslung loads.[5]

SECTION 5 – SUPPORT TO TACTICAL AVIATION OPERATIONS

"The role of tactical aviation is to support land force operations through the provision of aerial firepower, reconnaissance and mobility."[6] In practical terms, the provision of mission support for tactical aviation units is similar to that for other elements within a formation task force. A robust first-line-support capability is critical to tactical aviation units' ability to operate effectively. Second-line mission-support services may be provided by either the supported land force or the RCAF through the AEW's MSE. If provided by the land force, B-GL-300-004/FP-001, *Sustainment of Land Operations,* provides the doctrinal foundation. However, this will depend on the administrative relationship assigned. While the majority of operations-support functions (less FP) are provided by the RCAF, most mission-support requirements may be provided by either the RCAF or the supported land force. When second-line mission support is provided by the RCAF, the MSE is likely to be activated and employed. In either situation, support will normally include LEMS, the Materiel Management and Distribution System (MMDS), personnel-support services and HS to the tactical aviation unit.

The specific activities, maintenance tasks, repair parts, tools and test equipment required at each line to support tactical aviation elements need to be clearly articulated to ensure aviation units are properly supported. An ILS package forms part of the maintenance support for tactical aviation assets. RCAF-specific support issues (e.g., operations support, flight safety, airworthiness, aircraft maintenance, spare parts and aviation fuel) are addressed at the tactical and operational levels by RCAF staff planners. To do this effectively, RCAF staff work closely with the supported land force and tactical aviation chains of command.

While supporting land operations, a forward arming and refuelling point (FARP) may need to be established to support helicopters operating in forward locations. A FARP is necessary when the LOC have been stretched to the extent that tactical aviation assets are unable to return to their base to refuel. This situation may occur when a land formation is advancing rapidly while conducting offensive operations. In this scenario, second-line support is usually provided by the land formation's second-line-support

organization (service battalion) due, in part, to FP concerns and the lack of tactical land equipment integral to RCAF units. Third-line support is normally achieved through access to a theatre logistics base or a replenishment point, established by the responsible third-line-support organization. Third-line-support resources may be provided through various means, including the JTFSC lead/HN or prearranged contracts and agreements with local industry.

SECTION 6 – SUPPORT TO MARITIME AIR OPERATIONS

Air power employed in the maritime environment extends the reach of maritime operations, facilitates manoeuvre and enhances awareness through air power's characteristics of elevation, speed and reach.[7] Maritime helicopters detached from the RCAF to the RCN are employed as "maritime aviation," the term traditionally used to identify rotary-wing assets that are operating in a maritime role under operational control (OPCON) of the RCN but remain under OPCOM of the RCAF.

The maritime-aviation assets provide the capability of conducting several different missions, including anti-surface warfare, underwater warfare, and search and rescue. Unlike air power employed within the land environment (primarily tactical aviation), the use of air assets in the maritime environment does not normally involve the activation of the AEW and its OSE/MSE. As a result, mission support is usually provided by the RCN, often by a forward logistics site. At the operational level, the RCAF retains responsibility for RCAF-specific and longer-term support issues such as aircraft fleet management, operations support, flight safety and management of the Airworthiness Program.

SECTION 7 – SUPPORT TO SPACE OPERATIONS

The Comd 3 CSD is accountable to the Comd RCAF and is responsible for

a. space domain awareness;

b. space-based support of military operations both at home and abroad; and

c. defending and protecting military space capabilities including in collaboration with its allies and partners.

Support to space power activities includes space-system maintenance, logistics, engineering and communications. In addition, satellite operations, ground-segment maintenance, spacelift and spacecraft replenishment are unique to space-force support. Satellite operations include monitoring the health of a satellite and responding quickly to anomalies to restore the spacecraft to optimal performance. Replenishment involves replacing assets as they reach end-of-life to maintain continuity of service, while ground-segment preventive maintenance ensures ground stations continue to function properly. Loss-prevention programs are a key element of support and are employed to mitigate risk while accomplishing the mission. For the RCAF, sustainment of space and

ground-segment assets is frequently performed by commercial entities, DND and OGDA, depending on the scenario.

SECTION 8 – NORAD OPERATIONS

A Canadian and American binational organization, NORAD is charged with the missions of aerospace warning, aerospace control and maritime warning for North America. An aerospace warning is “a warning based on the detection, assessment and validation of an impending or actual intrusion into an airspace of interest by aircraft, missiles or spacecraft.”[8] Aerospace control is “the implementation and coordination of the procedures governing airspace planning and organization to minimize risk and allow for the efficient and flexible use of airspace.”[9]

The CDRNORAD is a US general officer with the dual role as the Comd US Northern Command (USNORTHCOM), while the Deputy CDRNORAD is a Canadian lieutenant-general. The CDRNORAD is responsible to both the president of the United States (via the secretary of defense) and the prime minister of Canada (via the CDS) and exercises OPCON over assigned NORAD forces. These combined forces are composed of HQ NORAD in Colorado Springs and three subordinate NORAD regional commands: CANR, Continental NORAD Region and the Alaskan NORAD Region. The sovereign airspace of Canada and the US comprises 20,000,000 square kilometres, requiring aircraft to cover vast operational areas—often over inhospitable terrain far from civilization—over the seas, along the coasts and in the far North. The fragility and support dependency of aircraft make it very difficult to disperse assets over such a wide area. Even with speed and reach, extended missions will quickly become difficult to sustain.

SUPPORT TO NORAD OPERATIONS

The Comd 1 Cdn Air Div serves as the Comd CANR, and as such, 1 Cdn Air Div is responsible for providing CANR with air forces to meet Canada’s commitment to the defence of North America. Supporting a NORAD operation involves significant coordination with the United States Air Force (USAF) to ensure support considerations are addressed while avoiding duplication of effort. Thus, a C2 arrangement and support-responsibility delineation are necessary to ensure mission support and operations support are provided but do not overlap. It may be necessary to use a MOB, FOL or even both, depending on the operation.

One example of this coordination is the communications support to the NORAD aerospace control mission, which includes a network of satellites, ground-based radars, airborne radars and fighters to detect, intercept and, if necessary, engage any air threat to Canada and the US. The continued maintenance of these networks is vital for an effective air-defence system, and this maintenance is a shared responsibility between Canada and the US. Also critical to a successful aerospace defence system is the ability to achieve interoperability between Canadian and US forces.

As discussed in Chapter 2, pre-existing supporting arrangements between Canada and the US such as ACSAs help enable the effective execution of NORAD missions by ensuring agreed levels of repair, provision of spares and common classes of supply. With the provision of mission support, particular attention has to be given to the type of air forces Comd CANR may be assigned or made available for air defence of the Canadian region, as these aircraft may have varied and unique support requirements that differ from RCAF aircraft fleets.

FORWARD OPERATING LOCATIONS

Because of the high probability that NORAD operations within the Canadian region will be conducted in the North, it is prudent to examine how operations in the Canadian Arctic are supported. The support concept for northern operations is based on the tenets of self-sufficiency; using temporary, forward-support installations; prepositioning specific types of materiel; and, where possible, obtaining support from OGDA or local industry. Supporting operations in the Canadian Arctic comes with inherent risks and challenges due to many factors, including the harsh climate, the region's vast, desolate geographical expanse and general lack of supporting infrastructure as well as technological challenges with communications.

The most common method of supporting operations in the Arctic is by using a FOL. While FOLs can technically be located anywhere, they are generally referred to as locations in the Canadian Arctic that are not normally occupied and that can support CF188 operations. The use of a FOL to support NORAD operations has both its advantages and challenges. Whereas the FOL provides a location from which to operate that may be closer in proximity to the potential threat (thereby extending an aircraft's reach and agility), it conversely offers limited infrastructure and resources with which to support an operation; this is particularly true of an operation that is of a longer duration. Even the sustainment of the FOL itself can be a challenge if it is a high-intensity operation.

It is important to note the local economy in most FOLs cannot provide support to air and space operations. The primary resupply for the communities is by annual sealift that is ordered and planned five to six months in advance of delivery and is heavily dependent on when the sea lanes will be free of ice. This lift usually includes fuel, construction supplies, other durable bulk goods and canned or other longer-lasting foods. Air resupply to communities is also heavily booked and focuses on fresh produce, milk and other perishables. As such, support personnel cannot plan on accessing food or materiel from the local communities. Morale and welfare activities should also be planned to have a minimum impact on these communities. Support staff should engage with community leaders in the early planning stages to find out what the communities can support.

As the FOLs are located in First Nations, Inuit and Métis communities, support planners should be aware of the Government of Canada's commitments to reconciliation and the specific concerns of these communities. Staff from 1 Cdn Air Div A9 and Joint Task

Force (North) can provide advice and assistance to ensure that RCAF operations are not disruptive to First Nations, Inuit and Métis communities.

SECTION 9 – EXPEDITIONARY OPERATIONS

In the context of air and space operations, an expeditionary operation is any operation conducted away from the MOB. Expeditionary operations may be conducted in domestic, continental or international theatres. To be capable of conducting operations at home and abroad, the RCAF must be an agile, expeditionary force. This necessitates having the personnel, doctrine, infrastructure, equipment, training and mindset to be able to conduct operations at a location other than a MOB. To rapidly project air power, the RCAF must force generate and maintain forces capable of responding to all types of operations.[10] This HR ATF is identified at the strategic level through the RCAF force posture and readiness directive.

The RCAF's principal expeditionary organization, 2 Wing, constitutes the core of a permanent deployable force on a rotating HR basis. 2 Wing's mandate is to command, control and enable expeditionary air operations, which inherently includes establishing, activating, and supporting an air base and air capability. 2 AES force generates trained, equipped and ready-to-deploy task-tailored forces to provide the necessary support to conduct expeditionary operations. The RCAF will normally commit elements of 2 AES to form a deployed air expeditionary support detachment (AESD) under the command and control of an ATF commander.

AIR TASK FORCE[11]

The RCAF organizes deployed operations using the ATF structure. This flexible and scalable organization will normally be comprised of the ATF Comd/HQ, air task force coordination element and an AEW, which consists of the AESD and air dets. Figure 5-2 gives a template for ATFs and can be adjusted depending on the mission. The size of the ATF can vary across the spectrum, from a single aircraft detachment with no support to a large multi-fleet organization with a matching infrastructure and support footprint. When a helicopter-centric ATF is required, a modified version of the ATF structure may be used, as both tactical aviation and maritime helicopter units routinely use CA, RCN or Canadian special operations forces (CANSOF) sustainment systems to operate away from the DOB.

An ATF is comprised of an OSE, MSE and a force-protection element (FPE).

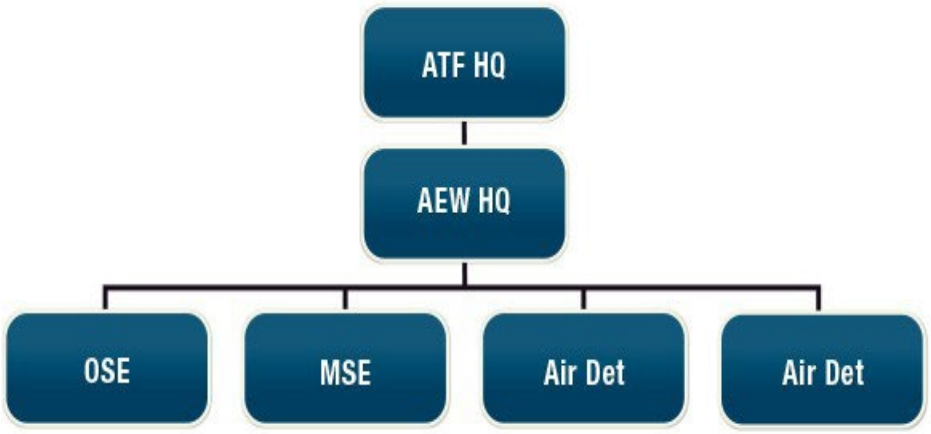

Figure 5-2. Typical ATF/AEW structure

a. **The OSE** provides the operational support to allow the ATF Comd to conduct safe and effective operations in accordance with the air operations directive of the higher HQ. The OSE is normally comprised of the following elements: current air operations, meteorological services, aircraft-maintenance support, aerospace management, CIS, intelligence flight safety, and limited advisory capability for EOD / improvised-explosive-device disposal.

b. **The MSE** provides mission support to the entire ATF either directly or by coordinating with combined and joint structures. The MSE is normally comprised of the following elements: CE, logistics (supply; transportation; food services, movements and transportation; personnel administration and services; financial services; ammunition specialists; and postal support), and electrical and mechanical engineering. Depending on the HN or coalition support, the ATF Comd may require additional support staff to facilitate full-spectrum operations. MSE personnel staff the mission-support-operation cell within the ATF battle staff.

c. **The FPE** consists primarily of the aerodrome security force (for security operations) but can expand its role, as required, to include the following additional FP-related capabilities: aerodrome intelligence, surveillance and countersurveillance; CBRN defence; military engineering (including fire protection); force health protection; and logistics, which may be grouped within the FPE for efficiency and span of control. These capabilities may be delivered through resources integral to the FPE or via external means (e.g., MSE, OSE, technical assistance visit, reachback and partner nation). The provost marshal is the commander's security and MP advisor, coordinating and providing advice on law enforcement, custody operations and traffic control. C2 of the FPE must rest with an appointed person properly

trained in FP operations and planning.

SUPPORT TO EXPEDITIONARY OPERATIONS

Expeditionary operations will evolve either in a planned, deliberate manner or as a rapid-response operation. The ability to support both scenarios means that support resources need to be adequately maintained. The OSEs and MSEs needed to mount and sustain operations are drawn mostly from permanent wing organizations.[12] Maintaining the mandated readiness levels required by the RCAF necessitates continuation training, equipment maintenance and personnel readiness. For example, in addition to their wing responsibilities, OSE/MSE members must maintain a prescribed level of personal readiness and participate in exercises so that they can deploy on short notice to any destination. This preparedness for military duty—combined with the speed, reach and flexibility of airlift—gives the RCAF a unique ability to project air power where and when required.

After the initial (or vanguard) air expeditionary force has been established and when it is due for rotation, the command element, OSE and MSE will be relieved by organizational components sourced from designated wings in accordance with the most current *RCAF Managed Readiness Plan*. At times, the designated wings may not have all of the personnel, particularly for specialist trades, that are necessary for an ATF or other deployed organization. Incremental tasks are for individuals or very small contingents of personnel to provide services in support of training/operations or other requirements away from their home wing. They are used to augment the support complement assigned to an ongoing operation, event or activity. Within the RCAF these tasks are controlled at the operational level and are assigned to wings on an equitable basis. Although incremental tasks need to be used for many situations, they have serious shortcomings in areas such as organizational unity, orientation of personnel, economy, morale and load sharing.

THEATRE SUPPORT

Theatre support comprises military and civilian organizations and capabilities at the operational and tactical levels, providing third-line through first-line support capabilities. The main elements that comprise theatre support are depicted in Figure 5-3.[13]

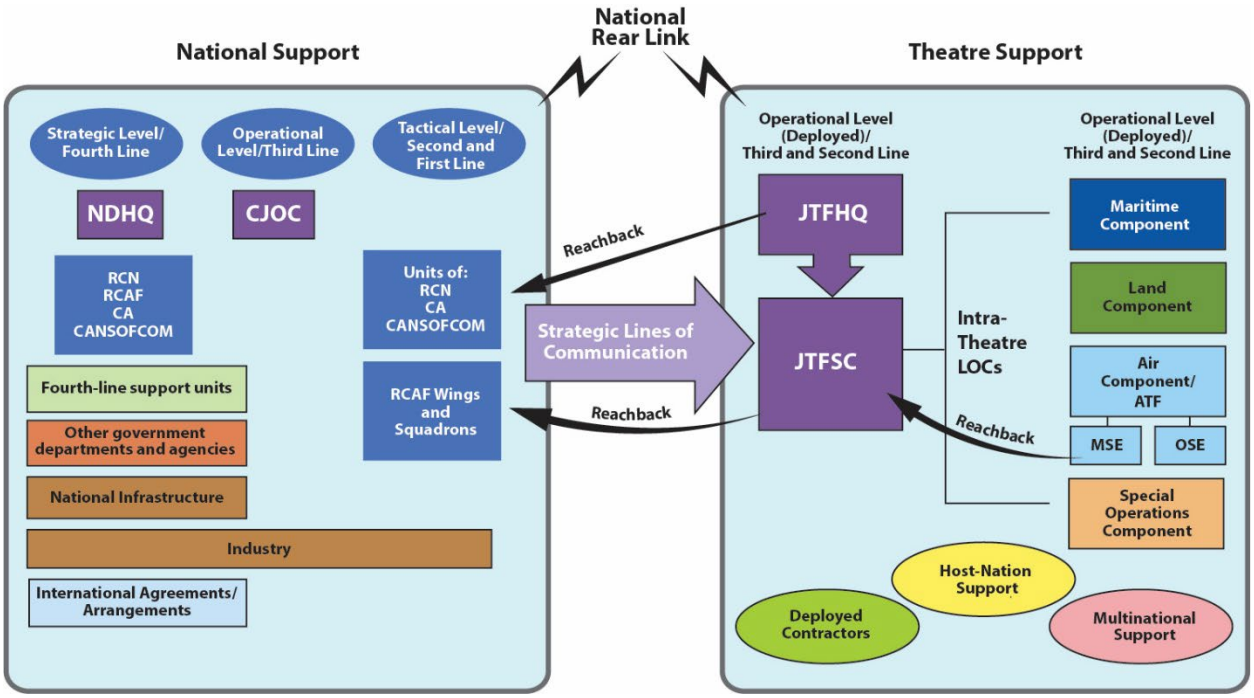

Figure 5-3. CAF support framework: theatre support

JOINT TASK FORCE HEADQUARTERS STAFF

Support responsibilities in the joint task force headquarters (JTFHQ) are split between the J1 (Personnel), J4 (Logistics), J6 (CIS), J8 (Finance) and J Engineer sections of the joint staff. Special staff such as the legal advisor and policy advisor provide the JTF Comd and coordinating staff with advice and assistance in specific professional and technical areas. The JTFHQ staff's responsibilities for support include:

a. providing specialist and technical advice to the JTF Comd;

b. developing and implementing theatre-level operational-support plans;

c. coordinating the provision of theatre-level operational support, in conjunction with CJOC staff and the JTFSC; and

d. coordinating the provision of shared support resources with the HN and other coalition partners, in conjunction with the JTFSC.

JOINT TASK FORCE SUPPORT COMPONENT

A deployed force will require certain elements of third-line, operational-level support, including movements functions at ports of debarkation; receipt and dispatch of inbound and outbound materiel and personnel; theatre-level stockpiling; contract management; financial services; equipment maintenance; military engineering; CIS; MP; postal, food

and personnel-support services; and HS. To provide this range of theatre-level support, a task-tailored JTFSC will normally be formed.[14]

The JTFSC provides or arranges theatre-level support to the components of a JTF. It provides most third-line and, when required, some second-line non-component-specific support. The JTFSC also serves as the bridge between the fourth-line-support capabilities provided by national support organizations and the first-line / second-line support capabilities found within each environmental or functional component, such as the MSE of an RCAF AEW.

At the tactical level, the RCAF uses the MSE and the OSE to provide support to a deployed ATF. In turn, the MSE engages the centralized CAF national support system through the JTFSC, if one is established. Coordination between the JTFSC and the component support organizations is critical to the successful support of operations. In some cases, this coordination may be based on a technical control relationship. For example, the officer commanding a medical unit within the JTFSC may have certain aspects of technical authority over medical personnel serving within the JTF's components. The JTFSC will also conduct the support-related aspects of theatre activation and deactivation (known as theatre opening and theatre closing), as described in CFJP 4-0, *Support*, chapters 5 and 7.

For operations where the lead environment is responsible for support functions in place of a JTFSC, additional care in planning must be taken to ensure that relationships and responsibilities are clearly defined during the initiation phase. This is most often formalized in a support-dependencies matrix, which depicts the support responsibilities assigned to the various operational-support units.

STAFF AND LINE RELATIONSHIP

Supporting any operation is easier with a good understanding of the RCAF and national-level support agencies. This knowledge is fundamental to both operational-level HQ support planners and unit support personnel alike. Likewise, the functional-support sections at an MOB (e.g., wing supply, transport and RCEME sections) must be familiar with their technical chains to ensure the mission/operation is supported in the best manner possible.

The link with the JTFSC is especially important during expeditionary operations, as it provides certain common operational-support requirements to the theatre of operations. In basic terms, the HQ staff develops support concepts and plans while wings and squadrons execute the assigned tasks. In an expeditionary operation, the ATF staff supports the commander by developing support plans, and as the "line" unit, the MSE executes the assigned tasks. Effective support plans are never developed in isolation, and HQ staff should seek advice and input from wings and squadrons to determine the best way to resolve a support problem. This cooperative "line and staff" relationship is crucial, as it enables support planning and task execution to be conducted simultaneously at the operational and tactical levels. While the tactical level is executing

support tasks, the operational level is planning future support activities.

Air component support staff, the MSE and the TF/JTFHQ need to coordinate support-planning efforts so that all players know what services each will provide, to whom, and how. All the supporting components must familiarize themselves with the capabilities and limitations of the JTFSC at the start of each operation, as JTFSC capabilities could vary from one operation to the next.

CONTRACTED SUPPORT AND HOST-NATION SUPPORT[15]

In-theatre contracted support and HNS can be economy-of-forces measures that enable the longer-term sustainment of operations by expanding capacity, mitigating the over-tasking of CAF resources and filling support capability gaps. Due to the potential impact on the HN's local economy and capacity, as well as the potential for competition with other deployed forces for scarce resources, contracting and HNS are normally the responsibility of CJOC and the JTFSC.

Deployed contractors are employees of companies that have contracts with DND/CAF. They are managed, not commanded, through the CAF chain of command. The JTF Comd has authority over deployed contractors within the AO, and they are considered to be "accompanying forces" under the law of armed conflict.

MULTINATIONAL SUPPORT

Multinational support is provided in cooperation with foreign military forces operating together in a multinational force. As with in-theatre contracting and HNS, it is often used as an economy-of-force measure and to mitigate national-support-capability deficiencies. Multinational support may cover a broad range of services and offer the advantage of sharing support resources within a multinational joint force, while at the same time posing challenges in developing a support system to satisfy national and multinational requirements. Support within multinational joint operations is covered in depth in CFJP 4-0, *Support*, Chapter 8.

STRATEGIC LINES OF COMMUNICATION

As depicted earlier in Figure 5-3, SLOC are the lifelines that link a deployed task force within a theatre of operations and national support in Canada. They are "all the land, water and air routes that connect a deployed force with the home nation, along which sustainment activities occur, as well as the activities themselves."[16] Further SLOC are depicted at Figure 5-4, indicating flow and breakdown of strategic, theatre and tactical airlift.

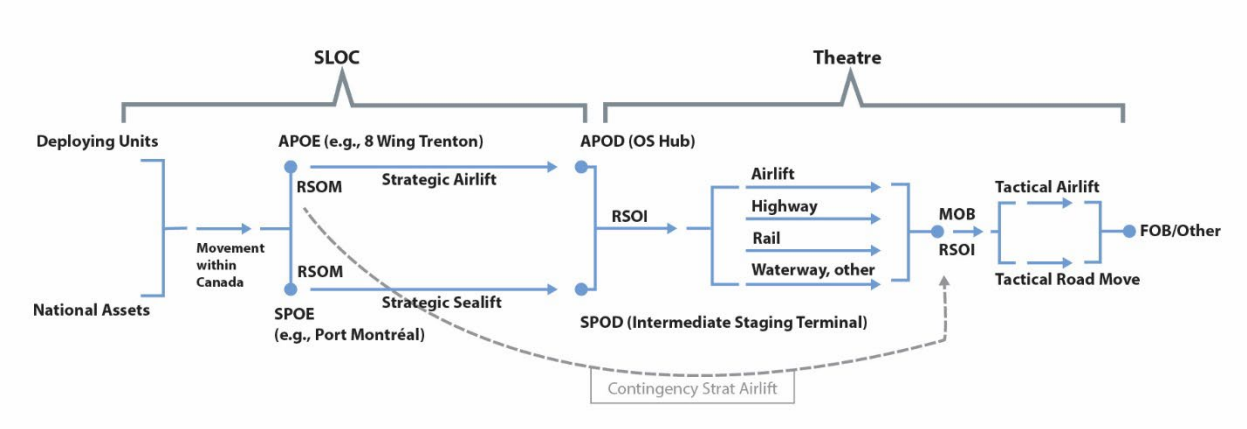

Figure 5-4. SLOC flow and breakdown

Whether operating independently or as part of a joint or multinational force, the RCAF depends on the SLOC and CAF support framework to sustain its deployed operations. Primarily through its air mobility assets, the RCAF plays a key role in the success of SLOC. CJOC will command and control operational-support facilities, which may be established along SLOC to enable the effective sustainment of operations, including OS Hubs, intermediate staging terminals, casualty support teams, and third-location decompression facilities.

OS Hubs are critical elements of SLOC, from which a military force may be launched into a theatre of operations. OS Hubs involve very specific, pre-negotiated arrangements that allow the CAF/RCAF access, rather than a permanent physical presence, to countries in key strategic locations around the world. Ideally, they will be located near a major city serviced by an international airport and close to a seaport. An OS Hub is not a base; rather, it is a means of facilitating the projection and sustainment of CAF/RCAF TFs.[17]

A fully activated OS Hub can provide a broad range of operational-support functions. Some of these are

a. movement of forces between the OS Hub and the theatre of operations and the retrograde movement of materiel and personnel from the theatre to Canada;

b. materiel management, which may include prepositioning, storage and materiel consolidation/de-consolidation;

c. aircraft services such as fuelling, maintenance and in-flight feeding;

d. strategic CIS support, including secure and non-secure communications;

e. personnel services such as mortuary facilities, maintenance of personnel records and recreational amenities; and

f. HS, such as strategic aeromedical evacuation and access to hospital services to stabilize critically ill or injured patients.

GLOSSARY

The definitions contained in this glossary are derived from the *Defence Terminology Bank* (*DTB*).

Term and Abbreviation	Definition
aerospace control (AC)	The implementation and coordination of the procedures governing airspace planning and organization in order to minimize risk and allow for the efficient and flexible use of airspace. (*DTB* record 3422)
aerospace warning	A warning based on the detection, assessment and validation of an impending or actual intrusion into an airspace of interest by aircraft, missiles or spacecraft. (*DTB* record 44191)
air mobility	The ability to deliver personnel or materiel by air to, from and within a theatre of operations. (*DTB* record 37284)
airworthiness	The fit and safe state for flight that is achieved when an aeronautical product conforms with its approved type design, is manufactured and maintained in compliance with standards and is operated within its design limits. (*DTB* record 36707)
comprehensive approach	A philosophy according to which military and non-military actors collaborate to enhance the likelihood of favourable and enduring outcomes within a particular situation. (*DTB* record 34522)
expeditionary operation (exped op)	An operation that requires the projection of military power over extended lines of communications into a distant operational area to accomplish a specific objective. Notes: 1. In the context of air operations, an expeditionary operation is any operation conducted away from the main operating base. 2. Expeditionary operations may be conducted in domestic, continental or international theatres. (*DTB* record 34907)

Term and Abbreviation	Definition
force employment (FE)	1. At the strategic level, the application of military means in support of strategic objectives. 2. At the operational level, the command, control and sustainment of allocated forces. (*DTB* record 32173)
force generation (FG)	The process of organizing, training and equipping forces for force employment. (*DTB* record 32171)
forward operating base (FOB)	An expeditionary base, located in the combat zone, that supports the employment and sustainment of deployed forces. (*DTB* record 28933)
forward operating location (FOL)	Any location at which materiel has been prepositioned and services prearranged to support the employment and sustainment of expeditionary air forces. (*DTB* record 37296)
host-nation support (HNS)	Civil and military assistance rendered by a nation, in time of peace, crisis, or war, to a force that is located on, operating in/from, or is transiting through that nation's territory. (*DTB* record 4466)
intelligence, surveillance and reconnaissance (ISR)	An activity that synchronizes and integrates the planning and operation of all collection capabilities with exploitation and processing to disseminate the resulting information to the right person, at the right time, in the right format, in direct support of current and future operations. (*DTB* record 30996)
joint force air component commander (JFACC)	A designated operational-level commander responsible for making recommendations to the joint force commander on the proper employment of all assigned, attached and made-available air forces. (*DTB* record 43364)
joint task force	A temporary grouping of elements from more than one component, under one commander, formed for the purpose of carrying out a specific operation or mission. Note: Typical components are maritime, land, air, special operations and support. (*DTB* record 31012)

Term and Abbreviation	Definition
materiel	All equipment, stores, packaging and supplies used by the military forces. Note that this includes aircraft, ships, and vehicles. (*DTB* record 43416, modified)
materiel management	All activities necessary to acquire, hold, use, and dispose of materiel, including the notion of achieving the greatest possible efficiency throughout the life cycle of materiel assets. (*DTB* record 36799)
mission support (msn sp)	The provision of logistical, technical and administrative support to [air] operations. Note: Mission support includes construction engineering, communication and information systems, supply, transport, electrical and mechanical engineering, food services, human resources and finance services. (*DTB* record 34911)
redeployment (redepl)	The relocation of a deployed force to a new area of operations. Note: Redeployment can involve returning the forces to their main operating bases or deployment to a new area to carry out a different operation. (*DTB* record 36932)
supported commander	A commander who has the primary responsibility for all aspects of an assigned military task and has the authority to give general direction for supporting efforts. Note: The relationship between supported and supporting commanders does not constitute a formal command relationship. (*DTB* record 37280 – DND/CAF) A commander having primary responsibility for all aspects of a task assigned by a higher NATO military authority and who receives forces or other support from one or more supporting commanders. (*DTB* record 19025 – Canada & NATO)

Term and Abbreviation	Definition
supporting commander	A commander who provides a supported commander with forces, capabilities or other support and/or who develops a supporting plan. Note: The relationship between supported and supporting commanders does not constitute a formal command relationship. (*DTB* record 37281 – DND/CAF) A commander who provides a supported commander with forces or other support and/or who develops a supporting plan. (*DTB* record 37281 – Canada & NATO)
strategic lines of communication (SLOC)	All the land, water and air routes that connect a deployed force with the home nation, and along which sustainment activities occur, as well as the activities themselves. Note: The lines of communications include the transportation nodes. The associated activities include reception, staging, onward movement and integration (RSOI); third-location decompression and medical evacuation. (*DTB* record 41456)
survivability	The ability to avoid, withstand or recover from adverse effects. (*DTB* record 13845)

ABBREVIATIONS

Abbreviation	Term
1 Cdn Air Div	1 Canadian Air Division
2 AES	2 Air Expeditionary Squadron
3 CSD	3 Canadian Space Division
A3	air staff designation: operations
A4	air staff designation: logistics
A8	air staff designation: finance
A9	air staff designation: civil-military cooperation
AA	Airworthiness Authority
ACSA	acquisition and cross-service agreement
ADM	assistant deputy minister
admin	administration
ADM(Mat)	Assistant Deputy Minister (Materiel)
A&E	ammunition and explosives
AEW	air expeditionary wing
air det	air detachment
Air Res Flt	Air Reserve Flight
AJP	Allied Joint Publication
AMA	Aerospace Medical Authority
AO	area of operations
APOD	airport of debarkation
APOE	airport of embarkation

Abbreviation	Term
ATC	air traffic control
ATF	air task force
C2	command and control
CA	Canadian Army
CAF	Canadian Armed Forces
CAF TC	Canadian Armed Forces Transition Centre
CAMP	Contingency Aircraft Maintenance Program
CAN	Canada
CANR	Canadian NORAD Region
CANSOFCOM	Canadian Special Operations Forces Command
CBRN	chemical, biological, radiological and nuclear
CDRNORAD	Commander NORAD
CDS	Chief of the Defence Staff
CE	construction engineering
CFHA	Canadian Forces Housing Agency
CF H Svcs Gp	Canadian Forces Health Services Group
CFINTCOM	Canadian Forces Intelligence Command
CFJOSG	Canadian Forces Joint Operational Support Group
CFJP	Canadian Forces Joint Publication
CIS	communication and information systems
CJOC	Canadian Joint Operations Command
CMP	Chief Military Personnel
CMSG	Canadian Materiel Support Group

Abbreviation	**Term**
COA	course of action
col	colonel
Comd	commander
DAOD	Defence Administrative Orders and Directives
DGAEPM	Director General Aerospace Equipment Program Management
DND	Department of National Defence
DOB	deployed operating base
DTB	*Defence Terminology Bank*
env O	environment officer
EOD	explosive ordnance disposal
EW	electronic warfare
exec	executive
FE	force employment
FG	force generation
flt	flight
FOB	forward operating base
FOL	forward operating location
FP	force protection
FPE	force-protection element
FSO	flight safety officer
GAC	Global Affairs Canada
GSO	general safety officer

Abbreviation	Term
HN	host nation
HNS	host-nation support
HQ	headquarters
HR	high readiness
HS	health services
ILS	integrated logistic support
IM	information management
int	intelligence
J1	joint staff designation: personnel
J2	joint staff designation: intelligence
J3	joint staff designation: operations
J4	joint staff designation: logistics
J6	joint staff designation: communication and information systems
J8	joint staff designation: finance
JAG	Judge Advocate General
JFACC	joint force air component commander
JTF	joint task force
JTFHQ	joint task force headquarters
JTFSC	joint task force support component
L1	Level 1
LEGAD	legal advisor
LEMS	Land Equipment Management System

Abbreviation	Term
LOC	lines of communication
MAMS	mobile air movement sections
MLSA	mutual logistics support arrangement
MND	Minister of National Defence
MOB	main operating base
MP	military police
MSE	mission-support element
MSS	mission support squadron
NDHQ	National Defence Headquarters
OGD	other government department
OGDA	other government departments and agencies
OPCOM	operational command
OPCON	operational control
OPP	operations planning process
ops	operations
ops coord	operations coordination
Orgs	organizations
OSE	operations-support element
OS Hub	operational support hub
PA	public affairs
PAO	public affairs officer
pers servs flt	personnel services flight
PSP	Personnel Support Program

Abbreviation	Term
PSPC	Public Services and Procurement Canada
RCAF	Royal Canadian Air Force
RCAF DN	Royal Canadian Air Force Doctrine Note
RCChS	Royal Canadian Chaplain Service
RCEME	Royal Canadian Electrical and Mechanical Engineers
RCN	Royal Canadian Navy
replen	replenishment
RP	real property
RSOI	reception, staging, onward movement and integration
RSOM	reception, staging and onward movement
SCWO	squadron chief warrant officer
SJS	Strategic Joint Staff
SLOC	strategic lines of communication
SME	subject matter expert
SPOD	seaport of debarkation
SPOE	seaport of embarkation
sqn	squadron
sqn exec	squadron executive
STANAG	standardization agreement
STRAT	strategic
TACOM	tactical command
telecomm	telecommunications
TEME	transportation, electrical and mechanical engineering

Abbreviation	Term
TF	task force
W Comd	wing commander
W Compt	wing comptroller
WCWO	wing chief warrant officer
W Exec	wing executive
WoG approach	whole-of-government approach
W Rdns	wing readiness
WSM	weapon-systems manager

REFERENCES

Canada, DND. A-PP-005-000/AG-002, *Procurement Administration Manual*, Revision 123. Ottawa. March 2023.

Canada, DND. B-GA-400-000/FP-001, *Royal Canadian Air Force Doctrine*, 3rd Edition. Ottawa. November 2016.

Canada, DND. B-GA-402-005/FP-001, *Royal Canadian Air Force Doctrine: Expeditionary Air Operations*. Ottawa. November 2020.

Canada, DND. B-GA-007/AF-001, *Air Movement Organization and Procedures, Volume 1: Organization & Operating Procedures*, Change 8. Winnipeg. September 2021.

Canada, DND. B-GA-440-000/AF-000, *Tactical Helicopter Operations*, Change 1. Ottawa. February 1999.

Canada, DND. B-GJ-005-300/FP-001, CFJP 3-0*, Operations*. Ottawa. 2011.

Canada, DND. B-GJ-005-302/FP-001, CFJP 3-2*, Domestic Operations*. Ottawa. November 2011.

Canada, DND. B-GL-005-000/FP-001, CFJP 01, *Canadian Military Doctrine*. Ottawa. September 2011.

Canada, DND. B-GL-005-400/FP-001, CFJP 4-0*, Support,* 2nd Edition. Ottawa. June 2021.

Canada, DND. B-GL-005-404/FP-000, *Joint Movement Support.* Ottawa. 2003.

Canada, DND. B-GJ-005-500/FP-000, *The Canadian Forces Operational Planning Process*, Change 2. Ottawa. 2008.

Canada, DND. B-GL-300-004/FP-001, *Sustainment of Land Operations*. Ottawa. December 2010.

Canada, DND. B-GL-342-001/FP-000, *The Land Equipment Management System.* Ottawa. 2022.

Canada, DND. Defence Administrative Orders and Directives (DOAD) 1000-0, “Foundation Framework for Defence Administrative Orders and Directives.” Ottawa. January 2017.

Canada, DND. DAOD 1000-4, “Policy Framework for Materiel and Asset Management.” Ottawa. March 2017.

Canada, DND. DAOD 1000-5, “Policy Framework for Financial Management.” Ottawa. March 2017.

Canada, DND. DAOD 1000-6, “Policy Framework for Information and Information Technology Management.” Ottawa. January 2017.

Canada, DND. DAOD 1000-8, “Policy Framework for Safety and Security Management.” Ottawa. January 2017.

Canada, DND. DAOD 1016-0, “Expenditure Management.” Ottawa. August 2017.

Canada, DND. DAOD 2008-4, “Public Affairs, Military Doctrine and Canadian Forces Operations.” Ottawa. January 1998.

Canada, DND. DAOD 2015-1, “DND/CAF Airworthiness Programme.” Ottawa. July 2018.

Canada, DND. DAOD 3000-0, “Materiel Acquisition and Support.” Ottawa. March 2018.

Canada, DND. DAOD 3007-0, “Integrated Logistics Support.” Ottawa. March 2022.

Canada, DND. DAOD 3035-0, “Materiel Assurance.” Ottawa. May 2021.

Canada, DND. DAOD 6000-0, “Information Management and Information Technology.” Ottawa. June 2017.

Canada, DND. DAOD 6001-0, “Information Management.” Ottawa. June 2017.

Canada, DND. DAOD 6003-0, “Information Technology Security.” Ottawa. June 2017.

Canada, DND. DAOD 7014-0, “Memorandum of Understanding.” Ottawa. June 2017.

Canada, DND. RCAF DN 19/01, *RCAF Domestic Organizational Structure – Wing Restructure Plan*. Ottawa. October 2019.

NATO Standard. AJP-6*, Allied Joint Doctrine for Communications and Information Systems,* Edition A, Version 1. Brussels. February 2017.

NOTES

PREFACE AND KEYNOTES

1. HNS is “civil and military assistance rendered by a nation, in time of peace, crisis or war, to a force that is located on, operating in/from, or is transiting through that nation’s territory.” *DTB* record 4466.

2. Canada, DND, B-GA-400-000/FP-001, *Royal Canadian Air Force Doctrine*, 3rd Edition (Ottawa: DND, 2016), 15.

3. Canada, DND, Defence Administrative Orders and Directives (DAOD) 2015-1, “DND/CAF Airworthiness Program,” last modified July 26, 2018.

CHAPTER 1

1. *DTB* record 1361.

2. *DTB* record 34949.

3. Canada, DND, DAOD 3000-0, “Materiel Acquisition and Support,” last modified March 23, 2018.

4. Materiel is “all equipment, stores, packaging and supplies used by the military forces.” *DTB* record 43416. Materiel includes aircraft, ships and vehicles.

5. *DTB* record 20171.

6. Canada, DND, B-GL-005-400/FP-001, Canadian Forces Joint Publication (CFJP 4-0), *Support*, 2nd Edition (Ottawa: DND, June 30, 2021), 1-3; and Canada, DND, B-GL-300-004-FP-001, *Sustainment of Land Operations* (Ottawa: DND, December 13, 2010), 2-1.

7. For more information on the joint staff structure, refer to Canada, DND, B-GJ-005-300/FP-001, CFJP 3.0*, Operations* (Ottawa: DND, 2011), 4-6. Air staff organizations follow the same basic format/responsibilities, substituting an “A” for the “J” with the applicable number (e.g., J1 Personnel, A1 Personnel).

8. *DTB* record 13845, modified.

9. Tactical aviation assets are located at select CA garrisons.

10. Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 2-1–2-8.

11. Canada, DND, B-GL-300-004-FP-001, *Sustainment of Land Operations*, 2-5. The term “line” refers to the organizational distribution of capabilities. Within the CA the term “echelon” is also used to describe lines of support.

12. *DTB* record 47834. “Within a pre-established global hub-and-spoke network, [an OS Hub is] an operational support node situated along or at the terminus of strategic lines of communication.”

13. Canada, DND, B-GL-005-400/FP-001, CFJP 4-0 *Support*, 2-5.

CHAPTER 2

1. The comprehensive approach is “a philosophy according to which military and non-military actors collaborate to enhance the likelihood of favourable and enduring

outcomes within a particular situation." *DTB* record 34522. For a more thorough description of the Comprehensive Approach, refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 2-7–2-8.

2. Canada, DND, DAOD 1000-4, "Policy Framework for Materiel and Asset Management," last modified March 30, 2017; and Canada, DND, DAOD 3000-0, "Materiel Acquisition and Support."

3. Canada, DND, DAOD 1000-11, Policy Framework for Infrastructure and Environment Management," last modified March 30, 2017.

4. Canada, DND, DAOD 1000-5, "Policy Framework for Financial Management," modified March 30, 2017.

5. Canada, DND, B-GJ-005-300/FP-001, CFJP 3.0, *Operations* (Ottawa: DND, September 2011), 4-4–4-5. The joint staff is usually organized along traditional lines and a number of divisions that are responsible for distinct staff activities. Logistics (J4) assists the commander with the arrangements for the logistical aspects of the operation.

6. Canada, DND, DAOD 1000-0, "Foundation Framework for Defence Administrative Orders and Directives," modified March 30, 2017. By means of eight policy-framework DAODs, the deputy minister and the CDS have authorized the development and issuance of DAODs by assigning functional authority to L1 advisors and other senior officials in specific functional areas. On the basis of the assignments in the policy framework DAODs, the L1 advisors and other senior officials may issue binding direction in DAODs in their functional areas to DND employees and CAF members. The L1 advisors and other senior officials may also cancel DAODs in their functional areas.

7. Canada, DND, DAOD 1000-4, "Policy Framework for Materiel and Asset Management"; and Canada, DND, DAOD 1000-8, "Policy Framework for Safety and Security Management," modified March 30, 2017.

8. NORAD represents the only binational command structure in the world in which powers are shared between Canada and the US. The commander is always American, while the deputy commander is always Canadian.

9. Refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 2-10–2-11, for a more complete description of the composition, roles and responsibilities of CJOC and its operational-support formations.

10. A WoG approach is "an integrated approach to a situation that incorporates diplomatic, military, and economic instruments of national power as required." *DTB* record 35242.

11. In fall 2015, Public Works and Government Services Canada (PWGSC) was renamed Public Services and Procurement Canada. PWGSC remains the legal name of the department. "Policy on Social Procurement," Public Services and Procurement Canada, modified August 12, 2022.

12. Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 2-12.

13. For further information, refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0*, Support*, 2-10–2-11; and Canada, DND, DAOD 7014-0, "Memorandum of Understanding," modified June 7, 2017.

CHAPTER 3

1. An FOB is a special type of DOB; it is "an expeditionary base, located in the combat zone, that supports the employment and sustainment of deployed forces." *DTB* record 28933.

2. An FOL is a special type of DOB; it is typically a site in the Canadian Arctic, not normally occupied, that is able to support CF188 operations. An FOL could be a commercial facility. An FOL is "any location at which materiel has been prepositioned and services prearranged to support the employment and sustainment of expeditionary air forces." *DTB* record 37296.

3. For more on expeditionary air operations, refer to Canada, DND, B-GA-402-005/FP-001, *Royal Canadian Air Force Doctrine: Expeditionary Air Operations* (Ottawa: DND, November 2020).

4. While EOD is a key component of aerodrome damage repair, the RCAF does not have an integral EOD capability. This function is performed by CA EOD personnel or coalition partners.

5. Policy direction can be found in Canada, DND, DAOD 6000-0, "Information Management and Information Technology," modified June 5, 2017.

6. For further information on the IM plan, refer to Canada, DND, DAOD 6001-0, "Information Management," modified June 5, 2017.

7. For further information, refer to Canada, DND, DAOD 6003-0, "Information Technology Security," modified June 5, 2017.

8. *DTB* record 36707.

9. The concept of corrective and preventive maintenance for all aircraft is described in the Canadian Forces Technical Order (CFTO) series: C-05-005-Pxx/AM-001, where the xx represents from 02 to 12 (also known as the P-series publications).

10. Canada, DND, DAOD 3007-0, "Integrated Logistics Support," modified March 16, 2022; and Canada, DND, A-LM-505-001/AG-001, *Guidance Manual - Integrated Logistics Support* (Ottawa: DND, May 1, 1995).

11. Canada, DND, DAOD 3000-0, *Materiel Acquisition and Support*.

12. Canada, DND, DAOD 3035-0, "Material Assurance," modified May 13, 2021.

13. *DTB* record 34911, modified.

14. *DTB* record 36799.

15. For a full list of acts, regulations and policy instruments related to procurement and contracting, refer to Canada, DND, A-PP-055-000/AG-002, *Procurement Administration Manual* (*PAM*) [Ottawa: DND, n.d.], 21.

16. *DTB* record 37284.

17. Refer to B-GA-401-004/FP-001*, Royal Canadian Air Force Doctrine: Air Mobility,* 1-2.

18. Canada, DND, B-GA-007/AF-001, *Manual of Air Movements, Volume 1, Organization & Operating Procedures*, Change 8 (Winnipeg: DND, September 29, 2021), 1-1–1-2.

19. Canada, DND, B-GA-007/AF-001 *Manual of Air Movements*, 8-9.

20. *DTB* record 15856; and Canada, DND, B-GJ-025-401/FP-201, CFJP 4-1.2, *Air Movement*, 2nd Edition (Ottawa: DND, 2016), 4-10.

21. Canada, DND, B-GJ-005-404/FP-000, *Joint Movement Support* (Ottawa: DND, 2003), 3-4–3-5.

22. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System* (September 10, 2001), Chapter 1, paragraph 13.

23. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 1, footnote 8. Examples include combat support equipment (CBRN defence equipment, tactical power and decontamination systems), general support equipment (deployable camps and utilities), combat-engineering equipment (bridging, mine/countermine and engineer kits), fire-rescue equipment, EOD equipment as well as simulators, trainers and targetry equipment.

24. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 1, paragraph 6.

25. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 3, paragraph 7.

26. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 7, paragraph 3. Backloading is the rearward movement of vehicle casualties to higher-level maintenance units.

27. For additional information, see Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 3, “Levels and Lines of Maintenance,” paragraphs 8–12.

28. Canada, DND, B-GL-342-001/FP-000, *The Land Equipment Management System*, Chapter 3, paragraph 33.

29. For additional information, refer to Canada, DND, A-85-269-001/FP-001, *Food Services Manual* (*FSM*) [Ottawa: DND, July 2007].

30. Canada, DND, B-GA-407-001/FP-001, *Royal Canadian Air Force Doctrine: Personnel*, 2nd Edition (Ottawa: DND, August 2021), 8-11.

31. Canada, DND, B-GA-407-001/FP-001, *Royal Canadian Air Force Doctrine: Personnel*, 8-3–8-10. These sections provide a detailed description of the personnel-management system and its components.

32. Canada, DND, B-GA-407-001/FP-001, *Royal Canadian Air Force Doctrine: Personnel*, 9-6–9-8.

33. For a list of applicable policies and directives, refer to Canada, DND, DAOD 1016-0, "Expenditure Management," modified September 5, 2017.

34. Canada, DND, DAOD 2008-4, "Public Affairs, Military Doctrine and Canadian Forces Operations," modified April 19, 2017.

35. Canada, DND, *Called to Serve (2022-2030) – The Royal Canadian Chaplain Service: Spiritual Resilience and Well-Being Strategy* (Ottawa: DND, n.d.), 5.

36. Canada, DND, A-CG-001-000/JD-000, *Canadian Armed Forces-Royal Canadian Chaplain Service Manual* (*RCChS Manual*) [Ottawa: DND, June 28, 2022], 15.

37. Canada, DND, A-CG-001-000/JD-000, *Canadian Armed Forces RCChS Manual*, 37–38.

38. "2018–2021 Office of the JAG Strategic Direction," Government of Canada, modified March 2, 2018.

39. Canada, DND, *Defence Counsel Services Manual* (Ottawa: Judge Advocate General, n.d.), 1-4.

CHAPTER 4

1. Additional information on the OPP can be found in Canada, DND, B-GJ-005-500/FP-000, CFJP 5.0, *The Canadian Forces Operational Planning Process (OPP)*, Change 2 (Ottawa: DND, 2008).

2. Adapted from Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 2nd Edition (Ottawa: DND, June 2021), 4-4.

3. Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, 4-9–4-10.

4. Canada, DND, DAOD 3012-2, "Management of Food Safety and Food Defence."

5. For further information, refer to Canada, DND, Royal Canadian Air Force Doctrine Note (RCAF DN) 19/02, *RCAF Expeditionary Organizational Structures: Planning Guidance* (Ottawa: DND, February 2021).

6. *DTB* record 36932.

CHAPTER 5

1. Canada, DND, B-GJ-005-300/FP-001, CFJP 3-0, *Operations* (Ottawa: DND, September 2011), 7-3.

2. Canada, DND, RCAF DN 19/01, *RCAF Domestic Organizational Structures: Wing Restructure* (Ottawa: DND, October 2019), 5.

3. Environment/general safety may be a part of wing HQ / specialist staff. Wing flight safety officers are part of wing HQ staff. Wing medical and dental detachments are commanded by Comd CF H Svcs Gp, while the MP are OPCOM to Military Police Services Group.

4. Canada, DND, RCAF DN 19/01, *RCAF Domestic Organizational Structures: Wing Restructure,* 5.

5. For additional information, refer to Canada, DND, B-GA-401-004/FP-001, *Royal Canadian Air Force Doctrine: Air Mobility* (Ottawa: DND, August 30, 2021).

6. Canada, DND, B-GA-440-000/AF-000, *Tactical Helicopter Operations*, Change 1 (Ottawa: DND, February 24, 1999), 1. Tactical aviation resources in combination with HS are the basis of the forward-aeromedical-evacuation system, which evacuates injured personnel within and from the battlefield.

7. Canada, DND, B-GA-403-000/FP-001, *Canadian Forces Aerospace Shape Doctrine* (Ottawa: DND, March 2014), 43.

8. *DTB* record 44191.

9. *DTB* record 3422.

10. In accordance with Canada, DND, B-GJ-005-000/FP-001, CFJP 01, *Canadian Military Doctrine* (Ottawa: DND, September 2011), 7-3, the three broad categories of operations are routine, contingency and rapid response.

11. This ATF information is adapted from Canada, DND, B-GA-402-005/FP-001, *Royal Canadian Air Force Doctrine: Expeditionary Air Operations*, 1st Edition (Ottawa: DND, 2020), 2–4.

12. 2 Wing normally provides the vanguard core staff for an OSE and MSE.

13. For a complete description of theatre support, refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*, Chapter 2, Section IV.

14. For a more complete description of the composition and functions of the JTFSC, refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support,* 2-17–2-18 for a more complete description of the composition and functions of the JTFSC.

15. Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support*. For a full discussion of theatre-level contracted support, refer to pages 2-19–2-20 and 6-9.

16. *DTB* record 41456.

17. For a full description of the OS Hub concept, refer to Canada, DND, B-GL-005-400/FP-001, CFJP 4-0, *Support,* 2-14–2-15.