National Defence / Défense nationale

A-GA-135-003/AG-001
D2-267/2015E-PDF
978-1-100-25937-6

AIRWORTHINESS INVESTIGATION MANUAL (AIM)

14 December 2018
Change #1 - 19 November 2019

Canada

INTENTIONALLY LEFT BLANK

FORWARD

1. The Airworthiness Program for the Department of National Defence and the Canadian Armed Forces (DND/CAF) was established by the Minister of National Defence (MND) on 18 September 1998. This program is designed to assist the MND in meeting national and international obligations for airworthiness management of military aviation as outlined in the *Aeronautics Act*. This legislation charges the MND with "regulation of aeronautics and supervision of all matters connected with aeronautics" for all military aeronautical products in Canada. This includes both the aeronautical products of DND/CAF operating on a worldwide basis as well as those of visiting forces while operating in Canada.

2. The aim of the DND/CAF Airworthiness Program is to ensure that an acceptable level of aviation safety is achieved and maintained for military aviation. In order to achieve this mandate, the DND/CAF Airworthiness Program established a management accountability framework, which consists of an Airworthiness Authority (AA), a Technical Airworthiness Authority (TAA), an Operational Airworthiness Authority (OAA) and an Airworthiness Investigative Authority (AIA), as well as two specialist advisors; the Aerospace Medical Authority (AMA) and the Flight Test Authority (FTA). Furthermore, the program tasks the AA, the TAA, the OAA and the AIA to establish airworthiness instruments, which may include regulations, for their areas of responsibility.

3. Amendments were made to the *Aeronautics Act*, the major portion of these amendments came in "Part II - Military Investigations Involving Civilians" and dealt with additional powers for the MND's designated AIA and the requirements that such investigations must undertake. The amended legislation required that regulations be developed for some of the provisions and *Military Airworthiness Investigation Regulations* were put in place to meet this requirement.

4. The objective of this Airworthiness Investigation Manual (AIM) is to delineate AIA policies and regulations for AIA authorities. It also outlines the basis for AIA standards, procedures and instructions and details how the AIA interacts within DND/CAF and with persons, agencies, companies or authorities outside of DND/CAF. This Manual expands on Defence Administrative Orders and Directives (DAODs 2015-0 & 2015-1) and is designed to complement the A-GA-005-000/AG- 001 (DND/CAF Airworthiness Program). Also, it complements the A-GA-135-001/AA-001 and the A-GA-135-002/AA- 001 (Occurrence Investigation Techniques for the Canadian Armed Forces) to fully document all aspects of the Flight Safety program.

5. The Office of Primary Interest (OPI) for this publication is the Directorate Flight Safety 2 (DFS 2). The minimum review cycle for this publication is every three years with new amendments issued as required. Enquiries or proposed amendments should be directed to DFS 2.

INTENTIONALLY LEFT BLANK

LIST OF AMENDMENTS

This publication supersedes A-GA-135-003/AG-001 dated 14 December 2018. The official and most current version of this publication is available electronically on the DFS Intranet and Internet websites or from the National Defence Publications Depot. Any amendment will be advertised electronically by DFS and details will be published on the DFS Intranet and Internet websites.

NOTE
A vertical line in the margin shows where the publication was amended from the previous version.

AMENDMENT	NUMBER	DATE
ORIGINAL	-	14 DECEMBER 2018
CHANGE	1	19 NOVEMBER 2019
CHANGE	2	
CHANGE	3	
CHANGE	4	
CHANGE	5	
CHANGE	6	
CHANGE	7	

INTENTIONALLY LEFT BLANK

LIST OF EFFECTIVE PAGES

The number of effective pages excludes pages intentionally left blank.

Section #	Change #	Page #	# of pages
Cover page	1	-	1
Foreword	1	i	1
List of amendments	1	iii	1
List of effective pages	1	v to vii	3
Table of contents	1	ix to xvii	9
Definitions	1	Defn-1 to Defn-11	11
Chapter 1	1	1-1 to 1-6	6
Annex A	1	1A-1	1
Annex B	1	1B-1 to 1B-3	3
Chapter 2	1	2-1 to 2-3	3
Chapter 3	1	3-1 to 3-4	4
Annex A	1	3A-1 to 3A-2	2
Chapter 4	1	4-1 to 4-8	8
Annex A	1	4A-1 to 4A-2	2
Annex B	1	4B-1 to 4B-4	4
Appendix 1	1	4B-1-1 to 4B-1-3	3
Annex C	1	4C-1 to 4C-2	2
Annex D	1	4D-1 to 4D-2	2
Chapter 5	1	5-1 to 5-10	10
Annex A	1	5A-1 to 5A-3	3
Annex B	1	5B-1 to 5B-4	4
Annex C	1	5C-1 to 5C-2	2
Annex D	1	5D-1 to 5D-2	2
Chapter 6	1	6-1 to 6-20	20
Annex A	1	6A-1 to 6A-2	2
Annex B	1	6B-1 to 6B-12	12
Annex C	1	6C-1 to 6C-4	4
Annex D	1	6D-1 to 6D-5	5
Annex E	1	6E-1 to 6E-3	3
Annex F	1	6F-1	1
Annex G	1	6G-1	1

Section #	Change #	Page #	# of pages
Chapter 7	1	7-1 to 7-5	5
Annex A	1	7A-1	1
Annex B	1	7B-1	1
Annex C	1	7C-1	1
Annex D	1	7D-1	1
Annex E	1	7E-1 to 7E-2	2
Appendix 1	1	7E-1-1	1
Chapter 8	1	8-1 to 8-11	11
Annex A	1	8A-1 to 8A-2	2
Annex B	1	8B-1 to 8B-2	2
Annex C	1	8C-1 to 8C-2	2
Annex D	1	8D-1 to 8D-2	2
Annex E	1	8E-1 to 8E-2	2
Annex F	1	8F-1 to 8F-2	2
Chapter 9	1	9-1 to 9-5	5
Annex A	1	9A-1	1
Annex B	1	9B-1 to 9B-2	2
Chapter 10	1	10-1 to 10-9	9
Annex A	1	10A-1 to 10A-6	6
Annex B	1	10B-1 to 10B-10	10
Annex C	1	10C-1 to 10C-3	3
Chapter 11	1	11-1 to 11-5	5
Annex A	1	11A-1 to 11A-9	9
Chapter 12	1	12-1 to 12-3	3
Chapter 13	1	13-1 to 13-5	5
Chapter 14	1	14-1 to 14-5	5
Chapter 15	1	15-1 to 15-38	38
Annex A	1	15A-1	1
Chapter 16	1	16-1 to 16-4	4
Annex A	1	16A-1 to 16A-5	5
Appendix 1	1	16A-1-1	1
Chapter 17	1	17-1 to 17-2	2
Annex A	1	17A-1 to 17A-6	6

Section #	Change #	Page #	# of pages
Annex B	1	17B-1	1
Appendix 1	1	17B-1-1	1
Appendix 2	1	17B-2-1	1
Appendix 3	1	17B-3-1 to 17B-3-3	3
Appendix 4	1	17B-4-1	1
Appendix 5	1	17B-5-1	1
Appendix 6	1	17B-6-1	1
Appendix 7	1	17B-7-1 to 17B-7-2	2
Annex C	1	17C-1 to 17C-2	2
Abbreviations	1	Abbrev-1 to Abbrev-6	6
		Total	**309**

INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

INTENTIONALLY LEFT BLANK

LIST OF DEFINITIONS

Aircraft

Any machine capable of deriving support in the atmosphere from reactions with the air.

a. CAF Aircraft. Includes aircraft that have been accepted by the CAF through purchase, loan or bailment. For FS purposes, aircraft belonging to the Air Cadet League of Canada and aircraft considered "military conveyance" as defined by the *CTAISB Act*. Aircraft under production for the CAF are considered CAF aircraft from the moment they leave the production line following final assembly, regardless of the actual acceptance date. This situation could be modified by contract provisions or special agreements.

> NOTE
> The MND is responsible for investigating occurrences involving military conveyances and the CTAISB Act does not permit the TSB to investigate them. A working agreement between DFS and TSB further articulates the generally accepted meaning of the CTAISB Act definition. While it is clear that civilian companies conducting day-to-day military contracted operations, such as contracted for pilot ab-initio and primary flight training for the CAF are always considered military conveyances, there remain significant grey areas that can only be resolved on a case-by-case basis between DFS and TSB. When there is a significant occurrence involving a civilian air asset or civilian personnel, the WFSO should inform DFS so that the appropriate coordination with TSB can occur.

b. Non-CAF Aircraft: These are subdivided as follows:

(1) Non-CAF military aircraft. There are two categories of non-CAF military aircraft:

(a) Allied Military Aircraft. These are aircraft belonging to an allied military force. When the CAF assumes quality-assurance responsibility for these aircraft during production, repair, modification or overhaul, they are considered CAF aircraft from the moment they are accepted by the contractor until they leave Canada or are accepted for flight by an aircrew of the country of ownership.

(b) Non-allied Military Aircraft. These are aircraft belonging to a non-allied military force.

c. Civilian Aircraft. This term is normally self-explanatory, but when a CAF aircraft is lent or bailed to a civilian agency on a temporary basis, the CAF continues to be involved.

Aircraft Damage

Damage is defined as physical harm to an aircraft that impairs the value or normal function of

that aircraft. Damage is said to have occurred when the aircraft or any portion of it is lost or requires repair or replacement as a result of unusual forces like a collision, impact, explosion, fire, rupture, or overstress. Damage does not include faults that progressively develop from repeated applications of load at or below the design operating limits of the aircraft as a result of normal flight stresses. Additional damage resulting from stress failures may be classified appropriately as damage. Routine system or component unserviceability are not considered to be damage, and need not be reported unless the originator feels that there was injury or damage potential.

> NOTE
> If the equipment has not been misused or subjected to unusual stress failures, it shall not be classed as damage, but as normal wear resulting from prolonged service use.

Aircraft Damage Level (ADL)

The ADL is a qualitative categorization system used to determine the level of damage sustained by an aircraft during an occurrence. The following damage level definitions are used to reflect the degree of damage:

a. Destroyed/missing: The aircraft has been totally destroyed, is assessed as having suffered damage beyond economical repair or is declared missing;

> NOTE
> Aircraft totally destroyed are normally written off the inventory. Accidents with a lower ADL may subsequently result in administrative write-off of the aircraft for reasons not directly related to the damage. The original ADL will be recorded in the FSIMS for statistical purposes.

b. Very serious: The aircraft has sustained damage to multiple major components;

c. Serious: The aircraft has sustained damage to a major component;

> NOTE
> When a fuselage, wing, helicopter drive train or rotor blade are damaged beyond economical repair or are shipped to a repair facility, the level of damage will be referred to DFS for categorization (e.g. rotor blade change is minor damage, multiple blade changes is serious damage, transmission overspeed requiring overhaul is minor damage, sudden stoppage requiring complete change of drive train is serious damage).

d. Minor: The aircraft has sustained damage to non-major components; and

e. Nil: The aircraft, including the power plant, has not been damaged.

NOTE
When there are unique contractual maintenance arrangements in place that preclude CAF personnel from performing repairs that are considered within second-line maintenance, the case will be referred to DFS, who will assign the ADL.

Aircraft Major Components

Aircraft major components are:

a. Fixed Wing:

(1) the fuselage, cargo ramp and major structural sections thereof, but does not include canopies, jettisonable stores, windows, astrodomes, antennae, radomes, MAD booms, aerodynamic braking devices, small non-structural panels, doors or hatches, and non-integral nacelles,

(2) the wings and major structural sections thereof, but not including the wingtips, non-integral nacelles, spoilers, flaps, ailerons or other control-of-lift devices,

(3) the empennage and major structural sections thereof (vertical stabilizer, horizontal stabilizer, and stabilator), but not including the rudder or elevator; and

(4) the landing-gear oleos, legs, struts, sponsons and similar weight supporting members and structures, but not including the tail wheel strut or support assemblies, wheels, floats, shoes, skis, non-integral removable axles, brakes, tires, gear doors or actuating rods;

b. Rotary Wing:

(1) the fuselage, cargo ramp and major structural sections thereof, but does not include, windows, astrodomes, antennae, radomes, small non-structural panels, doors or hatches, and non-integral nacelles,

(2) the main rotor and tail rotor blades system, main transmission, and gearboxes but not including the drive shafts,

(3) the helicopter tail boom and pylon, but not including the fairings, nonintegral vertical or horizontal stabilizers or synchronized elevators, and

(4) the landing-gear oleos, legs, struts, sponsons and similar weight supporting members and structures, but not including the tail wheel strut or support assemblies, wheels, floats, shoes, skis, helicopter crosstubes or skids, non-integral removable axles, brakes, tires, gear doors or actuating rods; and

c. UA Major Components: As defined for manned aircraft above.

NOTE
Powerplants are NOT considered to be major components for the purposes of determining the Aircraft Damage Level.

Power Plant

The power plant includes the engine, engine-driven components and related systems, including propellers, afterburners, fans and the like.

Aircraft Store

An aircraft store is any device carried internally or externally and mounted on aircraft suspension and release equipment, whether or not the item is intended to be separated in flight from the aircraft. Aircraft stores are classified in two categories as follows:

a. Expendable Store: Expendable store is an aircraft store normally separated from the aircraft in flight such as a missile, rocket, bomb, mine, torpedo, pyrotechnic device, sonobouy, signal underwater sound device, survival kit air droppable (SKAD) or other similar item; and

b. Non-expendable Store: Non-expendable device charged with explosives, propellants, pyrotechniques, initiating composition or nuclear, biological or chemical material, for use in military operations, and includes a non-charged or inert replica of such a device.

Air Weapons

Air Weapons are any ammunition, explosives and/or pyrotechnics suspended, launched, released or fired from an aircraft; it includes any aircraft store, that interfaces with the air weapons system (AWS) including bombs, missiles, torpedoes, flares, pyrotechnics, SKAD (excluding the SKAD dropped as cargo), chaff and flares, sonobuoys and airborne targets and banners. This applies to both live and inert weapons.

Air Weapons System (AWS)

A system containing armament computers, mechanical, electromechanical and electronic components, which is part of an aircraft's permanent equipment or installed as a mission kit and is used to suspend, launch, release or fire ammunition/explosives and/or pyrotechnics in support of the mission being flown.

Ammunition

A device charged with explosives, propellants, pyrotechnics, initiating composition or nuclear, biological or chemical material, for use in military operations, and includes a non-charged or inert replica of such a device.

Ammunition and Explosives (A&E)

A&E is the Canadian preferred synonym for NATO's "explosive ordnance". It includes all ammunitions and explosives used on an aircraft and weapons systems.

Explosive

Any thing that is made, manufactured or used to produce an explosion or a detonation or pyrotechnic effect, and includes any thing prescribed to be an explosive by the regulations, but does not include gases, organic peroxides or any thing prescribed not to be an explosive by the regulations. (*Explosives Act* - "the regulations" refers to the *Explosives Regulations*, 2013)

Non-Air Weapons Ammunition and Explosives (A&E)

A&E installed or carried on-board aircraft that are not considered as air weapons. This may include A&E being carried as cargo or explosives incorporated within aircraft systems such as aircraft fire detection and extinguishing systems, ejection and escape systems and aircraft hoisting systems.

Cause Factor

The presence or absence of an action, condition or circumstance that leads to a FS occurrence.

Collateral Investigation

This term applies to any investigation of an occurrence conducted by other than FS personnel or for purposes other than FS.

Flight Safety (FS)

The state in which risks associated with flight activities, as well as those related to, or in direct support of the operation of the aircraft, are reduced and controlled to an accepted level.

FS Accident

An event in which one or more of the following occurred:

a. a person is missing or receives fatal, very serious or serious injuries or illness (Black, Grey, Red or Yellow) as determined by a medical officer in accordance with CFAO 24-1. The aircraft, its equipment or its operation must have contributed to the event for it to be classed as an air accident; or

b. a CAF aircraft is destroyed, missing or sustains very serious or serious damage.

FS Airworthiness Investigator

The airworthiness investigator is a FSO appointed by DFS/AIA who has received specialty training in aviation occurrence investigations. This airworthiness investigator is certified as qualified as delineated in this manual and is authorized to conduct independent airworthiness investigations.

FS Hazard

An existing condition whereby there is possibility of adverse effect on health, property or safety of flight (SoF).

FS Incident

An event in which one or more of the following occurred:

a. someone receives minor injuries (Green or Nil) as determined by a medical officer in accordance with CFAO 24-1, or there is risk of injury;

b. a CAF aircraft sustains minor damage; or

c. there is no injury or damage but accident potential did exist.

FS Investigation

A flight safety investigation (FSI) refers to any investigation conducted under the terms of this publication for the sole purpose of occurrence prevention. These investigations are also referred to as airworthiness investigations and fulfil the investigation requirement of the CAF/DND Airworthiness Program.

FS Investigation Report

The report produced in support for a Class I FSI into the circumstances of a particular FS occurrence, and subsequently commented upon by various levels of command and the Parties/Persons with Direct Interest (PDIs), is titled a FSI Report (FSIR).

FS Occurrence

Any event that involves the operation of a CAF or a military conveyance aircraft, including unmanned aircraft (UA), or involves activities in support to flying operations where safety of flight is compromised. To constitute an occurrence, the event may not necessarily have caused injuries to personnel or damage to materiel or property but had the potential to do so.

NOTE
The aircraft, its equipment or its operation must have contributed to the event for it to be classed as an air incident.

NOTE
During paradrops, SAR Techs and their equipment are considered part of the aircraft until the SAR Tech or equipment has safely reached the ground or water.

NOTE
The following events are FS occurrences: lightning strike, bird strike, emergency jettison, loss of cargo or slung load, inadvertent firing or hang-up of airborne armament equipment or munitions, precautionary power plant shut-down, aircraft exceedance, near mid-air collision, malfunction of life-support equipment, crew member experiences an aeromedical problem, damage to civilian or military property, or any other event having accident potential.

Air FS Occurrence

An event involving a CAF aircraft that occurs between the time the first power plant start is attempted with intent for flight and the time the last power plant or rotor stops. For a glider, the event took place from the time the hook-up is completed until the glider comes to rest after landing.

Air Weapons FS Occurrence

An air weapons FS occurrence is any air weapons and/or air weapons system related event where there was damage or a risk of damage to the aircraft, property or the air weapon itself, or injury or a risk of injury to personnel, regardless whether safety of flight is compromised or not from the moment that an air weapon is removed from an approved storage facility with the intent for loading onto an aircraft, until either the delivery of the air weapon to a target or its return to an approved storage facility.

Ground FS Occurrence

An event involving a CAF aircraft that occurs when there is no intent for flight, or when there is intent for flight but no power plant start has been attempted, or after the power plants and rotors have stopped.

FS Publications

FS publications include all material published by DND for FS purposes, including posters, charts, booklets and the like, intended to assist FSOs and others in reporting procedures and cause factor assessment.

FS Reports

This term refers to all reports, whether oral or written, made under the authority of this manual.

FS Risk

A FS risk is the projected likelihood and severity of the consequences or outcome from an existing hazard or situation associated with flight activities.

Hazard Condition

Any actual or potential condition that results or can result in the degradation of the level of aviation safety.

Investigator In Charge (IIC)

The IIC will be a qualified, trained and certified accident investigator appointed by the AIA or through authorized delegation by the 1 CAD FSO. The IIC conducts all airworthiness investigation activities on behalf of the AIA. All activities of personnel involved in the investigation are to be coordinated through the IIC.

Military Conveyance Aircraft

A military conveyance aircraft is any aircraft, including a civilian registered aircraft, that is operated by or on behalf of the DND, the CAF, or a visiting force.

Near Mid-air Collision (NMAC)

A NMAC situation is an unintentional pass between aircraft within 1000 feet or a situation wherein one or more aircraft had to manoeuver aggressively to avoid a mid-air collision.

Operating Unit

An Operating Unit is a unit under whose authority a flight has been authorized in accordance with National Defence Flying Orders (reference B).

Parties/Persons with a Direct Interest (PDI)

Typically, PDI status is given to crew members, the affected CoC(s) and contractors directly involved in the operation maintenance or manufacture of the aircraft. Notwithstanding, a PDI is defined as:

a. an individual who is the subject of the report or a witness used in the report who, in the opinion of the AIA, is able to comment constructively on the factual accuracy of the report; and

b. an individual, Command or Organization that in the opinion of the AIA is directly affected by the findings, cause factors and/or preventive measures recommended within the report.

Personnel Casualty Level (PCL)

The PCL is a colour-based categorization system used to identify the most severe casualty suffered by personnel in an FS occurrence. The PCL is determined by a medical officer in accordance with CFAO 24-1. The PCL assigned for an occurrence is defined as follows:

a. BLACK: PCL level assigned when a fatality has occurred;

b. GREY: PCL level assigned when personnel are missing;

c. RED: PCL level assigned when personnel are very seriously injured or ill and the person's life is in immediate danger;

d. YELLOW: PCL level assigned when personnel are seriously injured or ill. There is cause for immediate concern but the patient's life is not in immediate danger. Usually the person is non-ambulatory; and

e. GREEN: PCL level assigned when personnel are moderately injured or ill in an occurrence for which medical attention is needed but there is no immediate concern. Usually the person is ambulatory.

NOTE
FS reports shall only provide PCL information. No other medical information or details shall be communicated or entered in FSIMS.

Preventive Measure (PM)

A PM is any step that can be taken to decrease the likelihood of a FS occurrence.

Safety of Flight (SoF)

SoF is a desired mode of operation whereby the preparation of and conduct of a flight is done by following best possible maintenance and operational practices as well as approved procedures. Doing so will minimize, to the maximum extent possible, risks associated with flight operations.

Stage of Operations

This term refers to the task that is being attempted or performed at the time of an occurrence. To ensure consistency in statistical analysis, the stages of operation are categorized as fol-

lows:

a. Parked: Power plants and rotors are stopped, and the aircraft is stationary or unintentionally in motion; chocks may or may not have been used. No action is in progress that is directly associated with any other stage of operation;

b. Maintenance: Power plants are stopped and maintenance duties, including servicing, refuelling, inspection, modification, repair and arming, are being performed on the aircraft. Towing, loading and run-up are excluded;

c. Towing: The aircraft is being positioned, or prepared for positioning, by towing, pushing or bear trap handling;

d. Loading: The aircraft is being loaded or unloaded with cargo, passengers or crew or is being prepared for loading or unloading;

e. Ground running: The aircraft is stationary or unintentionally in motion, with a power plant being started, running or being shut down. Temporary pauses in the taxi stage are not categorized as ground running;

f. Taxiing: The aircraft is intentionally moving under its own power on land, a flight deck or water before the application of power for take-off or after the direction of the landing roll is changed to taxi. It also includes aircraft moving by intentional coasting with power plants stopped or taxi operations where there is no intent for flight. It does not include air-taxiing by helicopters;

g. Take-off: Lasts from the time that power is applied for take-off until reaching 500 feet AGL or operating height, whichever is lower. For a deliberate touch-and-go landing, the take-off stage starts when power is re-applied;

h. In flight: In flight lasts from the time the aircraft reaches 500 feet AGL or operating height, whichever is lower, until the landing phase is initiated. Helicopters are considered to be in flight when air-taxiing, slinging, hoisting, rappelling or hooking up or jettisoning loads. Occurrences involving paradrops are also included under this stage of operation; and

i. Landing: Landing lasts from the time the landing phase is initiated until the time the direction of the landing roll is changed to taxiing.

Unit of Occurrence

This term refers to the unit involved in the event or, in the case of an accident occurring at other than a CAF wing or base, an appropriate unit close to the accident site.

Unit of Ownership

This term refers to the unit that has control and authority over the aircraft. For ground occurrences, the unit of ownership is the unit, wing, or base to which the aircraft is assigned in order to accomplish a specific operational or maintenance task. The only exceptions are:

a. for aircraft that are undergoing depot-level maintenance at a contractor's plant, the appropriate NDQAR is the unit of ownership and ADM (Mat)/NDHQ is the headquarters;

b. for new aircraft being produced for the CAF, the applicable NDQAR assumes unit of ownership status from the moment that the aircraft leaves the production line following final assembly, regardless of the acceptance date;

c. the provisions of subparagraphs above also apply to allied military aircraft that are being maintained or manufactured in Canada under a CAF-supervised contract; and

d. for other non-CAF aircraft, the DFS shall make suitable arrangements.

Unmanned Aircraft (UA)

An aircraft that does not carry a human operator and is operated remotely using varying levels of automated functions. The UA is the aircraft portion of the UAS.

Unmanned Aircraft System (UAS)

A system whose components include the unmanned aircraft, the supporting network and all equipment and personnel necessary to control the unmanned aircraft.

INTENTIONALLY LEFT BLANK

CHAPTER 1 - DND/CAF AIRWORTHINESS PROGRAM AND THE *AERONAUTICS ACT*

GENERAL

1. The *Aeronautics Act* governs aviation activities in Canada. This legislation applies to two federal ministers; the Minister of Transport and the Minister of National Defence (MND). The *Aeronautics Act* charges the respective Ministers with responsibility "for development and regulation of aeronautics and supervision of all matters connected with aeronautics" with the scope that applies to "all aeronautical products and other things in Canada, to all persons outside Canada who hold Canadian aviation documents and to all Canadian aircraft and passengers and crew members thereon outside Canada." Further, the MND is charged with these responsibilities for "military personnel, a military aeronautical product, a military aerodrome or military equipment of Canada or a foreign state (while operating in Canada) or a military facility relating to aeronautics, and (any) service relating to (such) aeronautics." In order to fulfill the MND's obligations with respect to this responsibility, the Department of National Defence and the Canadian Armed Forces (DND/CAF) established an Airworthiness Program. Some portions of the *Aeronautics Act* only apply to the MND, for example under Part II, section 12 (1), the legislation directs that the MND "shall designate…an…Airworthiness Investigative Authority, who is responsible for advancing (military) aviation safety." The objective of this chapter is to briefly outline the DND/CAF Airworthiness Program and to explain some the AIA's unique roles and responsibilities as laid out in Part II – Military Investigations Involving Civilians of the *Aeronautics Act*.

BACKGROUND

2. Prior to the DND/CAF Airworthiness Program, an internal 1993 audit by the Chief of Review Services identified deficiencies that showed the need for the creation of a more structured DND/CAF Airworthiness Program. Some of the specific concerns were:

a. the MND's national and international airworthiness obligations for military aviation were not being met;

b. the MND had not delegated any of his airworthiness responsibilities;

c. there was no airworthiness management accountability framework; and

d. DND/CAF airworthiness rules and standards were not harmonized with Transport Canada (TC) and the manner in which civilian contractors, who were supporting CAF flying operations, could perform various airworthiness activities was unclear.

3. In response to these concerns, the MND directed that a structured DND/CAF Airworthiness Program be developed and the Concept Paper for a DND/CAF Airworthiness Program was approved on 16 September 1998.

DND/CAF AIRWORTHINESS PROGRAM

4. The DND/CAF Airworthiness Program is based upon airworthiness management concepts used world wide by military and civil airworthiness authorities, while being tailored to meet the unique needs of the DND and the CAF. It is based on the fundamental principles that

airworthiness-related activities are completed to accepted standards, performed by authorized individuals, accomplished within accredited organizations, and done using approved procedures.

5. The objective of the DND/CAF Airworthiness Program is to achieve and maintain an acceptable level of safety for military aviation.

6. The concepts that govern the DND/CAF Airworthiness Program are that it must:

   a. document formally and control assignment of authority, including the associated responsibilities and accountabilities;

   b. establish independence between the Regulator (the individual responsible for making the rules) and the Implementer (the individual who conducts the activity);

   c. control the design, manufacture, maintenance, materiel support and operational usage of aeronautical products;

   d. ensure the airworthiness of an aeronautical product prior to its service use;

   e. maintain, once established, the initial state of airworthiness of an aeronautical product throughout its entire operational service use;

   f. conduct all airworthiness-related activities involving aeronautical products within an effective quality system framework; and

   g. achieve the applicable objectives of the *Aeronautics Act*.

AIRWORTHINESS PROGRAM ROLES

7. Within the CAF, the operational staffs are responsible for flying operations, aerospace control and operator training and qualification. Similarly, the technical staffs are responsible for the design, manufacture, maintenance and materiel support of aeronautical products, as well as for the training and qualification of technical personnel. To accommodate these responsibilities, the Airworthiness Program elements have been split into operational and technical areas. This division of responsibility has given rise to the Operational and Technical Airworthiness Programs. The Airworthiness Investigative Program was added to monitor the Airworthiness Program and to investigate aviation safety-related issues and occurrences. Some of the roles and responsibilities of this portion of the program are specified in the *Aeronautics Act*.

8. There are three distinct roles present in the Airworthiness Program. They are Regulator, Implementer and Investigator:

   a. the Regulator develops airworthiness instruments for design, manufacture, maintenance, material support and operation of aeronautical products and ensures their compliance;

   b. the Implementer conducts the activities for the associated aeronautical products as directed by the regulator. This role is assumed by the organizations, employees, and members of the DND/CAF as they conduct airworthiness related tasks; and

   c. the Investigator ensures that airworthiness related safety occurrences and safety issues are investigated “independently” of the Regulator and Implementer. The

reports produced in this activity are provided to the MND and although there is no executive authority associated, AIA reports generally recommend action be taken by the Regulators or Implementers.

OVERVIEW OF PROGRAM AUTHORITIES

9. The DND/CAF Airworthiness Program established a management accountability framework of four Airworthiness Authorities, with clear delegation of authority from the MND to the specified positions in DND/CAF. Also, the *Aeronautics Act* under Part II, section 12(1) requires the MND to specifically designate an Airworthiness Investigative Authority to be responsible for "advancing aviation safety". This MND designation (Annex A) was made to the Director of Flight Safety. Further, the MND directed the CDS to delegate to these Authorities, under section 4.3(1) of the *Aeronautics Act*, the powers, duties and functions necessary for the Airworthiness Program (Annex B). Section 4.31 of the *Aeronautics Act* permits authorized persons to further authorize any person under their authority, the powers duties and functions associated with airworthiness, thus permitting the application of Airworthiness concepts and principles to the lowest possible levels in the Department and supporting organizations. The Airworthiness Program tasks that are to be performed by the specific airworthiness authorities are outlined in individual CDS (delegation) Orders. The four Authorities are:

a. the Airworthiness Authority (AA);

b. the Technical Airworthiness Authority (TAA), regulator;

c. the Operational Airworthiness Authority (OAA), regulator; and

d. the Airworthiness Investigative Authority (AIA), investigator.

10. The AA has the authority to approve airworthiness-related policy and is responsible for the development, promotion, supervision and management of the DND/CAF Airworthiness Program. The Chief of the Air Force Staff (C Air Force), who is also the Commander Royal Canadian Air Force (RCAF), is normally the AA. Significantly, for the investigative portion of the program, the AA must ensure "that the Airworthiness Investigative Authority is not impeded in any way in the investigation of matters concerning aviation safety conducted under paragraph 4.2(1)(n) of the *Aeronautics Act*."

11. The TAA is responsible for the regulation of the technical airworthiness aspects of the design, manufacture, maintenance and material support of aeronautical products and the determination of the airworthiness acceptability of those products prior to granting them Technical Airworthiness Clearance (TAC). The person holding the position of Director General Aerospace Equipment Program Management (DGAEPM) or, in the event of the absence or incapacity of the Director General, the person holding the position of Director Technical Airworthiness and Engineering Support (DTAES), or in the event of the absence or incapacity of the Director General and the Director, the person holding the position of Director Aerospace Equipment Business Management is the TAA for DND and the CAF.

12. The OAA is responsible for the regulation of all flying operations. This includes responsibility for the regulation of operational procedures, flight standards, operator training, qualification and licensing, aerospace control operations and the determination of the airworthiness acceptability of aeronautical products prior to granting them Operational Airworthiness Clearance (OAC). The CDS has designated the officer holding the position of the

Commander, 1 Canadian Air Division (1 CAD) or, in the event of the absence or incapacity of the Commander or, if the position is vacant, the officer performing the duties and functions of the Deputy Commander Force Generation, as the OAA for DND and the CAF.

13. The AIA is responsible for the regulation of the airworthiness aspects of the Flight Safety Program (FSP). The AIA is also responsible for the independent investigation of airworthiness-related occurrences and for the monitoring of the DND/CAF Airworthiness Program to identify deficiencies. The MND has designated the officer holding the position of Director Flight Safety (DFS) or, in the event of the absence or incapacity of DFS, or if the position is vacant, the officer performing the duties and functions of DFS, as the AIA for DND and the CAF.

14. In addition to the four airworthiness authorities that comprise the DND/CAF Airworthiness Program management accountability framework, there are two additional authorities associated with the program. These are the Flight Test Authority (FTA) and the Aerospace Medical Authority (AMA).

15. The C Air Force and the Assistant Deputy Minister (Materiel) (ADM (Mat)) have designated the Commanding Officer Aerospace Engineering Test Establishment (AETE) as the FTA. Amongst other duties, the FTA is to assist the Airworthiness Authorities in their responsibilities within the airworthiness program and to ensure that Flight Test activities conducted in support of the program are conducted in a safe manner by qualified and authorized personnel. The flight testing conducted must ensure the FS concerns based on the intended operational usage of aeronautical products outlined in the Statement of Operational Intent (SOI) are properly addressed prior to operational flight evaluation.

16. The C Air Force and Chief of Military Personnel (CMP) have designated the person holding the position as Medical Adviser to the C Air Force, or the person performing this duty as the AMA who is also appointed the MND's Medical Adviser for the purposes of section 6.5(1) of the *Aeronautics Act*. This section of the *Aeronautics Act* requires that the MND designate a contact point to receive personal medical information about persons involved with aeronautical activities or products and that might compromise safety by the nature of the medical condition. Separate from the MND's Medical Adviser, the AMA has duties that involve a large number of airworthiness issues that have a medical nexus and the mandate of the AMA is to provide any required medical advice to the Airworthiness Authorities. One such duty is the responsibility to ensure the fitness of all aircrew who are either in direct control of CAF aircraft, or who are performing essential tasks onboard an aircraft.

17. A full description of the DND/CAF Airworthiness Program can be found in A-GA-005-000/AG-001, DND/CAF Airworthiness Program.

AIRWORTHINESS INVESTIGATIVE AUTHORITY MANDATE

18. The AIA's Airworthiness Program mandate is outlined in a CDS Order (see Annex B), which is signed by the CDS upon direction of the MND. Based on the delegation of airworthiness authorities under subsection 4.3(1) of the *Aeronautics Act*, this CDS order further delegates to the AIA, certain powers, duties and functions. Some of the most important delegations are the instructions detailing that the investigations are to be conducted independently and that the AIA is to inform the MND (via the AA and the CDS) of any interference in these functions. Annex B to this chapter gives the full details on the AIA's airworthiness delegations.

OBJECTIVE

19. The objective of this Airworthiness Investigation Manual (AIM) is to issue airworthiness policies, instructions and standards respecting the investigation of aviation-safety-related occurrences, airworthiness program monitoring functions and other issues that will satisfy the AIA's roles in the Airworthiness Program and the investigation-associated safety requirements of the *Aeronautics Act*. It also outlines the AIA's policies, procedures and means of compliance with applicable sections of the *Aeronautics Act*.

APPLICABILITY

20. This document is produced by the AIA under the authority of the AA. As indicated in the Airworthiness Program documentation, "new airworthiness instructions...are issued with a statement of applicability, means of compliance...and time. Compliance...shall be mandatory... unless an exemption or compliance extension (is issued)." As such, this publication is effective within 60 days of the date of publishing and any exemption or compliance extension must be applied for within that time frame.

AIRWORTHINESS AND FLIGHT SAFETY

21. It is important to understand the relationship between the DND/CAF Airworthiness Program and the FSP. As stated in the Airworthiness Program documentation, "the CAF Flight Safety Program performs the vital role of providing an independent review and assessment of the suitability and effectiveness of the Airworthiness Program, including its policies, standards and procedures." As outlined in the preceding paragraphs, one of the objectives of the Airworthiness Program is to establish and maintain an acceptable level of safety for military aviation, which is predicated on weighing the safety level desired against cost and operational capability of the various aircraft fleets. The acceptable level of safety varies for the fleet types and roles the aircraft assume because some safety levels for civilian aircraft types and roles are impractical for military operations. The As Low as Reasonably Practical Principle (ALARP) for risk is primary in the pursuit of these levels of safety; meaning risk reduction is pursued but must be weighed against financial and operational impacts of the implementation of initiatives.

22. The objective of the CAF FSP is to prevent the accidental loss of aviation resources through a program of safe behaviour, promotion, education and the investigation and analysis of matters concerning safety. A comparison of the two programs reveals that the Investigative Authority's portion of the DND/CAF Airworthiness Program closely matches the long-standing and very effective investigation and analysis segment of the FSP. Consequently the investigation and associated segments of the CAF FSP now form the Airworthiness Investigation Program. Because the FSP predates the Airworthiness Program, all Flight Safety Investigation terms such as FSIR are retained, even though they are the product of airworthiness investigation activities too. Of note, all investigation activities are conducted on behalf of the AIA through a system of qualifications, certifications and authorizations within the FSP's established structure.

23. In keeping with this concept, this manual and the A-GA-135-001/AA-001 (Flight Safety for the Canadian Armed Forces) and A-GA-135-002/AA-001 (Occurrence Investigation Techniques for the Canadian Forces) are designed to complement one another. The latter two documents outline the safe behavior portion of the FSP for the CAF and the techniques to be

employed for occurrence investigation; whereas, the AIM outlines the DND/CAF Airworthiness and Flight Safety Programs policies for the AIA's standards, authorities and processes for all investigations of Military Aviation occurrences and explains some of the AIA's unique roles and responsibilities as laid out in the *Aeronautics Act*.

Annex A
Chapter 1
A-GA-135-003/AG-001

ANNEX A - MND DESIGNATION OF AIRWORTHINESS INVESTIGATIVE AUTHORITY

DESIGNATION AND DIRECTION

1. I hereby designate as the Airworthiness Investigative Authority, pursuant to subsection 12(1) of the *Aeronautics Act*, the officer holding the position of Director Flight Safety, or in the event of the absence or incapacity of the Director Flight Safety, or if the position is vacant, the officer performing the duties and functions of the Director Flight Safety.

2. Pursuant to the definition of "Minister" in subsection 3(1) of the *Aeronautics Act*, I hereby direct that the Chief of the Defence Staff may delegate under subsection 4.3(1) of the Act to the Airworthiness Investigative Authority any powers, duties and functions necessary for the Airworthiness Program for the Department of National Defence and the Canadian Armed Forces.

3. This designation and direction takes effect on the later of the day that it is signed by the Minister and the day that section 12 of the *Aeronautics Act* comes into force.

Ottawa, 26th January 2015

DÉSIGNATION ET INSTRUCTION

1. Par la présente, je désigne en tant que directeur des enquêtes sur la navigabilité, au titre du paragraphe 12(1) de la *Loi sur l'aéronautique*, l'officier occupant le poste de directeur – Sécurité des vols ou, en cas d'absence ou d'empêchement de celui-ci ou de vacance de son poste, l'officier exerçant ses pouvoirs et fonctions.

2. Aux termes de la définition de « ministre » qui se trouve au paragraphe 3(1) de la *Loi sur l'aéronautique*, je donne par la présente pour instruction que le chef d'état-major de la défense puisse déléguer, au titre du paragraphe 4.3(1) de cette Loi, au directeur des enquêtes sur la navigabilité tous les pouvoirs et fonctions qui lui sont nécessaires dans le cadre du Programme de navigabilité du ministère de la Défense nationale et des Forces armées canadiennes.

3. La présente désignation et instruction prend effet à la date de sa signature par le ministre ou à la date d'entrée en vigueur de l'article 12 de la *Loi sur l'aéronautique*, selon la dernière de ces éventualités à survenir.

Ottawa, le 26 janvier 2015

Le ministre de la Défense nationale

Robert Douglas Nicholson
Minister of National Defence

INTENTIONALLY LEFT BLANK

Annex B
Chapter 1
A-GA-135-003/AG-001

ANNEX B - CDS ORDER DELEGATING AIRWORTHINESS FUNCTIONS TO AIA

ORDER

Pursuant to the direction in respect of the Airworthiness Investigative Authority made by the Minister of National Defence on 26 January 2015 under the definition of "Minister" in subsection 3(1) of the *Aeronautics Act*, I hereby:

(a) delegate to the Airworthiness Investigative Authority, under subsection 4.3(1) of the *Aeronautics Act*, the powers, duties and functions necessary in the discharge of the responsibilities in the Annex to this order; and

(b) revoke all previous orders in respect of the Airworthiness Investigative Authority.

Ottawa, 2 February 2015

ARRÊTÉ

En vertu de l'instruction du ministre de la Défense nationale relative au directeur des enquêtes sur la navigabilité donnée le 26 janvier 2015 aux termes de la définition de « ministre » qui se trouve au paragraphe 3(1) de la *Loi sur l'aéronautique* :

a) je délègue au directeur des enquêtes sur la navigabilité, au titre du paragraphe 4.3(1) de la *Loi sur l'aéronautique*, les pouvoirs et fonctions qui lui sont nécessaires pour qu'il s'acquitte des responsabilités prévues à l'annexe jointe au présent arrêté;

b) j'abroge tout arrêté antérieur concernant le directeur des enquêtes sur la navigabilité.

Ottawa, le 2 février 2015

le général T.J. Lawson

T.J. Lawson
General

Annex to
Chief of the Defence Staff Order
February 2015

Annexe à
l'arrêté du chef d'état-major de la défense
le février 2015

AIRWORTHINESS INVESTIGATIVE AUTHORITY

DIRECTEUR DES ENQUÊTES SUR LA NAVIGABILITÉ

The Airworthiness Investigative Authority has responsibility for:

Il incombe au directeur des enquêtes sur la navigabilité :

(a) independently investigating matters concerning aviation safety under paragraph 4.2(1)(*n*) of the *Aeronautics Act*;

a) de procéder, en vertu de l'alinéa 4.2(1)*n*) de la *Loi sur l'aéronautique*, à des enquêtes indépendantes sur tout aspect intéressant la sécurité aéronautique;

(b) informing the Minister of National Defence, through the Airworthiness Authority and the Chief of the Defence Staff, of any apparent, potential or real interference with the execution of the powers, duties or functions under this order;

b) d'informer le ministre de la Défense nationale, par l'entremise du directeur général de la navigabilité et du chef d'état-major de la défense, de toute ingérence apparente, possible ou réelle dans l'exercice de ses pouvoirs et fonctions en vertu du présent arrêté;

(c) issuing airworthiness instructions and standards respecting the investigation of aviation-safety-related occurrences and issues that will satisfy the aviation safety requirements of the *Aeronautics Act*;

c) de publier, pour le domaine de la navigabilité, des instructions et des normes conformes aux exigences prévues à cet égard dans la *Loi sur l'aéronautique* pour les enquêtes portant sur des évènements et des questions liés à la sécurité aéronautique ;

(d) assigning investigative authority to organizations and individuals involved in the investigation of aviation-safety-related occurrences and issues;

d) d'attribuer un pouvoir d'enquête aux organisations et aux personnes qui prennent part à des enquêtes portant sur des évènements et des questions liés à la sécurité aéronautique;

(e) taking immediate appropriate action if any circumstance, practice or procedure causes any doubt as to the airworthiness of a military aeronautical product;

e) de prendre immédiatement les mesures appropriées lorsqu'une situation, une pratique ou une procédure soulève des doutes relativement à la navigabilité d'un produit aéronautique militaire;

(f) monitoring airworthiness activities and

f) de surveiller les activités et les

functions to ensure they comply with established regulations, standards and orders to identify any deficiencies in the Airworthiness Program for the Department of National Defence and the Canadian Armed Forces, and reporting them to the Airworthiness Authority;

fonctions de navigabilité afin de veiller à ce qu'elles soient conformes aux règlements, aux normes et aux arrêtés établis, pour déceler toute lacune dans le Programme de navigabilité du ministère de la Défense nationale et des Forces armées canadiennes et, le cas échéant, les signaler au directeur général de la navigabilité;

(g) conducting audits of processes and procedures with a view to recommending preventive measures to correct deficiencies if identified in the Airworthiness Program for the Department of National Defence and the Canadian Armed Forces or if aviation safety is suspected of being compromised;

g) d'effectuer des vérifications des procédés et des méthodes en vue de recommander des mesures préventives pour relever et, le cas échéant, corriger les lacunes soit du Programme de navigabilité du ministère de la Défense nationale et des Forces armées canadiennes, soit dans le cas où l'on soupçonne la sécurité aéronautique d'être compromise;

(h) informing the Minister of National Defence, through the Airworthiness Authority and Chief of the Defence Staff, of any significant airworthiness matter concerning military aviation;

h) d'informer le ministre de la Défense nationale, par l'entremise du directeur général de la navigabilité et du chef d'état-major de la défense, de toute question de navigabilité importante relativement à l'aviation militaire;

(i) preparing draft regulations and orders relating to airworthiness investigative matters for submission to the Governor in Council or the Minister of National Defence; and

i) de préparer des projets de règlements, de décrets et d'arrêtés relativement à des questions touchant aux enquêtes de navigabilité, aux fins de présentation au gouverneur en conseil ou au ministre de la Défense nationale;

(j) acting as the investigative member of the Airworthiness Review Board and the Airworthiness Advisory Board.

j) d'agir en qualité de membre chargé des enquêtes du Conseil d'examen de la navigabilité et du Conseil consultatif de la navigabilité.

INTENTIONALLY LEFT BLANK

CHAPTER 2 – THE AIA AND THE *AERONAUTICS ACT*

AERONAUTICS ACT - OVERVIEW

1. The *Aeronautics Act* requires the MND to designate an Airworthiness Investigative Authority (AIA) to be responsible for "advancing aviation safety" (referred to as the "authority" in the Act) and empowered the authorities' investigators to enable them to conduct safety investigations. The MND designated the Director of Flight Safety or the person acting as the DFS as the AIA (see Annex A, Chapter 1). Based on this designation and ministerial direction to the CDS, a CDS Order was made which delegated further powers, duties and functions to the AIA to enable investigative airworthiness duties to be discharged (see Annex B, Chapter 1). Part II of the *Aeronautics Act* deals with investigations of Military-Civilian occurrences. While Part II is referred to as "Military Investigations Involving Civilians"; section 24.8 of the Act directs that most of the powers, obligations and requirements listed in Part II also apply to Part I investigations, those undertaken via section 4.2(1)(n) to "investigate matters relating to aviation safety".

AERONAUTICS ACT AND INVESTIGATOR POWERS

2. The powers for military investigators conducting safety investigations were very similar to the powers that Transportation Safety Board civilian investigators utilize. Some of these powers may be considered somewhat extraordinary in nature and required the development of *Military Airworthiness Investigation Regulations (MAIRs)* to implement. The powers requiring these regulations include but are not limited to:

a. Compel a person to make a statement, make themselves available to be interviewed and to make available any evidence believed to be in their possession;

b. Compel a health practitioner to make themselves available to be interviewed and to make any evidence germane to the occurrence or regarding persons involved in occurrence and in their possession available to the investigation;

c. Compel an autopsy to be conducted on a person involved in the occurrence;

d. Conduct a search of any premises where evidence germane to the occurrence may be present and seize that evidence, which may involve serving a search warrant and the use of force if required. Force would only be used if authorized on the warrant and if a peace officer was present for the search; and

e. Require a person involved in an occurrence to have a medical examination conducted that may involve urinalysis but would not involve piercing of the skin.

3. Other powers are included in the *Aeronautics Act* such as the legal authority to cordon and control access to an occurrence site regardless of the sites' location, the authority to test objects - possibly to destruction and the requirement for persons to report occurrences. As well, the authority sets behavior codes for observers and may limit their access to certain information associated with the occurrence.

AIA INVESTIGATION OBLIGATIONS

4. Specific obligations are imposed upon the AIA by the *Aeronautics Act* to ensure that

information, procedures and reports associated with occurrence investigation are handled in specific and predictable manners. These obligations include but are not limited to:

a. Reports are produced for the MND. Reports are subsequently made public through an administrative agreement and procedures between the AIA and the MND. All reports are subject to release through ATI;

b. Information (particularly specific information such as witness identification and testimony, OBR info, representations to the investigation, communication records, anonymous reports, etc…) acquired for the investigations must be safe guarded, retained for 20 years, kept anonymous and subject to stipulations listed in the Act, may not be used for legal, criminal or other proceedings;

c. Investigators cannot be compelled to present evidence with respect to occurrence investigations in court except for special cause (or if requested for a Coroner`s Inquest);

d. Specific requirements with respect to consultation, report release and review of proposed actions are imposed on the AIA should another minister be involved in the occurrence report and/or associated recommendations; and

e. AIA investigators must be identifiable, act within the guidelines set out in regulations and/or imposed by the AIA.

AIA/FS AUTHORITY WATERFALL

5. All efforts to make the information in the FS manuals consistent with higher level documents have been made; however, it is important to note that the *Aeronautics Act* is the statutory authority for all airworthiness investigations undertaken by DND and the CAF. While these FS manuals are the AIA's means to give guidance, promulgate procedures and set policies for safety investigations, the Act and *MAIRs* should be consulted in the circumstance of investigations should any questions arise regarding the authority to conduct activities as airworthiness investigators. The AIA has developed a procedure to permit consultation 24/7 through use of the 1-888-WARN DFS (1-888-927-6337) which makes expert consultation available quickly and easily.

6. To aid in the understanding of the "waterfall" of authority, the following list depicts documentation hierarchy associated with the Airworthiness and Flight Safety Programs (note: not all airworthiness documents are included in this list, a more extensive list is contained in the DND/CAF Airworthiness Program manual (A-GA-005-000/AG-001):

a. Acts of Parliament

(1) Aeronautics Act

(2) *National Defence Act*

(3) *Visiting Forces Act*

(4) *Canadian Transportation Accident Investigation and Safety Board (CTAISB) Act*

b. GIC Regulations

(1) Military Airworthiness Investigation Regulations

c. Ministerial Orders and Directives

(1) MND Designation (and Direction) of Airworthiness Investigative Authority, 26 January 2015

(2) Ministerial Direction to CDS, 26 January 2015

(3) CDS Order of Delegation to the AIA, 2 February 2015

(4) DND/CF Airworthiness Program Approval, 100-19, 16 September 1998

d. Defence Administrative Orders and Directives (DAODs)

(1) DAOD 2015-0 – Airworthiness

(2) DAOD 2015-1 – DND/CF Airworthiness Program

e. Airworthiness Authorities' (AA, AIA, TAA and OAA) Policies, Orders and Directives

(1) AIA:

(a) A-GA-135-001/AA-001 – Flight Safety for the Canadian Armed Forces

(b) A-GA-135-002/AA-001 – Occurrence Investigation Techniques for the Canadian Forces

(c) A-GA-135-003/AG-001 - Airworthiness Investigation Manual (AIM)

(2) AA:

(a) A-GA-005-000/AG-001 – Department of National Defence/Canadian Armed Forces Airworthiness Program

(b) ACO 8001-2 – Release to Service – New and Modified Fleets

INTENTIONALLY LEFT BLANK

CHAPTER 3 - AIRWORTHINESS INVESTIGATION PRINCIPLES

INTRODUCTION

1. The RCAF and the CAF have had an active and successful FS Program (FSP) since 1942. Part of this program involved the investigation of aviation related occurrences. The investigation and associated segments of the FSP form the Airworthiness Investigation Program. In order to achieve the same level of success, the AIA employs many of the same principles that the FSP embraces. The objective of this chapter is to outline the principles employed by the AIA in conducting investigations.

AIRWORTHINESS PRINCIPLES

2. The DND/CAF Airworthiness Program is based on the fundamental principles that airworthiness related activities are:

a. completed to accepted standards;

b. performed by authorized individuals;

c. accomplished within accredited organizations; and

d. done using approved procedures.

3. Airworthiness investigations comply with these principles with some minor deviation. In the case of airworthiness investigations, the powers that authorized individuals employ may be augmented for a specified time by certain AIA “retained” authorities depending on the circumstances associated with the investigation. The authority to conduct a Class II investigation or approve an Enhanced Supplementary Report (ESR), are examples of such “retained” authority.

AIA *AERONAUTICS ACT* REQUIREMENTS

4. The *Aeronautics Act* (section 12) requires the AIA to be responsible for “advancing aviation safety” by performing certain functions. These statutory requirements include:

a. investigating military-civilian occurrences to find causes and contributing factors;

b. identifying safety deficiencies;

c. making recommendations designed to eliminate or reduce deficiencies; and

d. providing reports to the MND.

5. Further, the Act directs that it is not the function of the authority (AIA) to assign fault or determine civil or criminal liability but this should not deter the authority from producing a report where these things may be inferred. However, the Act states that no AIA finding may be construed as assigning fault or determining civil or criminal liability and that the AIA’s findings are not binding on the parties to any legal, disciplinary or other proceeding.

PURPOSE AND REQUIREMENT TO REPORT OCCURRENCES

6. The purpose of FS reporting is to alert all concerned of circumstances that have

resulted in or have the potential to cause damage to aircraft, air weapons or injuries to personnel. This is a critical requirement of the Airworthiness and FSP; consequently, Commanders (Comds), Commanding Officers (COs) and contracted Accountable Executives alike must encourage personnel to report all occurrences and hazards. If all events that cause a potential or actual FS compromise are reported, then emerging trends can be identified and analyzed. The analysis then allows appropriate PMs to be devised and implemented by Comds/COs/Accountable Executives. Reporting responsibilities, guidelines, obligations and details are found in Chapter 4 of this manual. Of note, *MAIRs* contain reporting requirements that are statutory.

7. The FS Information Management System (FSIMS) is the primary tool used by the FSP to report and record all FS occurrences, FS hazards, analysis, cause factors and PMs. FSIMS was developed to meet the automated support needs of the DND/CAF FSP and provides FSOs at all levels with an ability to input, record and track FS occurrences. FSIMS is a DWAN backbone application and for civilian military aviation companies, access to the FSIMS can only be made through DWAN sites. Typically there are representatives associated with these companies that have such access and this routing will be their primary method of interface with FSIMS.

AIA PRINCIPLES

8. The *Aeronautics Act* requirements are entwined within the objectives of the DND/CAF Airworthiness Program which functions to establish and maintain an acceptable level of safety for military aviation. In order to accomplish this, airworthiness investigations are based on four principles:

a. airworthiness investigations are conducted independently from any influence of the Chain of Command (CoC);

b. airworthiness investigators must not assign blame;

c. the focus of airworthiness investigations is to develop effective, practical PMs that will preclude or reduce the risk of a reoccurrence; and

d. airworthiness investigations make recommendations to the CoC for action, but these recommendations are not binding.

Independence from the Chain of Command

9. In order to avoid a conflict of interest situation, airworthiness investigators must be independent of any influence from the CoC. This independence is extremely important for the credibility of the AIA organization. In support of this principle, the AA is charged (through the CDS Delegation Orders) with the responsibility of ensuring that the AIA is not impeded in any way in the investigation of matters concerning aviation safety conducted under paragraph 4.2(1)(n) of the *Aeronautics Act*; and, the AIA must inform “the Minister of National Defence, through the Airworthiness Authority and the Chief of the Defence Staff, of any apparent, potential or real interference with the execution of the powers, duties or functions.”

Non-Attribution of Blame

10. It is critical that airworthiness investigators receive honest, accurate and complete

information from the individuals involved in an occurrence. It is only with this type of information that investigators can identify all the facts and determine all the circumstances that led to the occurrence. This can only be achieved in an organizational culture in which individuals can freely and openly admit their errors and omissions without fear of repercussions from the organization. This concept requires a commitment from the organization not to use airworthiness investigation information for legal, administrative or disciplinary purposes. In addition, it requires that airworthiness investigators ensure that their reports do not assign blame (or appear to assign blame) for the occurrence.

AIA Notification of Person-Centric Deviation to the Chain of Command

11. The Just Culture discussed in the FSP manual (Flight Safety for the Canadian Armed Forces, A-GA-135-001/AA-001) accepts neither a punitive nor a blame-free culture. The non-attribution of blame in an AIA investigation should not be confused with a blame-free culture. The Just Culture cannot allow individuals to hide behind the veil of FS when a person-centric deviation has occurred – an act that is a reckless, negligent, intentional, or willful disregard of orders, regulations, or procedure. In this event, the element of reckless, negligent, intentional or willful disregard is not a matter for the AIA to investigate, but rather the CoC. As both the FS investigator and the AIA are obligated to respect the statutes set out in the *Aeronautics Act* and the *Privacy Act*, this creates for them a dilemma of how to inform the chain of command of this aspect. Therefore, upon determination of a person-centric deviation, the FS investigator will immediately notify the AIA of this information. The sole responsibility to notify the CoC rests with the AIA, who will do so by direct correspondence. Once notification to the appropriate command authority has been made by the AIA, the AIA's obligations to uphold the Just Culture have been met. It then becomes incumbent on the CoC to respond accordingly. A sample letter from the AIA to the chain of command is found in Annex A.

Focus on Preventive Measures

12. The primary focus of all airworthiness investigations will be to identify effective, practical PMs in a timely manner to the CoC. In order to do this, all PMs will be based on well-researched information and sound analysis. PMs must clearly articulate the problem, the expected action to rectify the problem and a proposed level of command (tactical, operational or strategic) to ensure that the proposed actions are completed. PMs are to be forwarded to the CoC (or via the DND/CAF sponsor to a civilian contractor) for consideration and action as soon as practical and need not wait for the formal publishing of reports. Consequently, safety actions can begin quickly as facts are revealed in the investigation, analysis is conducted and appropriate PMs become evident.

Recommendations to the Chain of Command

13. The aim of airworthiness investigations is to develop PMs. These PMs are then forwarded as recommendations to the CoC. As one of the basic building blocks of the Airworthiness Program the "AA requires that any reduction to the accepted level of safety must be fully documented and accepted in all situations where time permits the application of a formalized risk management process... the TAA and OAA are engaged fully in these processes." (A-GA-005-000/AG-001, Part 1, Section 1 para 15). However, the CoC is not obligated to accept the AIA's recommendations. Details regarding PM generation,

associated analysis and management of PMs can be found in Chapter 16 of this manual; however, the principles associated with handling PMs are listed below. Upon receipt of the recommendations of an airworthiness investigation report, Comds/Accountable Executives have options based upon the format of the recommended PM:

a. they can accept the recommendation and direct the implementation of the proposed action;

b. if the recommendation is supported but is beyond the purview of the local Commander, then the recommendation can be forwarded to the appropriate Commander (through the CoC) with the recommendation that it be implemented; or

c. the Commander can reject the recommendation and accept the risk of a similar occurrence happening in the future:

   (1) should the PM be part of an Action Directive from the C Air Force (the end result from a completed FSIR) and because such a course of action implies a reduction in the accepted level of risk, a risk assessment must be undertaken to fully document the accepted level of risk,

   (2) the Commander could partially accept the recommendations and implement the accepted portion of the recommendation. However, this also would require a risk assessment to document the mitigated level of risk for this situation. The risk assessment should include an explanation of the decision for the rejected part of the recommendation, or

   (3) should the PM be the result of an investigation not involving an Action Directive (SR or ESR), documentation of the reasons and the assessment for not implementing the PM should be forwarded to the AIA and other levels in the FS chain. It will then be recorded in FSIMS.

Annex A
Chapter 3
A-GA-135-003/AG-001

ANNEX A – AIA LETTER OF NOTIFICATION OF PERSON-CENTRIC DEVIATION TO CHAIN OF COMMAND

1010-CT146-FSIMS#

29 February 2013

Distribution List

AIA NOTIFICATION OF PERSON-
CENTRIC DEVIATION TO CHAIN OF COMMAND

References: A. FSIMS XXXXX
B. A-GA-135-003/AG-001 Airworthiness Investigation Manual

1. On 21 Feb 13, I tasked a class I flight safety investigation to investigate the accident involving Bell 412 CF C-FYZX, Ref A. To date, the investigation has made significant progress to determine the cause of this accident and to identify preventive measures that will reduce the possibility of future recurrence.

2. The Investigator-in-Charge (IIC) of the investigation has informed me that there are elements of the accident that appear to be reckless, willful, or negligent. In my discussion with the IIC, I believe that these elements of the investigation meet the criteria of a person-centric deviation, outlined in Ref B, and that they consequently fall outside my mandate as the Airworthiness Investigative Authority. As such, in accordance with Ref B, Chapter 3, this is my formal notification to you, the Commander 2 Canadian Air Division, so that these elements of the investigation may be more appropriately considered by you and your staff.

3. I recognize that you may consider this notification to be vague. However, the privilege that is accorded to the information that has allowed me to determine the extent of my airworthiness investigation, as safeguarded in both the *Aeronautics Act* and the *Privacy Act*, statutorily prohibits my communication to you of any further details. These statutes also compliment the limiting of information sharing that supports the decades of effort to establish and maintain a culture of free and open reporting. Nonetheless, this formal notification to you should represent the serious nature of the observed person-centric deviation.

4. Should you have any questions concerning this letter, I would be happy to discuss them with you in a manner that safeguards the integrity of the Canadian Armed Forces Flight Safety Program.

J. Alexander
Colonel
Airworthiness Investigative Authority

Distribution List

Action

Comd 2 Cdn Air Div

Information

Comd RCAF
1 Cdn Air Div//Comd/Div FSO//
2 Cdn Air Div FSO
15 Wing//Comd/Cmdt 3 CFFTS//

CHAPTER 4 – ACCIDENT/INCIDENT REPORTING SYSTEM

BACKGROUND

1. The DND/CAF Airworthiness Program mandates the requirement to conduct investigations of matters related to aviation safety and the FS Program (FSP) encompasses detailed processes for reporting and investigating safety situations. Also, in an effort to identify hazards before they cause serious occurrences, the FSP encourages all personnel associated with flying operations to report all situations that have the potential to cause a FS incident or accident. The purpose of investigating is to analyse the information derived from these investigations and to develop effective PMs to reduce the risk of reoccurrence.

REPORTING RESPONSIBILITY

2. Commander 1 CAD, Commander 2 CAD, Commander Canadian Army, Commander Royal Canadian Navy, Commander CANSOFCOM, and all other formation commanders operating under the Airworthiness program authorities retain responsibility for the reporting of all FS occurrences involving DND/CAF air assets. Comds of commands, formations, wings, bases, and units and managers of contracted organizations responsible for conducting or supporting air operations shall ensure that all FS occurrences, the applicable cause factors and PM are reported in accordance with the provisions of this manual. Comds shall ensure that all aircraft commanders, air vehicle operators and all other personnel supporting air operations are conversant with FS reporting procedures.

GUIDELINES FOR REPORTABLE OCCURRENCES

3. The following guidelines should be applied to ascertain if an event should be reported as a FS occurrence:

a. Was there an accidental injury or illness to a person or damage to a civilian or military property or to a DND/CAF operated aircraft as a result of DND/CAF air operations?

b. Was there potential for injury or illness to a person or potential for damage to a civilian or DND property or to a DND/CAF aircraft as a result of DND/CAF air operations?

c. Could reporting the FS event generate a PM that may prevent a similar occurrence?

d. If the answer to any of these questions is yes, then an FS occurrence report shall be filed.

4. This concept can be directly applied to occurrences involving flight and support to flight operations; however, the concept is more difficult to apply where involvement in flight line operations is less obvious. If flight safety is not jeopardized, then the event should be reported as a general safety occurrence.

MAIR REQUIREMENTS

5. There is a statutory obligation to report specific military-civilian occurrences to the AIA as listed in *MAIR* 2(1) or (2) (see Annex B, Appendix 1). This reporting obligation is fulfilled through utilizing the FSP and the reporting functionality within the FSIMS.

6. If a civilian contractor does not have direct access to FSIMS, they can report occurrences through their associated Wing/Formation FSO, who will process the occurrence report into FSIMS on their behalf. However, should a civilian contractor or entity not have a pre-existing arrangement and they must report a military-civilian occurrence under *MAIR* 2(1) or (2), they can use DND form 4513 (see para 7.b) to meet this requirement. All FSOs within the FS program should be prepared to assist in this activity if required.

REPORTING FORMS

7. The following FS forms are used to initiate reports of FS occurrences, hazards and emergency escape. They are available for download from the DFS intranet site under the *"Administration"* tab.

a. Flight Safety Occurrence Report Initial (CF 215). A CF 215 shall be submitted to a FSO within 12 hours of a FS occurrence. A sample form is also provided at Annex A.

> NOTE
> A CF 215 is required for each separate FS occurrence. If two or more aircraft are involved in a single event, only one CF 215 report will normally be required.

b. Military Airworthiness Investigative Authority (AIA) - Occurrence Report (DND 4513). A DND 4513 may be used to report military-civilian occurrences as required by *MAIR* 2(1). A sample form is provided at Annex B. In addition, *MAIR* 2(1) & (2) details who is required to report and provides a list of mandatory military-civilian occurrences that must be reported. This list is duplicated in Annex B, Appendix 1 for reference purposes.

c. Flight Safety Hazard Report (DND 2484). A DND 2484 should be filed when personnel identify any condition that has the potential to cause injury or damage during CAF air activities or support to the latter. This form is designed to record observations on hazardous conditions or deficiencies in the aviation system (for input into FSIMS). A sample form is also provided at Annex C.

d. Report of Emergency Escape from Aircraft (DND 1056). A DND 1056 shall be submitted by every survivor who has abandoned an aircraft during an emergency situation, e.g. fire, ejection or bail-out.

e. Report of Emergency Landing/Ditching on Water (DND 724). A DND 724 shall be submitted for every emergency water landing (ditch).

REPORTING TO OTHER PROGRAMS

8. Notification of a FS occurrence within the FSP does not alleviate the responsibility for

reporting to other command, safety and airworthiness channels as required by their respective programs/procedures. The FSO should ensure these additional agencies are notified as applicable. Annex D contains a non-exhaustive listing of the most common additional reporting requirements.

> NOTE
> Injuries reported as part of a FS occurrence must also be reported to the General Safety Program. It will require investigation by the appropriate authorities external to the FSP in accordance with A-GG-040-001/AG-001.

REPORTING INFORMATION AND SECURITY

9. Reporting FS information is vital to the Flight Safety and Airworthiness Investigation Program. However, there will be times when Operational Security (OPSEC) and Operational/ time sensitive information could have implications on active operations. In these cases, the method and security associated with reporting must be adjusted to counter the possible negative effects that public release of information or knowledge of an occurrence could impart on non-friendly forces. For example, it may not be appropriate to transfer information in an unsecure manner on an occurrence for an air asset that is actively engaged in operations in a forward area since the knowledge of this event could be advantageous to enemy operations. For such circumstances, reports must still be made as indicated within time lines outlined in this manual but in a secure manner so as to preclude any advantages such knowledge might impart on these non-friendly forces.

> NOTE
> FSIMS is not a classified system and shall not mix classified and unclassified data. In the case of a classified FS occurrence, the reporting unit shall provide the IR content relating to the classified FS occurrence over secure means. An electronic proformat form can be downloaded from the DFS Intranet website under tab Resources\ Administration. The details of the occurrence will not be entered into FSIMS. DFS will retain ownership of the occurrence until it is deemed declassified. When the occurrence is declassified, the details of the investigation will be uploaded in FSIMS by DFS. Ownership of the occurrence will then revert to the reporting unit/organizations.

OCCURRENCES INVOLVING NON-CAF AIRCRAFT

10. Regardless of the report(s) required by non-CAF authorities, occurrences involving a CAF asset and a non-CAF aircraft shall be reported as directed in this publication.

AIRCRAFT AT CIVILIAN CONTRACTORS

11. FS occurrence reports are required for each occurrence involving aircraft where there is DND/CAF involvement during the periods specified as follows:

a. new aircraft (except when special arrangements exist): from the time a DND/CAF aircraft leaves the production line after final assembly;

b. aircraft on inspection, repair or overhaul: for the entire period an aircraft is at a civilian contractor facility; and

c. allied military aircraft under a DND/CAF supervised contract: treat as a DND/CAF aircraft until it leaves Canada or is accepted by aircrew of the country of ownership.

CIVILIAN OR CONTRACTED AIRCRAFT/FACILITIES

12. Reports are required for each occurrence involving a non-CAF aircraft when there is CAF involvement. In the case of contracted training, operational flying or maintenance, the applicable contract or memorandum of understanding (MOU) will govern the organization's FS reporting requirement and clearly identify the extent of CAF involvement:

a. non-CAF aircraft and facilities under contract to provide support to CAF flying operations at or below the wing/base or unit level shall be included within the existing wing/base or unit FSP and will report FS occurrences under the authority of the applicable wing/base or unit comd;

b. FS reporting by contractors providing support through NDQAR or equivalent third-line maintenance facilities shall report occurrences through an assigned wing FSO familiar with those contractor operations; and

c. CAF aircraft FS occurrences involving civilian aircraft, civilian facilities and civilian aircraft operating at military facilities in Canada shall be reported to the nearest TSB Regional Office. Near misses or similar occurrences involving civilian ATC units are to be reported to the Nav Canada Regional Air Traffic Services Officer, and a normal FS occurrence report is to be filed.

OCCURRENCES INVOLVING PARACHUTISTS/RAPPELLERS

13. SAR Tech Personnel. Occurrences involving SAR Tech personnel jumping from either CAF aircraft or CAF military conveyance aircraft will be classified as FS occurrences if the event took place during the jump exit, parachute descent or parachute landing. These occurrences will be filed against the tail number of the aircraft from which they jumped. Occurrences that transpire after the SAR Techs are safely on the ground are to be handled through the General Safety Officer.

14. Other Personnel. Parachute and rappel occurrences involving all other parachutists or rappellers who are jumping from either CAF aircraft or CAF military conveyance aircraft will be classified as FS occurrences only if the event took place while on board the aircraft or during the aircraft exit and if it is determined that the aircraft (and by extension the flight crew) or aircraft equipment used did contribute to the occurrence. Otherwise, the occurrence shall be reported through the General Safety Officer and/or the Canadian Advanced Army Warfare Center (CAAWC).

NOTE
Parachute occurrences are to be reported to the Canadian Advanced Army Warfare Center (CAAWC)

OCCURRENCES INVOLVING UNMANNED AIRCRAFT (UA)

Categories of UA

15. The categories described below represent guidelines only, especially in regard to maximum takeoff weight (MTOW) and may be adjusted for specific system types. The category in which an Unmanned Aircraft System (UAS) resides shall be stated in the Type Certificate, Restricted Type Certificate, or the Specific Purpose Flight Permit. UAS are divided into three categories according to the UA MTOW as follows:

a. Class 1: UA with MTOW of less than 150kg (330 lbs). This classification comprises the following sub-categories:

(1) Micro: UA weighing less than 1kg (2 lbs),

(2) Mini: UA weighing from 1kg up to and including 15kg (2 lbs up to and including 33 lbs), and

(3) Small: UA weighing greater than 15 kg to less than150kg (33 lbs to less than 330 lbs);

b. Class 2: UA with MTOW of 150kg up to and including 600kg (330 lbs up to and including 1323 lbs) MTOW; and

c. Class 3: UA with MTOW is greater than 600kg (greater than 1323 lbs).

UAS Occurrence Reporting

16. UA, like any other CAF aircraft, are subject to the DND/CAF FSP. However, UA FS reporting takes into consideration design, function, complexity and level of skill required for their operation and maintenance. Damage to a UA component that is designed as consumable will not normally be reported using FSIMS. The following guidelines will apply to the reporting of UA FS occurrences:

a. Class 1:

(1) Micro: the following occurrences shall be reported:

(a) injuries or potential for injury to personnel;

(b) violation of assigned airspace; and

(c) NMAC or mid air collision (with manned aircraft);

(2) Mini: Report all occurrences as stipulated above and:

(a) NMAC or mid air collision (with UAS or manned aircraft);

(3) Small: Report all occurrences stipulated above and:

(a) Level of damage is serious or above,

(b) Maintenance failures or related conditions affecting safety of flight;

(c) Failure of the launch and/or recovery/capture mechanism, and

(d) Uncommanded control input

b. Class 2: Report all occurrences stipulated above; and

c. Class 3: Exactly as per manned aircraft.

17. For UAS flown under the Open Category (CANFORGEN 118/18), occurrences will be reported as stipulated above; however no investigations are required to be carried-out unless tasked by the AIA. These incidents are to be entered in FSIMS 'For Tracking Purposes Only (FTPO)'.

OCCURRENCES INVOLVING AIR WEAPONS SYSTEM

18. Chapter 1 of the FS Manual (A-GA-135-001/AA-001) explains the interface between the FSP and the Air Weapons Safety Program (AWSP) and in particular, the oversight responsibilities accepted by the AIA to investigate air weapons safety occurrences. An air weapons safety occurrence is any FS occurrence associated with an air weapons system or associated with an air weapon from the time the air weapon is removed from an approved storage facility, such as a ready-use magazine or unit A&E lock-up, with the intent for loading onto an aircraft, until either the delivery of the air weapon to a target or its return to an approved storage facility.

19. An air weapons occurrence may be reported through the FSP (via CF 215 or DND 4513 as applicable) or the A&E Defect and Malfunction Report (CF 410) or both. The following paragraphs detail the reporting requirements for each program.

20. FS/Military AIA - Occurrence Report. A CF 215 or DND 4513 shall be filed through FSIMS for any weapons related occurrence where there was damage or a risk of damage to aircraft, property or the air weapons system itself, or injury or a risk of injury to personnel. As a minimum, the following types of air weapons occurrences must be reported through the FSP:

a. accidental functioning of an air weapon;

b. inadvertent release or firing of an air weapon;

c. hazardous malfunctioning of an air weapons system or air weapon (ex. Runaway gun, hang-up); and

d. any occurrence associated with air weapons and air weapons systems that may reflect on the reliability of the air weapon, the air weapons system, the operating procedures or personnel.

21. A CF 215 / DND 4513 is not required for hand-initiated and manually deployed or released store occurrences where safety of flight, equipment or personnel was not compromised.

22. Ammunition and Explosives (A&E) Defect and Malfunction Report (CF 410). A CF 410 shall be filed by the armament authority IAW A-GG-040-006/AG-002 for any defect and malfunction, regardless whether safety of flight is compromised or not, and whether a CF 215 is filed or not. The completion of a CF 215 report does not replace the requirement to also file a CF 410 as required by the A&E Safety Program. The completion of the CF 410 is mandatory and very important in order to document the malfunction or defect and to assist in identifying trends and deficiencies of the item for life cycle materiel management purposes IAW DAOD 3002-4.

23. A-GG-040-006/AG-002 provides procedures for the completion of the CF 410.

Examples of occurrences requiring the completion of a CF 410 include:

a. malfunction of a deployed or released expendable store (i.e. flare malfunction, bomb malfunction, jammed gun, etc.),

b. malfunction of ammunition, weapon or explosive,

c. damage to an air weapons system or component; and

d. the malfunction of a hand-initiated and manually deployed or released expendable store (i.e. flare, signal smoke and marker).

NOTE
While beyond the scope of the FSP, the usage of air stores within Canadian Forces ranges shall be reported in the Canadian Forces Range Information System (CFRIS) as per CANFORGEN 104/11.

NOTE
The release and/or impact location of the malfunctioned store shall be recorded on the CF 410 to aid Unexploded Explosive Ordnance (UXO) tracking and is especially important for stores deployed or released over and impacting non-DND property.

24. Aircraft Unserviceability Report (CF 349)/Maintenance Work Order. Usually, an investigation is required to determine if the technical cause of an air weapon malfunction is related to the air weapon itself or the aircraft weapons system. Therefore, until the cause of the air weapon malfunction is determined, the aircraft and/or aircraft weapons system shall be FS quarantined. A CF 349/Maintenance Work Order shall be filed if it is assessed that the aircraft or aircraft system caused the weapon system malfunction (e.g. hung bomb or unexploded ordnance where aircraft system caused the weapon system malfunction).

HAZARD REPORTING

25. Personnel at all levels must maintain vigilance for potential hazards within the work place. This could take the form of unsafe work habits, environmental conflicts, or management direction. When these hazards are recognised, personnel should be encouraged to report them to the FS representatives in their unit. The FS Hazard Report form (see Annex C) can be used to alert the FS System to potential problem areas and is available for download from the DFS intranet site under the *"Administration"* tab. This form may be submitted anonymously or it may be signed. When the unit FS NCM or Officer receives a FS Hazard Report, it shall be assessed for its validity and possible PM to mitigate it. If the FS Hazard Report has been signed the person that submitted the report may be contacted for further clarification if desired.

26. The hazard shall be treated the same way as an occurrence with respect to the responsibilities for tracking and closing, and the report will be closed only when the PM have been implemented or rejected by the appropriate authority. Once a hazard report has been closed, it is essential that the FSO report back to the individual who submitted the report (if identified) on the action taken or why, as applicable, PM could not be implemented. This all-important step is key to encourage the open and honest reporting of hazards.

27. The FS Hazard Report form includes an identification of "Hazard Severity" and

“Probability”, which will correspond to a level of risk in FSIMS. This level is identical to the risk matrix used for RARM. For all risks above “acceptable”, the hazard has to be reported up to the applicable Div FS office, as detailed in Chapter 16. To ensure adequate and timely visibility of all hazards at higher headquarters, it is critical that UFSO/WFSO input and release (i.e. “send”) the hazard reports within FSIMS.

Annex A
Chapter 4
A-GA-135-003/AG-001

ANNEX A - FORM CF 215: FS OCCURENCE REPORT - INITIAL

National Défense
Defence nationale

Flight Safety Occurrence Report - Initial

Ref: A-GA-135-001/AA-001, Chapter 9, Annex E
The person(s) reporting a flight safety incident or accident or data specific to birdstrikes and/or bird sightings having a flight safety implication should fill out as best as possible applicable portions of this form. The completed form is to be sent to any Flight Safety Office.

General

Date / Time of occurrence _____ / _____ (GMT)

Type of occurrence ☐ Air ☐ Ground

(Indicate additional report types if applicable)

☐ Bird strike ☐ ALSE issues ☐ Air Weapon System

CF 410 ☐ Filed ☐ Not Required

Personnel Casualty Level (PCL) (most serious injury assessed IAW B-MD-007-000/AF-003)

☐ Nil ☐ Green (minor injury) ☐ Yellow (serious injury)

☐ Red (very serious) ☐ Black (fatal) ☐ Grey (missing)

Safety of Flight Compromise Level (SFCL)

☐ Low ☐ Medium ☐ High ☐ Extreme

Aircraft

Aircraft Damage Level (ADL)

☐ Nil ☐ Minor ☐ Serious (major component / 3rd line) ☐ Very serious (multiple major components / 3rd line) ☐ Destroyed / Missing

Aircraft type and registration (e.g. CC138 / 138802)	**Operated by** (Unit / Squadron)	**Aircraft ownership** (Squadron / Wing)

Stage of operations (e.g. in-flight, take-off, taxi, parked, towing, etc.)	**Altitude** (AGL)	**IAS** (knots)

Mission type (e.g. training, ferry, operational, testing, display)	**Barrier engaged** ☐ Yes ☐ No

Location

Location of occurrence (e.g. local area, ramp, en route; for crash sites, use Latitude and Longitude or other specific geographical reference)	**NAVAID location** (if beyond 5 miles of airport)
	Ident
	Distance to (NM)
	Bearing to (°M)

Description

Detailed description of occurrence

Title (short 2-3 word description of occurrence):

Narrative:

CF 215-E (01-2014) CLF 2.0
Design: Forms Management 613-995-9944 / 613-947-8944

Formulaire disponible en français - CF 215-F

Page 1/2

Canada

Personnel Information

	Role (e.g. aircrew, maintenance)	**MOS ID**	**On board**	**Injury**
1.			☐ Yes ☐ No	
2.			☐ Yes ☐ No	
3.			☐ Yes ☐ No	
4.			☐ Yes ☐ No	
5.			☐ Yes ☐ No	
6.			☐ Yes ☐ No	

Condition

Weather (e.g. rain, snow, fog)		**Light conditions** (e.g. bright day, dusk, dark night)	
Cloud (e.g. above, below, between, in, none)		**Visibility** (NM)	
Wind	Speed (knots):	Direction (degrees):	Magnetic

Birdstrike Report

Category
☐ Impact ☐ Near miss ☐ Sighting

Remains submitted
☐ Yes ☐ No

Within 5 NM of airport
☐ Yes ☐ No

Flight disruption
☐ Continued flight ☐ Landed nearest airport
☐ Returned to airport ☐ Aborted take-off

NOTAM warning
☐ Was alerted ☐ None issued
☐ Didn't check ☐ Not available

Lights on
☐ External ☐ Navigation ☐ Red rotation beacon ☐ Landing
☐ Wing ☐ Strobe ☐ White rotation beacon

Part Struck
☐ Canopy ☐ Nose ☐ Wing ☐ Flap ☐ Landing Gear
☐ Radome ☐ Tail unit ☐ Fuselage ☐ Rotors ☐ Stores / Tanks
☐ Engine # 1 ☐ Engine # 2 ☐ Engine # 3 ☐ Engine # 4 ☐ Other

Type of damage
☐ Aircraft skinned ruptured ☐ Windshield or other glazing damaged
☐ Air inlets/scooped blocked ☐ Fans/compressor blades, IGVS damaged
☐ Impaired function of flight controls, flaps, spoilers or slats
☐ Metal deposited in oil filters or other evidence of internal engine damage

Bird description

Species:	Quantity:

Bird size classification
☐ Small (starling) ☐ Medium (gull) ☐ Large (duck) ☐ Unknown

Drafter's name, initial and rank	**Office**	**Telephone**

CF 215-E (01-2014) CLF 2.0 **Page 2/2**

Annex B
Chapter 4
A-GA-135-003/AG-001

ANNEX B - FORM DND 4513: MILITARY AIA - OCCURRENCE REPORT

PROTECTED A (When completed)

National Defence / Défense nationale

Military Airworthiness Investigative Authority (AIA) - Occurrence Report

The contents of this occurrence report shall only be used by the Military Airworthiness Investigative Authority (AIA) for the sole purpose of accident prevention. When completed, this occurrence report and the identity of the person who made it are privileged and, except as provided by the *Aeronautics Act* or as authorized in writing by the person who made the report, no person, including any person to whom access is provided under the *Aeronautics Act*, shall knowingly communicate this report or permit it to be communicated to any person, or disclose the identity of the person who made it.

Instructions

- Not all spaces need to be completed in order to submit this occurrence report.
- If more space is required to complete an information block, add additional sheet(s) as required.
- Fill in the info known at the time. Further info can be passed to the AIA as it becomes known.
- An AIA investigator can be reached 24/7 at 1-888-WARN DFS (1-888-927-6337) and will assist with this occurrence report if required.

National Defence / Défense nationale

PROTECTED A (When completed)

Military Airworthiness Investigative Authority (AIA) - Occurrence Report

CONTACT INFO

From

Last name	First name		
Mailing address			
Organization	Phone number	Cell phone number	Fax number
E-mail address			

AIRCRAFT / FLIGHT DETAILS

Aircraft

Type	Model	Registration mark	Country of registration

Aircraft owner

Last name	First name	
Organization	Phone number	E-mail address

Operator

Last name	First name	
Organization	Phone number	E-mail address

Pilot in command

Last name	First name	
Licence number	Phone number	E-mail address

Flight details

Flight number	Date of departure *(yyyy-mm-dd)*	Time of departure
Last point of departure	Intended destination	Actual destination

Air traffic controller on duty

Last name	First name

DESCRIPTION OF OCCURRENCE

Occurrence details

Occurrence date *(yyyy-mm-dd)*	Occurrence time	Occurrence location *(if missing, last known location)*

Persons on board

Total number on board: _____ Number of flight crew: _____ Number of cabin crew: _____ Number of passengers: _____

Injuries

	Fatal	Serious	Minor	None	
Flight crew					Total fatal:
Cabin crew					Total serious:
Passengers					Total minor:

Formulaire disponible en français - DND 4513-F

PROTECTED A (When completed)

DESCRIPTION OF OCCURRENCE

Injuries *(cont'd)*

Actions taken to provide medical assistance to injured persons

Location

The location of the accident, incident, situation or condition by latitude and longitude or by reference to an easily defined geographical point.

Latitude:	Geographical point *(describe)*
Longitude:	

Occurrence summary / Description of events

Dangerous goods on board or released from aircraft

☐ Yes ☐ No

List any dangerous goods, as defined in section 2 of the *Transportation of Dangerous Goods Act, 1992*, carried on board or released from the aircraft, including the shipping name or UN number and consignor and consignee information

Damage to aircraft, environment or property

☐ Yes ☐ No

Description of damage

PROTECTED A (When completed)

ACTIONS TAKEN OR PLANNED

Missing aircraft

Indicate the last known position of the aircraft by latitude and longitude or by reference to an easily defined geographical point, the date and time that the aircraft was at that position and the actions taken or planned to locate the aircraft.

Latitude:	Geographical point *(describe)*
Longitude:	
Date *(yyyy-mm-dd)*:	
Time:	

Actions taken or planned to locate aircraft

Inaccessible aircraft

Actions taken or planned to gain access to the aircraft

Persons, aircraft, property and the environment

Actions taken or planned to protect

Do you believe this report requires immediate attention by an AIA investigator?

☐ **Yes** ☐ **No**

AIA contact information

Call: 1-888-WARN-DFS (1-888-927-6337) **E-mail: CAirForceDFSinvestigations@forces.gc.ca**

Appendix 1
Annex B
Chapter 4
A-GA-135-003/AG-001

APPENDIX 1 - LIST OF MANDATORY MILITARY-CIVILIAN REPORTABLE OCCURRENCES AS PER MAIR 2(1)

Mandatory reporting

2 (1) Any civilian who is an owner, pilot-in-command or crew member of an aircraft, has possession of an aircraft as lessee or otherwise, holds a Canadian aviation document with respect to an airport or heliport, is in charge of an airport or heliport, whether as employee, agent or representative of the holder of the Canadian aviation document, or provides air traffic services or maintenance services in respect of an aircraft or other aeronautical product must report to the Authority if they have direct knowledge of:

(a) any of the following accidents or incidents that is a military-civilian occurrence:

(i) a person sustaining an injury that requires medical intervention, becoming ill or dying as a result of being on board the aircraft, coming into contact with any part of the aircraft or its contents, conducting maintenance on the aircraft or other aeronautical product or being directly exposed to the aircraft's jet or propeller blast or rotor down wash,

(ii) the aircraft sustaining damage, or experiencing a failure, that adversely affects the structural strength, flight characteristics or performance of the aircraft and that requires repair or replacement of any affected component,

(iii) the aircraft going missing or being inaccessible,

(iv) an engine failing or being shut down as a precautionary measure,

(v) a transmission gearbox malfunctioning,

(vi) smoke or fire that is not related to the normal operation of an aircraft or other aeronautical product being detected,

(vii) difficulties in controlling the aircraft as a result of any aircraft system malfunction, weather phenomena, wake turbulence, uncontrolled vibrations or operations outside the flight envelope,

(viii) the aircraft landing or taking off outside or partially outside the area intended for that purpose or landing with all or part of its landing gear retracted,

(ix) the aircraft dragging any of its parts,

(x) any crew member being unable to perform their duties as a result of a physical

incapacitation or a malfunction of their life-support equipment,

(xi) a depressurization requiring an emergency descent, the activation of emergency systems or the use of emergency life-support equipment,

(xii) a fuel shortage requiring a diversion of the aircraft or approach and landing priority at the aircraft's destination,

(i) the aircraft being serviced with the incorrect type of fuel or lubricant or with contaminated fuel or lubricant,

(ii) a collision, other than a collision associated with normal operating circumstances, occurring between aircraft or between an aircraft and another object or terrain,

(iii) an aircraft coming so close to being involved in a collision described in subparagraph (xiv) that the safety of any person, property or the environment is compromised,

(iv) the distance separating two aircraft being less than the minimum established in the most recent version of the Canadian Domestic Air Traffic Control Separation Standards, published by the Department of Transport,

(v) a crew member declaring an emergency or indicating any situation that requires priority handling by an air traffic control unit or the standing by of emergency response services,

(vi) an accident or incident involving any device that is installed on an aircraft for emergency activation or for deployment or deployment and recovery during flight, including ejection seats, bombs, rockets, missiles, cartridge activated devices, jammers and targets,

(vii) a slung load being released from the aircraft unintentionally or as a precautionary or emergency measure,

(viii) dangerous goods, as defined in section 2 of the Transportation of Dangerous Goods Act, 1992, being released inside or from the aircraft,

(ix) a defect or deterioration of an aeronautical product that is not expected as a result of normal operations or maintenance being discovered,

(x) an aeronautical product sustaining damage during maintenance,

(xi) an unauthorized deviation from an approved maintenance program for an aeronautical product,

(xii) any object being found in an aircraft that is out of place and could result in damage to the aircraft with or without the intervention of a person, or

(xiii) a tool being lost during maintenance of an aeronautical product; or

(b) an accident or incident referred to in one or more of subparagraphs (a)(i) to (xxv) that involves an aircraft or installation referred to in subparagraph (a)(i) of the definition military-civilian occurrence in subsection 10(1) of the Act.

INTENTIONALLY LEFT BLANK

Annex C
Chapter 4
A-GA-135-003/AG-001

ANNEX C - FORM DND 2484: FS HAZARD REPORT

National Defence / Défense nationale

Flight Safety Hazard Report

Ref: A-GA-135-001/AA-001

You can prevent aircraft accidents by reporting hazards. A flight safety (FS) hazard is any condition that has the potential to cause injury or damage. Please take a moment to complete this form. Pass the completed form to your FS staff as promptly as possible so this hazardous condition may be addressed **BEFORE** it causes an occurrence.

The report may be submitted anonymously to any Flight Safety Office or mailed to DFS directly. **Reports will be treated in the strictest confidence**. The voluntary inclusion of contact details will help the Flight Safety staff to follow up the investigation.

Contact info:

Director Flight Safety
National Defence Headquarters
Major-general George R. Pearkes Building
101 Colonel By Drive
Ottawa ON K1A 0K2

E-mail: dfs.dsv@forces.gc.ca
Phone: 1-888-WARN DFS / 1-888-927-6337

Date reported (*yyyy-mm-dd)*

Name	Rank	Unit	Telephone

Hazard description *(The hazard I observed is ...)*

(Use additional sheet if needed)

Hazard severity *(provide your personal evaluation of the potential consequences if this hazard materializes) (see reverse for definitions)*

☐ Catastrophic ☐ Hazardous ☐ Major ☐ Minor ☐ Negligible

Hazard probability *(provide your personal estimate of the likelihood of this hazard occurring) (see reverse for definitions)*

☐ Frequent ☐ Probable ☐ Remote ☐ Extremely remote

Suggested solution

Formulaire disponible en français - DND 2484-F

DND 2484-E (01-2014) CLF 2.0
Design: Forms Management 613-995-9944 / 613-947-8944

Canada

Page 1/2

Hazard definitions
Severity
Catastrophic: All hazard conditions which would prevent continued safe flight and landing. Could result in death of the flight crew normally with loss of the aircraft.
Hazardous: Hazard conditions that would reasonably be expected to result in a large reduction in safety margins or functional capabilities, including higher crew workload or physical distress such that crew may not be relied upon to perform tasks accurately or completely. Could result in death or major injury to aircraft occupants or major damage to an aircraft system. Could result in death or major injury to ground personnel or the general public.
Major: Hazard conditions that would reasonably be expected to result in a moderate reduction in safety margins or functional capabilities, including a moderate increase in crew workload or physical distress impairing crew efficiency. Possible physical distress, including injuries to occupants or minor damage to an aircraft system.
Minor: Hazard conditions that would not significantly reduce aircraft safety, but would reasonably be expected to result in a slight reduction in safety margins or a slight increase in crew workload.
Negligible: No effect on safety. Negligible effect on safety margins.
Probability
Frequent: Occurs continuously for the entire fleet or aircrew population.
Probable: Occurs or likely to occur several times per year for the entire fleet or aircrew population.
Remote: Occurs or likely to occur one or more times per year for the entire fleet or aircrew population.
Extremely remote: Not expected to occur or likely to occur one or more times for the entire operational life of the fleet or aircrew population.

Annex D
Chapter 4
A-GA-135-003/AG-001

ANNEX D - OTHER RELATED REPORT FORMS

1. The following reports and/or forms are often used by FSOs to ensure command authorities are properly advised of the circumstances surrounding an occurrence. The forms listed are a summary of the main forms that are typically encountered by the FSO and is not meant to be an exhaustive list. The majority of these forms may be obtained through normal supply action and/or submitted electronically to the appropriate authority.

a. Significant Incident Report (SIR). This report should be filed when an aircraft occurrence will likely create public interest. DAOD 2008-3 – Issue and Crisis Management governs the production of an SIR.

b. Coroner's Report. A copy of this report, if raised, shall be included with the medical report.

c. Report on Injuries, Disease or Illness (CF 98). A CF 98 is used to report injuries, disease, illness or exposure or suspected exposure to toxic material and substances. In situations where FS occurrences involve injury or exposure or suspected exposure to toxic material and substances, FSOs shall ensure the unit General Safety Officer (GSO) is notified.

> NOTE
> Entry of the injury into the FSIMS database does not ensure either a CF 98 Report is completed or medical authorities are aware of the injury and/or exposure.

d. Hazardous Occurrence Report (DND 663). A DND 663 is used to report hazardous occurrences through the General Safety Program.

e. Unsatisfactory Condition Report (UCR) (CF 777A). A CF 777A may be submitted to address conditions directly affecting the safety of flight. The report shall be submitted in accordance with C-02-015-001/AG-000. All FS UCRs shall be coordinated with the FSO.

> NOTE
> Where the occurrence investigation reveals deficiencies with Aviation Life Support Equipment (ALSE), the FSO should ensure the Unit ALSE Officer is briefed of the ALSE issues. Entry of the occurrence into the FSIMS database does not ensure appropriate ALSE corrective actions have been taken.

f. Ammunition and Explosives Defect and Malfunction Report (CF 410). A CF 410 shall be submitted for ammunition defects and malfunctions as per A-GG-040-006/AG-002 - DND Ammunition Accident/Incident/Defect/Malfunction Reports And Disposal Requests.

g. Aircraft Maintenance Management Information System (AMMIS) (CF 349 and 543). To be submitted by first-line, second-line and third-line maintenance facili-

ties as required. Maintenance documentation produced following an FS occurrence must be annotated as FS as per C-05-030-001/AG-001. This annotation will ensure that the FS investigation is prioritized and that the chain of evidence custody is preserved.

h. ADDN Occurrence Report. This form is for ships at sea.

CHAPTER 5 – INVESTIGATION CLASSIFICATION SYSTEM AND FLIGHT SAFETY REPORT TYPES

AIRWORTHINESS INVESTIGATIONS

1. There are two key factors that must be addressed when considering airworthiness investigations. The first factor is that investigations are focussed on developing effective and reasonable PMs though not all occurrences will yield them. The second factor is that the perceptions of all personnel involved in DND/CAF air operations are critical to the FS and the DND/CAF Airworthiness Programs. Timely and accurate reporting are basic tenets of both programs. Consequently the overall health of these programs will suffer if the perception is created that reporting is being ignored. Therefore, the investigation program must focus the system's limited resources on those investigations that will yield effective PMs while ensuring that personnel continue to report all occurrences.

2. The objectives of conducting airworthiness investigations are to:

   a. focus valuable and limited investigation resources on those occurrences that will identify useful, relevant and effective PMs;

   b. identify PMs as quickly as possible and advise the CoC of those PMs that require immediate attention;

   c. complete investigations efficiently and, wherever possible, in accordance with (IAW) the appropriate timelines; and

   d. continue to foster a reporting culture.

CONCEPT OF OPERATIONS

3. The practise of reporting all aircraft occurrences will continue as well as the policy of urging all personnel to report all incidents and hazards. All occurrences will continue to be entered into the FSIMS for critical trending and analysis purposes. However, not all aircraft occurrences will be investigated to the same degree so a means to determine the investigation level required must be initiated so that the appropriately qualified, certified and authorized individuals are assigned to the investigation.

4. Once an occurrence has been reported, unit and wing FS staffs will conduct an initial assessment as to determine the level of investigation. If the occurrence is categorized as an accident (i.e. Category A, B or C), the matter shall be referred to DFS. For FS incidents (i.e. Category D or E), unit or wing FS personnel will conduct a preliminary evaluation using the FS Compromise Level (FSCL) and Aggravating Factors discriminators. If this assessment indicates that a higher level of investigation may be required, the determination of the investigation class will be done in consultation with AIA staff.

OCCURRENCE CATEGORY

5. The first step to determine the investigation class is to determine the occurrence category based on aircraft damage level (ADL) and personnel casualty level (PCL), whichever is the higher of the two values (see definitions for further details of ADL and PCL). Table 1 is used to determine the occurrence category for each FS occurrence involving a manned

aircraft. Table 2 is used to determine the occurrence category for each FS occurrence involving a UAS.

.

Aircraft Damage Level (ADL)	Personnel Casualty Level (PCL)	Occurrence Category
Destroyed or missing	Fatal injury or missing	A
Very serious damage	Very serious injury/illness	B
Serious damage	Serious injury/illness	C
Minor damage	Minor injury/illness	D
Nil	Nil	E

Table 1: Occurrence Category - Manned aircraft

Aircraft Damage Level (ADL)			Personnel Casualty Level (PCL)	Occurrence Category
UAS Class 3	UAS Class 2	UAS Class 1		
Destroyed or Missing			Fatal Injury or Missing	A
Very Serious	Destroyed or Missing		Very Serious Injury/Illness	B
Serious	Very Serious	Destroyed or Missing	Serious Injury/Illness	C
Minor	Serious/Minor	Very Serious/ Serious	Minor Injury/Illness	D
Nil	Nil	Nil	Nil	E

Table 2: Occurence Category - UAS

NOTE
DFS shall be contacted as soon as possible and toxicology testing should be initiated for any FS occurrence that is C category or higher, or if the occurrence category is yet to be determined but has the potential to be a C category or higher. The exception is C category damage to Class 1 UAS.

Note
A medical officer should determine the PCL IAW CFAO 24-1

INVESTIGATION CLASS

6. Investigations will be focused on selected occurrences that are deemed to provide the best potential for developing effective PMs. To accomplish this objective, the occurrence investigation classification system is utilized. Considerations that the AIA will undertake when assigning an investigation class are as follows:

a. Occurrence category: The occurrence category is based on the combination of the ADL and PCL per Table 1 or Table 2;

b. Flight Safety Compromise Level: The FSCL is categorized with a qualifier that describes the level to which safety margins were compromised. By extension, it provides an indication of how much the personnel and/or aircraft were put at risk. The purpose of this categorization is to ensure the occurrence is investigated at the proper level. Table 3 is used to determine the FSCL level for manned aircraft, while Table 4 is used to determine the FSCL for UAS; and

c. Aggravating Factors: There are other factors that may elevate the level at which an occurrence is investigated. If a higher level of investigation might lead to a more effective reduction of risk to persons, property or the environment, then this level should be assigned. Consideration shall also be given to the maintenance of trust in the FSP by CAF personnel and the general public by having occurrences investigated at the appropriate level.

7. In addition to FS occurrences of Category C or higher, all FS occurrences having FSCL or Aggravating Factors of High must be reported immediately to the AIA via 1-888-WARN DFS (1-888-927-6337) and toxicological samples should be taken.

FSCL Level	Condition
High	An occurrence where the risk or perceived risk has a potential for very serious injury, very serious damage to the aircraft or worse. DFS shall be notified via WARN-DFS.
Medium	An occurrence where the risk or perceived risk has a potential for serious injury or serious damage to the aircraft. The WFSO shall be notified.
Low	An occurrence where the risk or perceived risk has a potential for minor injury or minor damage to the aircraft (or its components).

Table 3: FSCL levels for manned aircraft

FSCL Level	Class of UAS		
	Class 3	Class 2	Class 1
High	An occurrence where the risk or perceived risk has a potential for very serious injury, very serious damage to the aircraft or worse. DFS shall be notified via WARN-DFS.	An occurrence where the risk or perceived risk has a potential for very serious injury or worse, or the destruction of the aircraft. DFS shall be notified via WARN-DFS.	An occurrence where the risk or perceived risk has a potential for very serious injury or worse. DFS shall be notified via WARN-DFS.
Medium	An occurrence where the risk or perceived risk has a potential for serious injury or serious damage to the aircraft. The WFSO shall be notified.	An occurrence where the risk or perceived risk has a potential for serious injury or very serious damage to the aircraft. The WFSO (or BFSO) shall be notified.	An occurrence where the risk or perceived risk has a potential for serious injury. The WFSO (or BFSO) shall be notified.
Low	An occurrence where the risk or perceived risk has a potential for minor injury or minor damage to the aircraft.	An occurrence where the risk or perceived risk has a potential for minor damage to the aircraft.	An occurrence where the risk or perceived risk has a potential for minor or serious damage to the aircraft.

Table 4: FSCL levels for UAS

8. Table 5 is provided as a guide to the factors used to determine the class of investigation to be conducted. In general, the class of investigation is based on the highest level of the factors considered. However, Table 5 is to be used as a guide only as the AIA may determine the class of investigation into any category of occurrence.

Factors			Recommended Investigation		
Occ Cat	FSCL	Aggravating Factors	Investigation Class	Investigating Agency	Investigation Report Type
A or B	High	High	I	DFS	FSIR
B or C			II	DFS	ESR
C or D	Medium	Medium	III	WFSO or UFSO	SR
D or E	Low	Low	IV	WFSO or UFSO	SR

Table 5: Flight Safety Investigation Classes

TASKING FOR CONDUCT OF INVESTIGATIONS

General

9. All FS investigations will be assigned an IIC by the appropriate FS investigating agency IAW Table 2. The mandate of the IIC is to conduct a thorough and impartial investigation into the occurrence and is delegated authorities as detailed in Chapters 8 through 10 of this manual. The IIC must also prepare and submit an investigation report, as per Table 2, for approval by the appropriate investigating agency.

Class I and II Investigations

10. The AIA directly assigns the IIC and the supporting investigation team for all Class I and Class II investigations via a formal tasking order (see Annex A for an example AIA tasking order).

11. The IIC for a Class I or Class II investigation shall normally be a DFS accident investigator with an IIC 1 or IIC 2 certification. The AIA may also task a non-DFS IIC, normally a highly experienced WFSO, to conduct a Class II investigation.

Class III and IV Investigations

12. All Class III and Class IV investigations are conducted by the assigned Wing/Formation FSO on behalf of the AIA. The Wing/Formation FSO, IIC and supporting investigation team are typically assigned and authorized through the established Wing/Formation FS structure. The investigation report is submitted to and released by the Wing/Formation FSO assigned as the investigating agency.

REPORT TYPES

13. It is important that airworthiness investigation reports are completed by the appropriate AIA's authorized individuals and forwarded in a timely manner. However, not all occurrences are investigated to the same degree due to a number of factors. Therefore, there are several types of airworthiness investigations, as well as various timelines by which the investigation reports are to be produced. Similarly, there is a hierarchy associated with the authorized individuals (investigators) that are assigned to complete the investigations and associated reports, based upon the individuals' training, position, experience, certification and AIA delegated authority that must be matched with the investigation class and complexity (as outlined in Chapters 8 through 10). A summary of the different types of airworthiness investigation reports and the time in which they would normally be completed follows.

Initial Report (IR)

14. IRs are required for all occurrences and should normally be submitted by the unit of occurrence within 12 hours of the occurrence. These reports give the initial details noted around the situation and a brief description of the unsafe nature of the occurrence. The FSIMS is normally used to report a simple occurrence. If unable to access the FSIMS, a telephone call, a CF 215, DND 4513 or FS message report is to be submitted to the home unit for input to the database. Annex B lists the information that, if available, should be included in the IR.

Supplementary Report (SR)

15. SRs are normally completed within 30 calendar days of the occurrence. SRs give details regarding facts of the occurrence, analysis of those facts, assigns cause factor(s) and recommend PM(s). SR report requirements are provided in Annex C. Additionally, guidance on writing the SR narrative is provided in Annex D.

Enhanced SR (ESR)

16. An ESR will be used for occurrences that are sufficiently complex to warrant a more thorough investigation than a normal SR but do not require the same degree of scrutiny that is required for an FSIR, such as for a Class II investigation. An ESR is an SR that will follow a modified four part ICAO format. In compiling an ESR, a number of interim reports are prepared with various distribution protocols. These reports and their associated timelines are as follows:

a. From the Investigator (FTI). The FTI provides a summary of the initial factual information pertinent to the occurrence. It is a high level perspective of the occurrence's factual information, for consumption by DND/CAF and is published in a bilingual format on the DFS website and in *Flight Comment* magazine. The FTI should be distributed within 30 days of the occurrence;

b. ESR Draft Report. The ESR Draft Report is simultaneously distributed to all Persons (Parties) of Direct Interest (PDIs) for review and comment in order to confirm the accuracy and completeness of the draft report. The ESR Draft Report should be distributed to PDIs within seven months of the occurrence. Replies are returned directly to the AIA to ensure privileged information is protected as required by the *Aeronautics Act*;

c. Final ESR. The Final ESR is the comprehensive report on the occurrence and is a refined version of the Draft for Comment Report that includes valid PDI inputs and should be distributed within 12 months of the occurrence. The AIA is the tasking and release authority for the report; and

d. Epilogue. The Epilogue, which is extracted from the synopsis in the Final ESR, is a summary of the investigation written with a high level perspective for consumption by DND/CAF, public, and media audiences. Similarly, it should be distributed in bilingual format within 12 months of the occurrence, concurrent with the Final ESR's public release. It is published on the DFS website and in *Flight Comment*.

Flight Safety Investigation Report (FSIR)

17. FSIRs are designed to provide a comprehensive report on a Class I occurrence, are usually produced by a team of investigators chosen for the particulars surrounding the occurrence, and generally follow the ICAO Annex 13 format. In compiling an FSIR, a number of interim reports are prepared with various distribution protocols. These reports and their associated timelines are as follows:

a. Preliminary FSIR. The Preliminary FSIR is an internal document distributed to the senior leadership that provides the initial factual information pertinent to the occurrence and makes recommendations for immediate PMs. It should be distributed within 30 days of the occurrence;

b. From the Investigator (FTI). The FTI provides a summary of the initial factual information pertinent to the occurrence. It is a high level perspective of the occurrence's factual information, for consumption by DND/CAF and is published in a bilingual format on the DFS website and in *Flight Comment* magazine. The FTI should be distributed within 30 days of the occurrence;

c. FSIR Draft Report. The FSIR Draft Report is simultaneously distributed to all PDIs for review and comment in order to confirm the accuracy and completeness of the draft report. The FSIR Draft Report should be distributed to PDIs within seven months of the occurrence. Replies are returned directly to the AIA to ensure privileged information is protected as required by the *Aeronautics Act*;

d. Final FSIR. The Final FSIR is the comprehensive bilingual report on the occurrence and is a refined version of the Draft for Comment Report that includes valid PDI inputs and should be distributed within 12 months of the occurrence. The AIA is the tasking and release authority for the report. It is published on the DFS website; and

e. Epilogue. The Epilogue, which is extracted from the synopsis in Final FSIR, is a summary of the investigation written with a high level perspective for consumption by DND/CAF, public, and media audiences. Similarly, it should be distributed in bilingual format within 12 months of the occurrence, concurrent with the Final FSIR's public release. It is published on the DFS website and in Flight Comment.

18. It must be emphasized that the timelines outlined in the aforementioned paragraphs are planned target dates and may vary depending on the complexity of the investigation and investigator workload.

SECURITY CLASSIFICATION OF FS REPORTS

19. FS reports and supporting documentation will normally be unclassified. However, some of the information contained in these reports and documentation is protected under the *Aeronautics Act*, the *Canadian Human Rights Act* and the *Access to Information Act*. Therefore, FS information will not be released without the express authority of the AIA. The special treatment accorded these reports is of vital importance in obtaining complete cooperation from witnesses and in determining the real cause(s) of an occurrence. Examples of agencies who might have access to FS information are as follows:

a. a coroner requests access for the purposes of a coroner's investigation; and/or

b. an individual is conducting a coordinated investigation under the provisions of one or more signed agreements (ex. a STANAG or a working agreement with TSB).

PROTECTION OF INFORMATION IN FS REPORTS

20. It is the policy of DND that some investigation reports will be made available to the public in order to facilitate accident prevention throughout the aviation community. They are released under the authority of the AIA pursuant to the powers delegated to him/her by the MND, with the understanding that the reports will be used for no other purposes than improving aviation safety. Details regarding release of FS information and the delegation of authorities

from the AIA to do so are contained in Chapter 10 of this manual.

21. The concept of classifying information given during an FS investigation as privileged encourages a frank and open reporting culture. This helps to determine the cause(s) quickly and to develop the most appropriate PM. It must be noted that FS reports and the supporting investigation files may be accessed through the *Access to Information Act*. Nevertheless, the contents of the reports are eligible for protection under the *Aeronautics Act*, *Access to Information Act* and *Privacy Act*.

FS INFORMATION MANAGEMENT SYSTEM (FSIMS)

22. To evaluate the effectiveness of their FS Programs, Comds and FSOs at every level must maintain records of every FS occurrence and hazard involving their facilities, equipment and personnel. FSIMS is the primary tool to assist this process and is useful for identifying trends.

23. The FSIMS was developed to meet the automated support needs of the CAF FSP. It provides FSOs at all levels with an ability to input, record and track FS occurrences. FSIMS shall be used to record all FS occurrences. If unable to access the FSIMS or if the situation warrants immediate notification of a serious occurrence, the FS occurrence information shall be forwarded to an FSO by telephone, fax or CAF msg using the CF 215, DND 4513 or FS message form. Routine FS occurrences will be submitted to the home unit FSO for input to the FSIMS database. As FSIMS does not automatically inform Comds of FS occurrence information, FSOs shall review FSIMS on a regular basis to ensure FS information has been distributed as required.

24. The unit of ownership is responsible for originating the FS report and ensuring it is entered in FSIMS. The unit of occurrence shall also ensure all additional reports related to the occurrence have been completed. In certain circumstances coordination between the unit of ownership and unit of occurrence may be necessary to ensure all pertinent FS information has been recorded. FSIMS development and policy is a DFS responsibility. The training of FS personnel on the use of FSIMS to input initial investigation data and hazard reports is the responsibility of 1 CAD FS and will be delivered through the FS Course.

TRANSFER OF OWNERSHIP

25. In the case where a unit discovers and reports an occurrence that should be investigated by another unit, the reporting unit will liaise formally with the investigating unit and discuss transfer of the investigation. Upon agreement, the unit invited to investigate the occurrence will acknowledge acceptance of ownership by forwarding the correspondence to DFS 2, cc DFS 3-2 (FSIMS Manager) and request official transfer of the investigation. If agreement on ownership cannot be reached, the reporting unit can request that DFS 2 decide which unit shall be responsible for the investigation. DFS 3-2 will ensure that any transfers be documented as appropriate and actioned in FSIMS.

RECONVENING A FSI

26. An investigation shall be re-opened by the AIA or the delegated FSO without delay if it appears that some evidence was not considered or was omitted; if a relevant aspect was not covered adequately; or new evidence has been uncovered, and this evidence would lead

to a PM which has not already been recommended. Such action should not be taken unless absolutely essential.

REPETITIVE OCCURRENCES (RO)

Definition of RO

27. Some occurrences are repetitive in nature and limited benefit would be gained by carrying out a full-scale investigation for each occurrence. An RO is defined as a recurring type of FS incident where the event and investigation results are consistent with a previous investigation. The use of an RO is limited to a Class III or Class IV investigations.

28. Even though ROs are repetitive in nature and have limited potential to find new causes and original PMs, a rudimentary investigation is still required to ascertain the facts and confirm the occurrence is similar in all aspects. Examples of typical ROs are the Cormorant tail rotor half-hub cracks, bird strikes with little to no damage and the Griffon chip light detectors occurrences.

RO Conditions

29. To qualify as an RO, an occurrence must meet the following conditions:

a. the personnel involved have suffered no injury;

b. the aircraft has sustained only minor or no damage;

c. the PM and cause factor(s) for the investigated occurrence is/are in line with a reference occurrence; and

d. the FS risk and aggravating factors, if any, are in line with the reference occurrence which will serve as the initial RO.

RO Staffing, Approval and Monitoring

30. Any occurrence which will be treated as an RO must refer to an original FSIMS reference ID # for which a detailed investigation was completed. It will use the same key words, cause factor(s) and PM(s) of the reference RO.

31. The 1 CAD FS staff monitors the occurrences reported by different wings and is the approving authority to accept a type of occurrences as an RO. If it is determined that a certain type of occurrences should be treated as a RO, the FSO or WFSO shall submit a request to the 1 CAD FSO for approval and inclusion on the RO master list. The suitability of the RO designation will be evaluated by the 1 CAD FS staff and approved, as applicable. The WFSOs and FSOs of affected units will be informed of the newly approved RO. The approved RO list will then be updated by the 1 CAD FS staff and posted on the FS Intranet site. By keeping track of ROs, DFS can initiate more detailed analysis, as required, if concerns are identified or as required. The RO list shall be reviewed annually for suitability by the FSIMS Working Group.

INVESTIGATION FOR TRACKING PURPOSE ONLY (FTPO)

32. If it is assessed by the investigative unit that a Class IV investigation will not lead to the production of significant cause factors and valuable PMs, the investigative officer will ascertain the facts in FSIMS so it can be recorded for future analysis and tracking purposes. Cause factor and PM recommendations to the WFSO will be as follows:

a. Cause factor: Nil (FTPO); and

b. PM: Nil (FTPO).

INVESTIGATION FILE INITIATION/RETENTION/DESTRUCTION

33. As required by the *Aeronautics Act*, the AIA is required to initiate investigation files that must be retained for specific periods as detailed in the *MAIRs*. All Investigation documentation, evidence and files, in both paper and electronic formats, to include all the information relevant to any representation made under subsection 18(2) of the Act, shall be retained by the originating unit or the respective unit, wing or FS investigation team until the investigation is formally closed. The files that are completed by a person authorized to complete investigations on behalf of the AIA shall be retained or a period of 5 years and disposed of IAW DND/ADM (IM) policy detailed in the Defence Subject Classification and Disposition System (DSCDS). For investigations completed by the AIA, the retention period is not less than 20 years from the date of the occurrence.

Annex A
Chapter 5
A-GA-135-003/AG-001

ANNEX A – SAMPLE FSIR TASKING ORDER

On 8 Sep 13, an Air Cadet glider operating out of Langley, BC, landed on the flat roof of a convenience store, 1/2 mile west of the airport. The aircraft wings and fuselage were damaged and the pilot incurred minor injuries.

Le 8 Sep 13, un planeur des cadets de l'air opérant à partir de Langley, BC, a atterri sur le toit plat d'un dépanneur, 1/2 mile à l'ouest de l'aéroport. Les ailes de l'avion et du fuselage ont été endommagés et le pilote a été blessé.

Refs: A. Telecon Capt White LMFV Wing FSO/ Maj Regnier DFS 2-7, 8 Sep 13
B. FSOMS 157879
C. A-GA-135-001/AA-001
D. A-GA-135-003/AA-001

Subject: Flight Safety Investigation (FSI) Tasking Order – C-GCLB

1. A Class I Fight Safety Investigation (FSI) shall convene at Langly, BC, no later than 9 Sep 13, or as directed by the Investigator-in-Charge, to investigate the circumstances involving glider C-GCLB on 8 Sep 13, refs A and B.

2. The investigation team is as follows:

A. Investigator-in-Charge (IIC): Maj K Smith, 19 Wg WFSO, 250-339-8211 x8227, CSN 252-8227; and
B. Investigator: Capt J White, LMFV Wing FSO, 604-306-9937.

3. The investigation team is to coordinate their own travel arrangements to Langley, BC, keeping the IIC informed.

4. The purpose of the FSI is to determine all factors that contributed to the occurrence, determine the final cause(s) and recommend safety preventive measures. With the exception of specified documentary evidence, no evidence gathered during the conduct of an FSI may be used for any purpose other than Flight Safety. The confidentiality of this evidence is expressed in Refs C and D, the *Aeronautics Act* and the *CTAISB Act*. The FSI shall remain convened until released by DFS.

5. The AIA delegates retained authority (RA) 5e to the IIC for this investigation. The AIM, Chapter 10, Annex C, Note 4 applies to this delegation. The FSI proceedings shall be reported using the format for a Flight Safety Investigation Report, per ref D. The report will be classified with the appropriate security level.

6. The IIC will issue regular sitreps on the investigation to the AIA for onward transmission as determined by the AIA.

7. If during the conduct of the investigation it is learned that a claim by or against the Crown is likely, the IIC shall immediately inform the CO RCSU (Pac).

8. If during the conduct of the investigation the IIC becomes aware of circumstances that suggest a collateral investigation is required, he is to immediately advise the AIA before informing the CO RCSU (Pac). The IIC shall not give evidence as to what circumstances brought about this determination, per ref D.

9. Media requests are to be coordinated through RCSU(Pac) PA.

10. Travel expenses to be charged to CC 34927A, FC 3373AC, Fund L101, GL 2106, IO TBD. Forward copies of all finalized claims to the DFS SO Coord, Therese Landry, ASAP.

End of English text/debut du texte français.

réfs: A. Téléconférence Capt White, OSV LMFV Ere / Maj Regnier, DSV 2-7, 8 sep 13
B. FSOMS 157879
C. A-GA-135-001/AA-001
D. A-GA-135-003/AA-001

Objet: Ordre de mission pour l'enquête de la sécurité des vols – Planeur C-GCLB

1. Une enquête de sécurité des vol (ESV) de classe I sera convoquée à la Langley, BC, au plus tard le 9 sep 13, ou comme dirigé par l'enquêteur désigné, pour examiner les circonstances de l'accident impliquant le planeur C-GCLB qui a eu lieu le 8 sep 13, réfs A et B.

2. L'équipe de l'ESV sera composée des personnes suivantes:

A. L'enquêteur désigné (ED) de la DSV: Maj K Smith, OSV 19e Ere, 250-339-8211 x8227; et
B. Enquêteur: Capt J White, OSV LMFV Ere, 604-306-9937.

3. L'équipe de l'ESV doivent coordoner leur propre transport à Langley, BC, en gardant l'ED informé.

4. Le but de l'enquête est de déterminer toutes les circonstances entourant l'événement, d'assigner les causes et de recommander des mesures préventives relatives à la sécurité. À l'exception de preuves documentaires spécifiques, aucune information recueillie durant la conduite de cette ESV ne peut être utilisée pour un but autre que la sécurité des vols. La confidentialité de l'information amassée est stipulée dans les réfs C et D, la loi sur l'aéronautique et la loi du bureau canadien d'enquête sur les accidents de transport et de la Sécurité dans les transports. L'ESV restera sur place jusqu'à nouvel ordre du DSV.

5. Les délégués du DEN ont conservé l'autorité (RA) 5e auprès de l'IIC pour cette enquête. La note 4 du MEA, chapitre 10, annexe C, s'applique à la présente délégation. Les conclusions de l'ESV seront rédigées selon le modèle d'un rapport d'enquête des sécurité des vols, réf D. Le rapport sera classé selon le niveau de sécurité approprié.

6. L'ED fournira des SITREP au DEN régulièrement pour distribution, au besoin, à la chaine de commandement.

7. Si, pendant la conduite de l'enquête, on s'aperçoit que l'accident peut donner lieu à une réclamation par ou contre la couronne, l'ED doit en aviser immédiatement le commandant du RCSU (Pac).

8. Si, dans le cadre de son enquête de SV, le ED est mis au courant de faits exigeant une enquête parallèle, il doit informer immédiatement le DEN. Suite a cette discusion, le ED doit informer le commandant l'URSC (Pac). L'OSV se limitera à suggérer la conduite d'une enquête parallèle et ne doit pas fournir les motifs qui l'ont amené à cette conclusion, réf D.

9. Les demandes médiatiques seront coordonnées par le QGDN/D AP Air à Ottawa.

10. Les dépenses de voyage doivent être portées au compte CC 34927A, FC 3373AC, Fund L101, GL 2106, IO TBD. Faire parvenir les copies finales de toutes réclamations au QGDN/DSV OEM COORD, Mme Thérese Landry, DQP.

S. Charpentier
Colonel
AIA

INTENTIONALLY LEFT BLANK

Annex B
Chapter 5
A-GA-135-003/AG-001

ANNEX B – INITIAL REPORT CONTENT

1. The following information should be reported in the event of a FS occurrence and will form the content of the Initial Report (including CF 215) and be entered into FSIMS within 12 hours of the occurrence.

GENERAL

- Date/Time of occurrence
- Type of occurrence
  - → Accident / Incident
  - → Air / Ground
  - → Bird strike
  - → Air Weapons System

SAFETY OF FLIGHT COMPROMISE LEVEL

- Level to which safety margins were compromised
  - → Extreme
  - → High
  - → Medium
  - → Low

PERSONNEL CASUALTY LEVEL

- Most serious injury assessed IAW B-MD-007-000/AF-003
  - → Nil
  - → Minor injury or illness (Green)
  - → Serious injury or illness (Yellow)
  - → Very serious injury or illness (Red)
  - → Fatality (Black)
  - → Missing (Grey)
- For each injury
  - → MOS ID
  - → Role (Aircrew, Maintenance, Other)
  - → Position on aircraft if on board
  - → Injury Severity

NOTE
The FS report shall only provide PCL information. No medical information or details shall be communicated or entered in FSIMS.

AIRCRAFT

- Aircraft Damage Level (ADL)
  - → Missing or Destroyed
  - → Very serious damage
  - → Serious damage
  - → Minor damage
  - → Potential for incident or accident
- Aircraft Type and Registration
  - → Unit of operation
  - → Unit of ownership
- Stage of operations (e.g. parked, in-flight with description, maintenance)
- Mission type (short description)
- Flight attributes (if applicable)
- Barrier Engagement (IAS, Wind, Weather, and Temp)

LOCATION

- Location of occurrence (describe)
- Navaid location (applicable for bird strikes)

DESCRIPTION

- Detailed description of occurrence
  - → Statement of fact (Who, What, Where and When)
  - → De-identified information

CONDITIONS

- Weather
- Cloud
- Visibility
- Light condition
- Wind Speed / Direction

BIRD STRIKE

The following information should be reported in the event of a bird strike and will supplement the content of the Initial Report and be entered into FSIMS within 12 hours of the occurrence.

- Category
  - → Impact / Near miss / Sighting
- Remains submitted
  - → Yes / No
- Within 5 NM of airport
  - → Yes / No
- Flight disruption
  - → Continued flight
  - → Returned to airport
  - → Landed Nearest airport
  - → Aborted take-off
- NOTAM warning
  - → Was alerted
  - → Didn't check
  - → None issued
  - → Not available
- Lights on
  - → External
  - → Wing
  - → Navigation
  - → Strobe
  - → Red rotating beacon
  - → White rotation beacon
  - → Landing
- Part struck
  - → Canopy
  - → Radome
  - → Engine #1 / #2 / #3 / #4
  - → Nose
  - → Tail unit
  - → Wing
  - → Fuselage
  - → Flap
  - → Rotors
  - → Landing gear
  - → Stores / Tanks
  - → Other

- Type of damage
  - → Aircraft skin ruptured
  - → Air inlets / Scoops blocked
  - → Impaired function of flight controls, flaps, spoilers, slats
  - → Metal deposited in oil filters or other internal engine damage
  - → Windshield or other glazing damaged
  - → Fans / Compressor blades, Inlet guide vanes
- Bird description
  - → Species / Quantity
- Bird size
  - → Small (Starling) / Medium (Gull) / Large (Duck)

Annex C
Chapter 5
A-GA-135-003/AG-001

ANNEX C – SUPPLEMENTARY REPORT (SR) REQUIREMENTS

1. The following information should be reported as part of the Supplementary Report (SR) and will form the content of the information entered into FSIMS. Not all the information categories below are required on all occurrence investigations. FSOs should provide information in the categories below only if that information is considered as contributing to the occurrence.

AIRCRAFT

- Flight attributes
- Altitude
- Air speed
- Dive angle
- G status
- Heading

MAINTENANCE INFORMATION

- Aircraft maintenance
- Time since new
  - → Time since overhaul
  - → Time since inspection
  - → Inspection type
  - → CF349 #
  - → CF543 #

AIRCRAFT COMPONENT INFORMATION

- Aircraft component or munitions for each component
- Nomenclature
  - → WUC
  - → Serial #
  - → Time since new (TSN)
  - → Time since overhaul (TSO)
  - → Time since installation/inspection
  - → Part number
- CFTO reference
- Munition lot and batch #
- Disposition

ARRESTING SYSTEM

- Arresting system – if arresting system was engaged or attempted? the report shall include:
  - → Aircraft speed and weight at arresting system
  - → Position and angle of engagement from runway centreline
  - → Use of brakes at engagement
  - → Chute used (visiting aircraft)
  - → Distance
  - → Successful or unsuccessful – explain
  - → Reason for engagement
  - → Damage to arresting system – brief description
  - → Elapsed time until arresting system available for reuse
  - → Aircraft damage caused by engagement – brief description

FLIGHT CONDITIONS

- Weather Conditions
  - → Flight conditions (i.e. IFR/VFR)
  - → Ceiling (ft)
  - → Temperature (Celsius)
  - → Visibility (Nautical Miles)
  - → Light Conditions (i.e. Twilight – dusk/dawn)
  - → Wind Speed
  - → Wind Direction
- Alighting Conditions:
  - → Type of Alighting Area (unprepared)
  - → Alighting Surface Conditions (ice-covered)

PERSONNEL

- For all personnel identified
  - → Time on duty: Last 48 Hours
  - → Time on duty: Last 24 Hours
- For Aircrew only – Flying Hours
  - → Grand total
  - → Total on type
  - → Past 30 days (all types)
  - → Last 48 hours (all types)
  - → Aircrew role (Aircraft comd, Co-pilot)
- Investigation Narrative
- Detailed explanation of how and why
- Cause Factors/HFACS
- PM

Annex D
Chapter 5
A-GA-135-003/AG-001

ANNEX D – PREPARATION OF AN INVESTIGATION REPORT

1. The intention of this annex is to provide FSOs with guidance on the drafting of an SR, and in particular, the investigation narrative.

DETAILS OF NARRATIVE

2. The investigation narrative portion of an SR entry is an important section of the overall report. The narrative section should describe, in sufficient detail appropriate to the occurrence circumstances, what happened (factual data based on the evidence collected) and why it happened. The information contained in the narrative should clearly support the assigned cause factors and PMs and allow the reader to understand how and why conclusions were reached. The length and amount of detail included in the SR investigation narrative will depend on the occurrence circumstances and generally be related to the complexity of the occurrence itself and the value output of the report.

EVIDENCE GATHERING

3. The “Whys” cannot be addressed until the “Whats” are known. Before you begin, determine if the evidence is complete enough and good enough to do a thorough and logical analysis of the occurrence. If not, continue to gather additional evidence related to the occurrence. If, for whatever reason, no further evidence is available, explain in the narrative why the relevant factual data was not available in the narrative.

FACTUAL DATA PARAGRAPH(S)

4. The initial paragraph, or several paragraphs, as required, should describe the factual data relevant to the occurrence. One possible approach to organizing the factual data portion of the narrative is to in turn describe the operation, the persons (Human Factors data), the machine, and the environment. The factual narrative should describe what happened, when it happened and where it happened in a logical order. Deviations from accepted norms should be clearly identified in the narrative. Do not include non pertinent information if the information provided has no influence on the cause of the occurrence (eg, detailed weather information if weather was not a factor). Performance data calculations, technical investigation results from other studies (eg QETE) are all considered to be factual data. Of note, no analysis or opinions should be part of this section.

ANALYSIS PARAGRAPH(S)

5. Analysis is the bridge between the factual information and the cause factors. The analysis paragraph(s) should explain how and why it happened. In other words: what story is told by the evidence that you presented in the factual portion of the narrative? Do not introduce new information in the analysis paragraphs. The analysis should be based on critical thinking processes and application of the rules of logic. The most commonly used logical

approach is inductive reasoning, which means making inferences based on the evidence (facts) and using specific information to come to a general conclusion. There is no set order to the analysis text but the investigator should arrange the analysis section to provide a clear explanation of why the occurrence happened.

BIASES

6. There are some common biases to be aware of and avoid while doing your analysis of the evidence:

a. Availability Bias: the investigator depends primarily upon information that is readily available to them and does not actively seek out other evidence.

b. Confirmation Bias: the investigator has a natural tendency to confirm rather than to deny a current hypothesis or use only the evidence that supports the opinion of the investigator.

c. Hind Sight Bias: the investigator see events that have already occurred as being more predictable than they were before they took place. One method to mitigate this bias for human factors related investigations is to ask these three questions for those involved in the occurrence:

(1) What did they understand the situation to be?

(2) What was their plan or intent? and

(3) How were they going to accomplish their plan?

NARRATIVE REVIEW

7. When the narrative is complete, the investigator shall do a thorough review to critically check if the conclusions (cause factors) are supported by the evidence. If the factual data is complete and the analysis thorough and logical, accurate cause factors can more easily be identified.

CAUSE FACTORS SECTION

8. No analysis and no new information shall be introduced in this section of the report. The cause factor(s) should be self evident from the factual information and the analysis that was written previously. While there has to be a correlation between the unsafe act(s) and what caused the unsafe act(s), there is no requirement to assign a cause factor for each unsafe act. Notwithstanding, the combination of the cause factor(s) assigned should cover the unsafe act(s) carried out.

PMs SECTION

9. As with the Cause Factors section of the report, no new information shall be introduced in the in the PMs section of the report. The reason for recommending the PMs should be self evident based on the investigation narrative. While there has to be a correlation between the cause factor(s) and the PMs assigned there is no requirement to assign a PM for each cause factor assigned. Notwithstanding, the combination of the PMs assigned should minimize the risk of a repeat of the contributing cause factors.

CHAPTER 6 – POST OCCURRENCE ACTIVITIES

References: A. 1016-18 (DFS) 7 May 2007 - CVR/FDR Policy
B. 1 CAD Orders, Vol 3, 3-304: Flight data recorder/Cockpit Voice Recorder/Crash Position Indicator/Other Cockpit Flight Recording Devices
C. *Aeronautics Act*
D. C-05-005-P09/AM-001 Maintenance Policy - Aircraft Weapons Systems Maintenance - Maintenance Program Implementation - Support Activities
E. C-05-005-P04/AM-001 Maintenance Policy - Aircraft Weapons Systems Maintenance – Aircraft Maintenance Record Set
F. C-05-010-003/AM-000 Oxygen Occurrence Investigation Techniques

PURPOSE

1. The objective of the FSP is to prevent the accidental loss of aviation resources. Unfortunately, despite the best efforts of all concerned, accidents can still occur. Accordingly, wings and units must prepare sound plans for this eventuality to ensure that loss of life and injury to personnel is minimized, damage to property is minimized and evidence is collected and protected to facilitate a thorough investigation. In addition, aircraft accidents understandably attract a lot of attention. Therefore, plans must include provisions for the timely release of accurate information to the chain of command, next of kin and the media.

INVESTIGATION PLANNING RESPONSIBILITIES

2. In preparing to respond to a FS occurrence, the AIA will:

   a. maintain a suitable cadre of trained, authorized and accredited aircraft accident investigators;

   b. authorize the 1 CAD FSO to train and accredit airworthiness investigators;

   c. maintain an adequate inventory of field investigation equipment including recording devices (audio and video), personnel protective equipment (PPE), communication devices, portable IM/IT and field navigation equipment;

   d. maintain a permanently monitored occurrence notification system (1-888-927-6337/WARN-DFS);

   e. maintain arrangements for specialist investigation support from organizations such as AETE, QETE, CFEME and National Research Council (NRC)

   f. maintain arrangements for coordinated investigations with other agencies within Canada (TSB) and with other nations (where feasible);

   g. develop a process that can initiate investigations quickly and deploy investigation teams within 24 hrs domestically and 48 hrs internationally; and

   h. develop a process that can be used to prepare, revise and finalize FSIs.

3. 1 CAD FSO shall in relation to FS matters look after the following:

   a. ensure that units and suitable personnel receive adequate training and accredit trained investigators as authorized by the AIA;

b. provide guidance in the preparation of accident response plans and review the plans and checklists as part of FS surveys;

c. follow up on PM flowing from SRs; and

d. conduct trend analyses to provide FS advice to Comd 1 CAD.

ACCIDENT / SERIOUS OCCURRENCE RESPONSE PROCEDURES

Notification

4. Immediately following an accident or serious occurrence, call DFS at 1-888-WARN DFS (927-6337) and the chain of command as appropriate. An initial report (IR) must follow. See Annex A for Accident and Serious Notification Procedures. DFS shall be contacted as soon as possible for any accident (Occurrence category 'A' to 'C') and for any occurrence having a Flight Safety Compromise Level (FSCL) and/or Aggravating Factors of "High" or "Extreme".

Response Requirements

5. Time is very important in post-occurrence activities to ensure the protection of evidence before it is altered or lost, or to potentially identify and implement immediate PMs before there is another occurrence. Planning is required to ensure that after an accident or serious occurrence, that all FS formations/units are prepared to respond, and that the response also allows for an effective and expeditious investigation to be carried out. The Comd/CO, through their respective FSOs, must ensure the wing/formation/unit is prepared to respond to any occurrence, regardless of location. A response plan must be developed which includes provisions for:

a. saving lives and preventing injury or further damage;

b. protecting the response team from hazards at accident sites; and

c. thorough investigation of every occurrence.

6. The elements of an efficient occurrence response are:

a. immediate, accurate and thorough reporting;

b. thorough independent airworthiness investigation leading to the discovery of cause factors and findings that identify PM;

c. implementation and recording of PM and feedback of information; and

d. periodically revisiting PM at a later date to ensure that they were properly implemented and have been effective.

7. Operation orders for DND/CAF activities involving air assets or support for air assets like exercises, operations, deployments or air shows shall include contingencies for FS occurrences. The Comd/CO should use this opportunity to assess the hazards of the operation and risks involved, and draw attention to specific areas where there might be particular concern. These should be highlighted in a statement on the overall importance of FS in the conduct of operations.

Emergency Response Plan (ERP) and Review

8. Each FS wing/formation/unit shall develop an ERP and validate it to ensure that critical actions are not overlooked. This plan should be reviewed and exercised periodically. It shall be held by:

a. the chain of command and the FSO;

b. the Duty Officer;

c. the Air Traffic Control Services;

d. the Operations Section;

e. the Senior Military Medical Authority; and

f. local services, including police, fire halls, hospitals, ambulance services and public affairs, as applicable.

ERP Components

9. The Aircraft Accident Checklist at Annex B lists the actions anticipated from the various organizations concerned in case of a serious accident and should be consulted when developing individual wing/formation/unit accident response plans. The wing/formation/unit accident response plan should include the following elements:

a. individuals to be advised of the accident, in order of precedence.

b. provisions for the immediate involvement of aero-medical personnel;

c. training of firefighting personnel in aircraft rescue techniques;

d. availability of rescue personnel whenever flying is in progress, including personnel to disarm, remove or safety explosive devices and pressurized systems;

e. provision of technical and operational advice to the pilot in an emergency;

f. a checklist to be used during emergencies by personnel in key positions like CO, DCO, SAMEO, tower, operations, OSCAR and FSO;

g. procedures for recovery or diversion of aircraft;

h. briefings to the local authorities on how to report an occurrence and what to do at the scene until CAF authorities arrive, like liaising with coroner or police;

i. alert the agencies that must respond to an off-site occurrence;

j. communications for all rescue vehicles and agencies, e.g. Padre, Environmental Officer and PAO;

k. the accident-rescue grid map of the airfield and surrounding area. Copies should be kept in the control tower, dispatch centres, OSCAR vehicle, ambulances, fire trucks, maintenance, and other vehicles that must respond to an accident or emergency;

l. preparations for evacuation and medical treatment of casualties. Make arrangements with local hospitals, fire halls and police for assistance, including briefings on rescue procedures and toxicology requirements for personnel involved in the

accident. Copies shall be kept in the tower, ambulances and accident response vehicles;

m. the search-and-rescue (SAR) plan (water, land or air parties), arrangements for a search centre and for SAR support;

n. considerations for runway clearance and diversion procedures to allow, if possible, the recording of evidence before wreckage is moved;

o. procedures for runway clearance, including instructions for the selection, maintenance and use of heavy equipment, cranes, jacks, portable floodlights, spare wheels and slings;

p. media response guidelines;

q. measures for the security of the aircraft;

> NOTE
> Whenever sabotage is apparent or suspected,
> Security Orders for the CAF apply.

r. periodic review of instructions, including:

(1) the testing or practice of crash alarm systems,

(2) the accident rescue response procedures, and

(3) the use of training films and other aids;

s. preparations for safeguarding evidence. Plans should include the following:

(1) making video recordings of emergency landings,

(2) guarding and protecting accident sites to protect evidence and any contaminated areas associated with the accident site. An accident security team shall be established with a designated OIC, who shall be responsible for:

(a) if crash site is outside a defence establishment, coordinating with local police authority to identify CAF security needs and ask for their support;

> NOTE
> The AIA has delegated the power to limit or prohibit access to an occurrence site under the Aeronautics Act, Section 14(7) to (9) to all FS personnel responding to a FS occurrence (also see Chapter 10, paras 14&15 and Chapter 10, Annex A, Note 4)

(b) seeking and issuing proper rules of engagement for military personnel;

(c) issuing, maintaining and using equipment to support guard operations;

(d) developing a shift system;

(e) making provisions for transport, money, rations and accommodation;

(f) ensuring that communications equipment is functional; and

(g) ensuring that provisions are made to set up a single controlled accident site entry/exit point at which appropriate protective instructions and kit will be issued, and

(3) selecting and briefing alternate security OIC and crew;

t. establishing chain of command for site control, within or outside the defence establishment site, prior to and following the arrival of the FS investigation team;

u. selecting, maintaining and using equipment for the protection and collection of evidence;

v. using the services of the Recovery and Salvage Support (RASS) of ATESS for heavy equipment and diving or dragging equipment to recover wreckage, using both civilian and DND/CAF resources (see C-05-010-002/AG-000 – Aircraft Salvage Procedures); and

w. preparing for the commencement of the investigation by ensuring as a minimum that:

(1) potential witnesses (including relevant maintenance personnel as applicable) are identified;

(2) personnel involved and witnesses are isolated and requested to provide a written statement as soon as possible after the accident;

(3) appropriate medical exams are conducted;

NOTE
A Report of Emergency Escape from Aircraft and/or Report of Emergency Landing on Water (see Chapter 4) may also be required.

(4) photographic and/or video imagery is taken of the accident site;

NOTE
Annex C details accident photographic requirements. Custody of photographs must be carefully controlled to ensure maintenance of the chain of custody of the evidence.

(5) personnel are instructed to take and ship samples;

(6) relevant measurements are taken;

(7) accident site diagrams are prepared;

(8) appropriate items are quarantined and impounded;

(9) weather observations at the time of the occurrence are taken; and

(10) any additional perishable evidence is identified and recorded/preserved.

FSO Responsibility

10. While the initial response to an accident is a CoC responsibility, the FSO plays a crucial role, on behalf of the AIA, to monitor the accident response and to ensure the preservation of evidence for the investigation, subject only to the over-riding priorities of preservation of life and prevention of further injury or damage. Annex D provides a checklist of specific actions to be carried out by the FSO, within the context of the overall wing/formation/unit ERP.

COMMUNICATIONS

Notification to Foreign Nations

11. When occurrences involve non-CAF aircraft and/or locations and facilities, DFS shall notify the Nations involved as required by NATO STANAG 3531, Letters of Agreement and other standing arrangements, so that the actual owners of the aircraft may discharge or take possession of their property and indicate what type of support they require from DFS.

Requests Beyond Wing Supporting Capability

12. Normally, the nearest wing will be designated as the supporting wing. Requests for assistance that are beyond the capabilities of a wing or a supporting wing shall be directed to 1 CAD/CANR Headquarters.

Notification to Coroner

13. In the case of fatalities, the provisions of the appropriate provincial coroner statute shall be respected. The coroner is responsible for establishing the cause of death and is the final authority for the removal of human remains.

Release of Information (Post Occurrence)

14. The release of information to the public is the responsibility of the Public Affairs Officer (PAO). Following an FS occurrence, the FSO or IIC shall maintain contact with the PAO to ensure timely and accurate news releases. Public and media interest must be anticipated and the FSO should be prepared to assist the PAO. When pressed for information, the FSO and IIC should be guided by DAOD 2008 and AIA delegated authorizations regarding release of information outlined in Chapter 10. If the occurrence is a significant event in that it involves either prominent persons or circumstances likely to create public interest, there will be a requirement to generate a Significant Incident Report.

> NOTE
> For guidance on Release of Information with respect to Types of Information, Privilege of certain information, Report release protocols, release of photos, imagery or video, classification of audience types and the AIA release authority matrix associated with information release – See Chapter 10

15. The FSO and the IIC may be asked to answer questions concerning an occurrence and its investigation. At no time shall they admit Crown responsibility for any damage, no

matter how obvious this liability may seem in the circumstances. They should reinforce that the mandate of the FSP is to investigate occurrences in order to prevent future occurrences through the implementation of preventive measures and that Flight Safety investigations do not assign blame and cannot be used for any other purpose than enhancing aviation safety.

16. The investigation team members should be responsive to media or public requests for general or background information, and should always treat reporters politely. The PAO shall be notified of any intent by or request to a team member to conduct an interview related to the investigation.

17. Under no circumstances will the individuals involved in an FS occurrence be interviewed by the media until they are cleared to do so by the IIC.

Briefing to Next of Kin (NoK)

18. The unit is responsible for keeping family members informed of the progress of an investigation. In the case where the accident involved casualties, the norm would be for DFS to provide the next of kin with an initial briefing describing the investigation process and provide them with a copy of the FTI prior to its public release on the DFS website. The intent of conducting the initial briefings is to provide the NoK with an explanation of the investigation process and provide them with a copy of the FTI so they can get ready to address the press prior to DFS public release. DFS will also give family members a detailed briefing on the findings, causes and recommendations contained in the final FSIR prior to its public release. Close coordination with Wing and Unit commanders and their advisors is essential to meeting the aim of the briefings while minimizing stress on the NoK and survivors. Details on the procedures, intent, timing and briefing content for NoK is contained in Chapter 12.

Information not to Be Released

19. To prevent impeding the investigation and to avoid premature or incorrect conclusions, the following shall not be released:

a. the specific location of an off-site occurrence if rescue procedures would be impeded by sightseers;

b. names of personnel killed, missing or injured until after their next of kin have been informed;

c. detailed descriptions of injuries or fatalities;

d. classified information and/or equipment, including weapons loading;

e. privileged information, such as witness statements, related evidence and all flight recorder information;

f. statements that tend to indicate responsibility of the Crown or any person;

g. statements that imply failure of equipment or facilities;

h. premature speculation that could jeopardize the conduct of the investigation;

i. statements on causes to civilians, including news media representatives;

j. accident statistics, rates, trends, costs of accidents and similar information without DFS authority;

k. when civilian or allied military aircraft or installations are involved, anything that has not been approved by their local representatives; and

l. information related to contracted organizations.

Release of Information to Contractors

20. Releasing information to commercial firms under DND contract is subject to QR&O 19.36, in that only general information may be released immediately to contractors, field service representatives or technical representatives. In addition, they may be given other information only as authorized within security limitations to fulfil their contracts. There will be occasions when field service or technical representatives will be enlisted as specialist advisors to investigations. In that case they will be allocated observer status while supporting the investigation. Procedures regarding this situation are contained in Chapters 8 through 10.

Release of Information to Other Nations

21. NATO STANAGs provide guidance for the dissemination of FS information. STANAG 3101 provides for exchange of information concerning aircraft or missiles in common use. Information concerning FS matters arising from the operation of a nation's air services within or over another NATO nation's territory is exchanged under the terms of STANAG 3102. Release of information to other Nations is based on the same principles. Additional details regarding conduct of other Coordinated Investigations is contained Chapter 14.

ACCIDENT SITE PROCEDURES

Health Protection

22. DND/CAF has a legal obligation to ensure the safety of all personnel involved in the support of an accident investigation, including any agency or civilian contractor involved in work at the accident site or the salvage operation. Crash Scene Hazard (CraSH) Management, as detailed in Chapter 7, must be included in all accident site procedures to ensure the safety of all personnel working at or near the accident site. ERPs must ensure that any information regarding accident site hazards is passed to any supporting agencies.

23. The particulars of all personnel involved in post-crash activities will be recorded prior to entering the cordon placed around the accident site or at the quarantine facility. The nature and duration of each exposure to the accident site/quarantine and the PPE worn during that exposure will also be recorded. This information will be placed on individual personnel files and medical records.

Accident Investigation Kit

24. Kits must be available at all wings and units operating in isolation. The FSO Accident Investigation Kit is referred to in the tool control system as TLD 1246. Units looking to resupply their kits can get the necessary information from CFTCCS ATESS in Trenton. The FSO is responsible for the provision and safekeeping of these kits. Because of the value and

attractiveness of many of the items, a member of the investigation team is required to be responsible for the kit when it is in use. Annex E lists the recommended items to be contained in the FSO accident investigation kit. There are three types of items:

a. Hand-portable Items. These are likely to be required at every accident site;

b. Contingency Items. These are heavy or bulky items that may be needed on site; and

c. Facilities. These may be needed on returning from the accident site to complete the investigation.

Site Security

25. Security is normally required at every accident site and local police are usually the best option unless the site is very isolated or only accessible to DND/CAF personnel. Of note, the *Aeronautics Act* permits the AIA or AIA designated personnel to cordon the site associated with occurrences (see Chapter 10 for details and the AIA authorization delegation matrixes for this item). On defence establishments site security will normally be the responsibility of the MPs. If the site is outside DND/CAF military facilities or what is considered a defence establishment, the local police have jurisdiction and their cooperation should be forthcoming. The aircraft commander, the CO or the senior capable survivor may obtain local police or other civilian personnel to perform the initial security.

26. Investigators are not to be tasked with the administration of the security party; thus a separate individual shall be tasked, briefed and equipped to handle the responsibility for the security of the site.

27. With the exception of established field service representatives (FSR) under contract to DND, company or contractor representatives are not to be permitted access to an accident site or wreckage components unless authorized by the AIA, typically under the authority of the IIC. Access to the accident site and the extent of investigative participation is left to the discretion of the AIA. Representatives of the news media should be asked to stay clear to protect the evidence on the crash site and for their own safety. The cordon can be enforced through provisions in the *Aeronautics Act* and any violation can lead to criminal charges under that Act. Media should be informed that a PAO will provide all details which may be released to the public. Cooperation of news photographers should be requested, but providing they do not encroach on the established cordon, they may gather imagery. Similar procedures are to be followed with owners of the property involved.

28. An additional consideration with respect to erecting a cordon is the security classification of the components, which may alone dictate the requirement for a cordon. COMSEC authorities should be consulted when COMSEC material is present.

29. For accidents or forced landings outside Canada, security will likely be provided by the country of occurrence, particularly if that country is a signatory of NATO STANAG 3531. Whenever CAF security is not provided, DFS shall be informed.

Security Duties

30. Security personnel must be briefed to ensure that no evidence is disturbed or obliterated, unless it is absolutely necessary in order to save lives or to prevent injury or further

damage. Moreover, personnel shall have been briefed on accident site hazards and made aware of the PPE required when working on site. If possible, items should be moved only short distances, in straight lines parallel to other parts being moved to preserve the layout of the scene. Photographs and video should be taken before evidence is disturbed and notes made of any explosive charges made safe and pressure systems deflated.

> WARNING
> Actions related to explosives or pressure systems, including making these systems safe, shall only be carried out by trained, qualified personnel and only if absolutely necessary.

31. The security OIC shall ensure that:

    a. doctors, coroners, first aid personnel, firefighters, rescue teams, aircraft disarming and wreckage recovery personnel, and authorized investigators and photographers are allowed access and are not impeded in the performance of their duties;

    b. civil and military property is adequately protected;

    c. unauthorized persons are not permitted to enter the area; and

    d. following release by the AIA, accident aircraft components appearing on the list of classified equipment are accorded appropriate security. Classified equipment may be removed from the site, on approval of the AIA's assigned investigator-in-charge (IIC) to ensure security control during the investigation. Ultimate disposal of classified equipment remains the responsibility of the NDHQ Item Manager, or DCOMSEC for COMSEC material.

Security in Foreign Nations

32. Outside Canada, the local authorities or locally provided security have jurisdiction for physical security. CAF requirements should be made known and CAF methods should be tactfully suggested. For details concerning the security of evidence within NATO countries, refer to AFSP 1.3 / STANAG 3531, available on the DFS intranet site under the "Manuals" tab. Additional considerations can be found in Chapter 14.

CVR AND FDR PARAMETER REQUIREMENTS

33. The Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) Parameter policy (ref A) established the airworthiness requirements for CAF operated aircraft to be equipped with on-board recording devices that are to be used for accident prevention and accident investigation. The policy originally signed off by Comd RCAF is set to transition to a CFTO being developed by TAA staff titled Aircraft Equipment Requirements (AER).

34. Ref B should be consulted to consider handling, requirements and lists the equipment installed on current aircraft in DND/CAF.

DEFINITIONS

Aircraft Recording Device (ARD)

35. An ARD is any device, installed on an aircraft or not, that records and stores data in any shape or form, and that relates to the operation of an aircraft regardless of wether it is manned or unmanned. An ARD falls into one of three categories depending on the type of data being recorded. The three categories are:

a. data recorder;

b. image/voice recorder; and

c. on-board recorder (OBR).

36. Annex F provides some examples of the different categories, as well as their status following a flight safety occurrence and who has the authority to release the data. Note that these examples may not be all inclusive and the following definitions are provided to guide the categorization of various recorders. When in doubt as to the exact categorie of a specific recorder the case should be refered to the appropriate DFS Desk Officer.

Data Recorder

37. Data recorders capture information that is essentially numerical raw data and purely factual in nature. Flight Data Recorder (FDR), UAS telemetry data recorder and maintenance recorders (e.g. HUMS, ACMI) are good examples.

Image/Voice Recorder

38. Image/Voice recorders comprise of any device that records image and/or voice, weither it be located on-board the aircraft or not, but that does not meet the definition of an OBR as per the *Aeronautics Act, Section 22*.

On-board Recorder (OBR)

39. An OBR is defined in the *Aeronautics Act, Section* 22. It states “In this section and in section 23, “on-board recording” means the whole or any part of either a recording of voice communications originating from an aircraft, or received on or in the flight deck of an aircraft, or a video recording of the activities of the operating personnel of an aircraft, that is made, using recording equipment that is intended not to be controlled by the operating personnel, on the flight deck of the aircraft, and includes a transcript or substantial summary of such a recording”.

40. The difference between an OBR and a image/voice recorder resides primarily in the determination weither or not the recording is made using “equipment that is intended not to be controlled by the operating personnel, on the flight deck of the aircraft”.

41. In the case of a UAS the operating personnel are located within the Ground Control Station (GCS) and as such the GCS is considered the flight deck of the Unmanned Aircraft.

NOTE

There is a mechanism for release of OBRs to section 45 of the *National Defence Act (NDA)* Board of Inquiry presidents and an appropriate test for such release. The appeal process to resolve disputes regarding OBR release is also included within the amendments and the use of such recordings for determining the capacity or competence of military personnel is specified. Also, the AIA is authorized to permit OBRs to be used for any activity that serves the interest of aviation safety, thus the AIA can permit the dual use of OBRs for training and debriefing on a daily basis and then for occurrence investigation when the circumstances so dictate.

HANDLING/DOWNLOADING OF ARD DATA

42. The following paras explain the categories of ARDs, their status in relation to a FS investigation, the statutory authority specifying how they shall be handled and the releasing authority for the different categories of ARDs. Annex F portrays these provisions in one simple chart.

Handling/Downloading of Data from Data Recorders

43. These recording devices may be downloaded for valid purposes such as those associated with fleet maintenance, operations, training or test purposes. The authority to download ARD data on a routine basis must rest within the associated 1 or 2 CAD Orders for the personnel conducting such activities. Notwithstanding, after a FS occurrence, these recording devices and data sets shall be quarantined as described below pending a decision on the requirement to retrieve the recorded data. This decision will be taken following consultation with Unit/Wing FS Personnel and the AIA if/as necessary. The quarantine will remain in effect until the data has been successfully downloaded and is proven usable for investigation purposes.

44. The release authority to lift the quarantine on these recording devices and data sets is the IIC for the investigation.

Handling/Downloading of Data from Image/Voice Recorders

45. Data from image/voice recorders is not privileged as these recorders do not meet the definition of an OBR as per the *Aeronautics Act, Section 22*. Same as the data recorders, the data from these devices may be downloaded for valid purposes such as those associated with fleet maintenance, operations, training or test purposes. And the authority to do so also rest within the associated 1 or 2 CAD Orders. The quarantine process is also the same.

46. The release authority to lift the quarantine on these recording devices and data sets is the IIC for the investigation.

Handling/Downloading of Data from an OBR

47. The *Aeronautics Act* states that the data from an OBR is privileged. The details associated for use and access to an ORB are contained within the statutes. Therefore, the authority to download data from an OBR must be obtained from the AIA, except for the

authorized actions associated with verifying the recorder serviceability and its' maintenance. Otherwise, download and use of these OBRs will only be granted for FS investigations or as approved by the AIA.

48. Privileged OBR data shall be protected whereby no person other than an authorized investigator or someone authorized by the AIA shall:

a. be given access to the data;

b. knowingly communicate or allow the data to be communicated; and

c. be required to produce OBR data or give evidence relating to it in any legal, disciplinary or other proceedings.

> NOTE
> If the capacity to download OBR data does not exist, then the complete unit must be sent to NRC for analysis.

49. FDR. Instructions for FDR periodic maintenance, data download, and calibration must be established for each fleet. Frequencies for these FDR maintenance activities are to be detailed in the maintenance schedule applicable for each fleet. Once every 12 months, the FDR data will be downloaded and sent to NRC Flight Recorder Playback Center for the purposes of validating the quality of the recording and the serviceability of the recorder. The frequency of the downloads may be increased, if so requested by the AIA, to verify the correct functioning of a recording system.

> NOTE
> FDR data that is removed/downloaded for maintenance-related activities do not need special documentation; however, the provisions stipulated in the paragraph above are to be upheld.

FS IMPOUND AND FS QUARANTINE PROCEDURES

50. In accordance with the *Aeronautics Act*, the AIA has the authority to seize items relating to a FS investigation. The mechanism by which this is done is by imposing a FS impound or a FS quarantine. This section details the procedures to be followed for FS impound/quarantine using the AIA authorities detailed in Chapter 10.

51. This section should also be read in conjunction with C-05-005-P09/AM-001, Part 3 (Technical Investigation Procedures) and Part 10 (Quarantine and Impounding of Aeronautical Products) which details specific maintenance program requirements for FS impound/quarantine, as well as C-05-004-P04/AM-001 which details specific requirements for recording of FS impound/quarantine in the maintenance record set.

Impounding Articles

52. Impounding articles refers to safeguarding material to prevent the loss or alteration of all records, documents, films, tapes, and forms that may be required for the investigation. Under unusual circumstances, some of this material may be required for continued operations, program completion or other assessments. Examples of such requirements are battle

damage assessment, weapons effect analysis, intelligence gathering and analysis or data assessment for on-going programs. This may require the viewing, copying or assessment of impounded items by personnel not involved with the Flight Safety Investigation activity. In these circumstances, the impounding FSO shall maintain evidence continuity and ensure that such activity is consistent with the higher-level requirements while honouring the privilege associated with such data, should it exist. For example, if the data includes voice or the movements of the crew, personnel viewing the data must be cautioned that particular data is privileged and can only be used for Flight Safety purposes and it should not be transmitted to other persons except for operational reasons. The person designated as the impounding officer shall submit a statement of impoundment to the investigative authority, using the format shown in Annex G. Any impounded items viewed for the above noted exceptions should be appropriately annotated. All impounded items shall bear a notation as per sample below.

Impounded:(*time, date, month, year*) on the authority of:

_____
(*full details of authority for impounding*)

_____
(Signature and Rank)
Impounding Authority

Items to Be Impounded

53. The following items shall be impounded following an accident and may be impounded following a serious incident:

a. the maintenance record set, current logbooks and computer records from ADAM or similar systems for the aircraft concerned and its components;

b. pertinent Aviation Fuel DND Sampler Reports (CF 907), Equipment Oil Sampling Register (CF 342) and Spectrometric Oil Analysis Reports;

c. ARD data;

NOTE
DFS will issue handling instructions for any recording devices removed from an aircraft involved in an occurrence.

d. the flight authorization form, flight plan, passenger manifest and load sheets for the flight in question;

e. data stored on the Mission Management Application (MMA) can be captured through the “impound” feature;

f. the crew's log books;

g. unit training and standards records;

h. tower log books and ATC communication and data recordings.

> NOTE
> In the case of civilian ATC facilities, contact DFS or DFS IIC, who will make the official impoundment request to Nav Canada.

> NOTE
> For an occurrence where elements of both a FS occurrence and an aviation infraction/violation are present, DICP and the AIA can, in order to conduct their respective investigations, request copies of the same ATC voice and data file recordings through their respective chains.

i. pertinent meteorological records, forecasts and special observations;

j. pertinent photographic records;

k. radar unit log books, radar scope tape and voice recordings relating to the occurrence;

> NOTE
> These records must be handled carefully, since they are irreplaceable

l. medical records and, in the case of fatalities, dental records and fingerprints from the National Defence Identification Service (NDIS) in NDHQ; and

m. any other documents, forms, tapes, films or computer records that are pertinent, e.g., maintenance, arrestor cable or AMSE records.

Quarantining

54. Quarantining is the withholding and safeguarding of physical evidence or hazardous items. Such items may include complete aircraft components, equipment, stores, and production lots or batches. Quarantining shall begin as soon as a unit learns of an FS occurrence. Objects to be quarantined shall be removed from use immediately, and kept in a secure storage (size permitting). Alternate arrangements shall be taken to withhold and safeguard larger items. In unusual circumstances, as noted in para 48 above, access to some quarantined items may be required to continue operations, programs or testing and this access must be documented by the quarantine officer while maintaining evidence continuity and other statutory or regulatory requirements.

Quarantining Documentation

55. If the item has a log book, an entry shall be made that the item is quarantined under authority of this publication. In the case of an accident, the person designated by the CO as the quarantining officer shall submit a statement to the DFS IIC using the format at Annex G.

56. Aircraft equipment/parts shall be prominently tagged with both a CF 706 (Quarantine

tag), and a CF 942 (Material condition tag).

57. A register is to be kept in the secure storage to identify items held in quarantine and provide a link to the FSIMS occurrences. This register shall also be used to record disposal actions for quarantined items (e.g. shipment data, released to LCMM as per e-mail dated dd-mm-yyyy).

Items to Be Quarantined

58. The following items, if applicable, shall be quarantined:

a. the aircraft;

b. the aircraft components (to include software and test equipment used to verify component serviceability) or personal equipment involved or suspected in the occurrence;

c. the equipment or facilities that last serviced the aircraft with oxygen, POL, armaments or other stores;

d. any other equipment such as that which may have hit the aircraft, cargo that caused problems, defective ground radar, arrestor cable, starting unit or other facilities; and

e. any stocks, particular makes or batches of components, like stores and POL, that are suspect

> NOTE
> Until the quarantine is lifted personnel will avoid turning on the battery or applying ground power in order to avoid the loss of recorded data. i.e. CVR and FDR information. The quarantine will remain in effect until the data has been successfully downloaded and is proven usable for evidence purpose.

59. When the facility involved is a civilian contractor for into-plane services, quarantining the facility shall be the responsibility of the appropriate technical services detachment.

Fluid Sampling

60. Fluid sampling is the gathering and submission of specimens of POL and other fluids for analysis. Sampling shall begin as soon as a unit learns of an occurrence. In the case of an accident, the sampling officer, usually the AFSO, must submit a statement of impoundment to the DFS Investigator using the format shown at Annex G. Sampling procedures shall be as directed in applicable CFTOs; if not specified, use sound engineering practices to prevent further contamination. If contamination is unavoidable, record its nature and if possible obtain a sample of the contaminant and take more than one sample from each source.

61. Ideally, all fluid sample analysis should be done at QETE. However, the need to avoid operational delays may dictate that a preliminary analysis be conducted locally. Coordination with QETE shall be carried out prior to any local fluid sample testing and QETE will provide either direct or delegated oversight of the tests. In this case, a second set of fluid samples will be sent directly to QETE for analysis.

62. Unless clear evidence exists that contamination or other component breakdown did not contribute to the occurrence, the following items must be sampled:

a. all entrapped fluids in any wreckage;

b. all entrapped fluids in any failed or suspect fluid systems such as fuel, oil, hydraulics and oxygen along with associated filters; and

c. all ground equipment (e.g. LOX/HOX cart, fuel bowser) and facilities (e.g. fuel tank) involved.

63. Samples must be analyzed as quickly as possible. If duplicate samples are taken they should be retained by one of the following until they are released:

a. FSO or D/FSO;

b. DFS;

c. Aircraft Fluids Servicing Officer (AFSO); or

d. a CAF-approved laboratory when authorized by one of the above and when overseen by QETE.

> NOTE
> Samples shall be labeled with the source component or item, the section or system of that item, the date and time of sampling, the nature of the sample fluid with any known or suspected contaminants, and any other information which will assist in the analysis.

64. The Fluid Sampling Kit (NSN 8115-21-886-4126) should be used, and is to be sent to QETE in accordance with transport instruction contained therein. QETE will send a replacement kit on request.

Authority to Access Impounded/Quarantined Items

65. The DFS IIC, Wing/Formation/Unit FSO, and individuals authorized by the relevant FS investigator, are the only people to have access to quarantined/impounded items.

Authority to Lift FS Impound/Quarantine

66. The AIA is the authority to release items from FS impound/quarantine. Items subject to a FS impound/quarantine may be released once a determination has been made that the lifting of the FS impound/quarantine will not affect the conduct of the investigation.

67. For Class I and II investigations, the authority to lift a FS impound/quarantine is delegated to the DFS-tasked IIC. For Class III and IV investigations, the authority to lift a FS impound/quarantine is delegated to the local FSO or in the absence of the FSO, any FS team member involved with the investigation and holding a current BI or IIC certification.

68. IAW reference D, any aircraft involved in a FS occurrence is immediately quarantined and maintenance activity is restricted to only those activites required to make the aircraft safe. The local FSO/FS Team member may authorize additional maintenance activities to be carried out on a FS quarantined aircraft, provided it does not adversely impact the FS investigation.

69. In exceptional circumstances, when no FSO/FS team member can be contacted, the CO may lift a FS impound/quarantine in order to deliver a critical operational capability. In the event this is necessary, the CO must ensure that all reasonable actions have been taken to preserve evidence for the FS investigation. The IIC shall be informed as soon as practical of the lifting of the FS impound/quarantine, as well as any mitigation taken to preserve evidence for the FS investigation. The CO may only delegate this authority to an acting CO in their absence or to a detachment commander in the case of a deployment from the home unit.

Provision for ARD Data

70. Lifting of quarantine for ARD data can only be done once the agency charged with producing the data has advised the applicable authority that the information was successfully downloaded and is usable and that a printed copy of the data has been produced.

Recording the Lifting of FS Impound/Quarantine

71. Reference E provides details on how to record the lifting of a FS impound/quarantine in the maintenance record set. Of note, release of a FS impound/quarantine falls under “Special Case Reporting” and there is no requirement for the unit to formally authorize the FS Authority, as performance of certification is inherent within the scope of their FS duties. Additionally, reference E (Maintenance Regulation Note 18), provides direction on how to certify the lifting of a FS impound/quarantine in the maintenance record set, in the event that the FS Authority is not physically present to sign, but can be otherwise contacted to make the decision.

72. Whenever log book entries have been made impounding or quarantining an item of evidence, a notation as per sample below shall be made in the log book on release of the item
.

Released (*time, date, month, year*) on the authority of:

_____
(full details of authority for lifting impounding/quarantining)

_____
(Signature and Rank)
Impounding/Quarantining Lifting Authority

Disposal of FS Impounded/Quarantined Evidence

73. Disposal instructions for certain items may only be issued by the appropriate authority at higher HQ, e.g. the applicable item manager at DAEPM. Before issuing such disposal instructions, the authority concerned must confirm whether the item is to be shipped under an FS quarantine or is to be released from quarantine.

74. Disposal instructions will include one or more of the following actions:

a. DFS handling instructions for OBR data;

b. Actions to be taken for each quarantined items:

(1) repair or return the items to normal use, including the return of personal property to the rightful owner;

(2) return the items to supply or forward for repair and overhaul;

(3) forward the items to a specified agency, e.g., QETE, AETE or contractor, for further investigation and analysis. Items are to remain under the FS quarantine and must be accompanied by sufficient details to describe the occurrence (e.g., UCR, CF 543, initial / supplementary report). Pack such parts in accordance with D-LM-008-001/SF 001 – Specifications for Methods of Packing, and A-LM-187-001/JS-001 – Packing and Preservation General Procedures;

(4) retain the items for a specified period; or

(5) scrap the items.

Authority for Civilian Into Plane Servicing Facility

75. When a civilian into-plane servicing facility under DND contract has been quarantined by the appropriate NDQAR, the release from quarantine shall be carried out by the CFQAR.

PROCESSING OF SPECIAL EQUIPMENT

76. Certain items must be handled with particular care and caution to avoid personnel injury or equipment damage and to prevent further damage that might hinder the investigation. Specific handling instructions are outlined below.

Escape Systems

77. If the occurrence involves an ejection seat or canopy, it should not be moved before the AETE specialist arrives on site.

78. Escape system components involved in ejections or damaged in accidents are to be photographed using close up, high quality color photography before any on site movement. All escape system components must be safetied by an AETE specialist prior to being shipped as per IIC instructions. Such items include ejection seats and all related components, e.g., leg straps, seat pack shells, seat pack/torso vest contents, and parachutes. These components are to be packed in accordance with appropriate CFTOs to ensure that they arrive at AETE in the same condition as found at the accident site. Applicable armament orders shall be observed before shipping any armament component, and the parts shall be packed in accordance with CFTOs.

79. Ejection equipment is not to be dismantled and parachutes are not to be repacked in their original enclosures. This equipment is to be packaged so as to prevent further damage in shipment. If the seat rocket has not fired, separation of the catapult tubes could cause the rocket to ignite unless the seat is made safe by an AETE specialist.

Aviation Life Support Equipment

80. In all ejections and in accidents involving injuries, all ALSE and all items of apparel must be suitably packed, annotated, and shipped to CFEME. CFEME should be consulted on proper packing/shipping procedures. Such items include aircrew helmets, oxygen masks, survival vests and contents, immersion suits, anti-G suits, handwear, footwear, flight clothing, and underclothing such as thermal vests, T-shirts and turtlenecks. To preserve the integrity of evidence, in-depth investigation of these items should not be attempted without the approval of CFEME. These items are to be struck off the appropriate inventory before shipping, as they will not be returned by CFEME. Personally purchased survival items, crests and badges are not to be removed. They will be returned to the owner when the CFEME investigation is completed.

Oxygen Systems and Related ALSE

81. FS occurrences involving oxygen systems require special care due to the unique hazards associated with oxygen. C-05-010-003/AM-000, *Oxygen Occurrence Investigation Techniques* (reference F), provides guidance for investigating occurrences involving oxygen systems and related ALSE, including specialist support available from the NDHQ ALSE Oxygen LCMM, CFEME and QETE.

QETE FS WORK REQUEST

82. A Unit requiring FS work to be carried out by QETE will need approval beforehand by the WFSO and the appropriate DFS Desk Officer. The UFSO will then confirm feasibility of project with QETE by sending a FS QETE Project Feasibility Assessment request to QETE, attention Q 2-2 with applicable photos, drawings, diagrams, etc. Upon approval by QETE, the FSO shall follow the SOP as detailed on the DFS intranet under the “*Administration”* tab.

Annex A
Chapter 6
A-GA-135-003/AG-001

ANNEX A – ACCIDENT AND SERIOUS OCCURRENCE NOTIFICATION PROCEDURES

Type of Occurrence	Unit of Occurrence	Wing *	DFS
Accidents (Category "A" to "C") or any occurrence with a FSCL of "High" or "Extreme"	Notify Wing of ownership by fastest possible means. If not practicable, call 1-888-WARN DFS (927-6337).	Immediately telephone DFS at 1-888-WARN DFS (927-6337)	If civilian involvement, notify TSB for a coordinated investigation.
		Accidents - Category A or B only, immediately contact as applicable: • Canadian Joint Operations Command (CJOC) - Canadian Forces Integrated Command Centre (CFICC) Senior Watch Officer: 613-945-4136 • The Canadian Special Operations Forces Command (CANSOFCOM) Desk: 613-998-4390 during working hours or after hours via Email CANSOFCOMOPS CANSOFCOM Ottawa-Hull@forces.gc.ca • 1 CAD Combined Air Operations Centre (CAOC) Duty Watch Officer: 204-833-2650.	
	If outside North America or Europe, notify the nearest Canadian diplomatic or foreign liaison staff.	Ensure DFS and 1 CAD FS are advised as soon as possible. Brief Duty Officers and confirm details as known.	If foreign military involvement, contact appropriate FS organization.
	Within 12 hours send an FS Initial Report (see Chapter 5).	If a fatality is involved, notify the local provincial coroner in accordance with CFAO 24-6.	Task a FS investigation.
	Follow CFAO 24-1 directions for casualty reporting and administration.		

CAUTION
Cellular phones should not be used to transmit sensitive information such as crew injuries or fatalities.

* Actions to be taken by the Supporting or Occurrence Wing as applicable.

Annex B
Chapter 6
A-GA-135-003/AG-001

ANNEX B – AIRCRAFT ACCIDENT CHECKLIST

References: A. QR&O 19.36 to 19.375 and 19.41
B. DAOD 1002-2, Informal Access to Personal Information
C. DAOD 2008-0, Public Affairs Policy – Authorities Table
D. DAOD 2008-3, Issues and Crises Management
E. DAOD 2008-4, Public Affairs, Military Doctrine and CF Operations
F. DAOD 3002-4, Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting.
G. DAOD 2008-1, Accountability and Responsability for Public Affairs

ACTIONS ON NOTIFICATION OF AN AIRCRAFT ACCIDENT

General

1. Personnel at the site of an accident and for every occurrence shall ensure that action is taken to prevent loss of life, injury to personnel or damage to property and to protect evidence and classified material against loss, alteration or compromise, irrespective of the locations described in the following paragraphs.

Telephone Notification

2. When information is received by telephone, the following should be recorded:
   a. the informant's name, location and telephone number;
   b. the time of the accident;
   c. whether there is a fire;
   d. exact location of accident site and its accessibility;
   e. location and condition of the crew and passengers;
   f. immediate medical response no matter what the condition of crew and passengers;
   g. in the case of a fatality, whether the coroner has been advised;
   h. whether there is serious property or environmental damage;
   i. the type and tail number of the aircraft;
   j. where the rescue team will be met;
   k. whether local emergency services have been notified;
   l. any other information that may be volunteered; and

> NOTE
> After the report is complete, phone the informant back to verify the authenticity of the call and that the contact phone number is accurate.

m. the times at which the information was received and when it was relayed to designated recipients.

> CAUTION
> Before ending the telephone call, caution the informant to remain clear of the wreckage, and ask the caller to attempt to deter others from entering the area due to hazards such as fuel fumes, fire, explosives, dust from composite materials, ejection seats, armaments, jettisonable tanks and/or pressurized systems. Also, disturbing or tampering with evidence could jeopardize the investigation and is illegal under the *Aeronautics Act*.

RESPONSE PROCEDURE AT ACCIDENT SITE

Immediate response

3. For every aircraft accident, personnel at the site shall ensure that the accident is reported as quickly as possible and that action is taken in conjunction with local authorities to:

a. prevent loss of life, injury to personnel or damage to property (including arranging for medical aid, fire suppression, making explosives safe, and SAR); and

> WARNING
> Making explosives or other aircraft systems safe could be very dangerous and should only be attempted by trained and qualified personnel and only if absolutely necessary.

b. protect evidence and classified material against loss, alteration or compromise (including arranging for guards/crowd control and photographing of wreckage before it is removed from runways or before the onset of snow or other weather phenomena).

4. The immediate response to an accident will normally be under the direction of the firefighters, and if fire or fumes are involved, self-contained breathing apparatus, coveralls, gloves and eye protection may be required.

> CAUTION
> Only firefighters, police and medical personnel should be directly involved in the immediate response.

5. There must be a strictly enforced policy of no smoking, eating or drinking at the site, as these activities promote the inadvertent ingestion of potentially hazardous or toxic materials from the wreckage.

6. Establish a protected entry point to the site, at which a facility should be erected to enable access control, the donning and doffing of protective equipment, cleaning of boots and

washing of hands before departing the site. All disposable gear such as masks, coveralls and gloves shall be removed and disposed of in accordance with appropriate directives.

Health Protection

7. After rescue activity is complete and the immediate threat to personnel and property has passed, the OSCAR will give the DFS IIC access to the site. The IIC shall inspect the site in full protective gear to assess hazards. The following should be considered (IAW publication C-05-010-002/AG-000):

a. Fire hazards. Extreme caution should be exercised if the site is contaminated by fuel. Smoking is prohibited. Aircraft batteries should be disconnected as soon as possible.

b. Explosion hazards. Qualified technicians should safety all explosives including armaments and explosive-activated devices.

> WARNING
> Death or serious injury can be caused by a tire exploding due to a damaged wheel.

> CAUTION
> All personnel, not otherwise involved in making explosive/pressurized systems safe, are to be kept a minimum of 500 feet from explosive devices and pressurized systems that have been subjected to accident impact forces or fire.

c. Blood-borne pathogens. All blood, tissue and certain body fluids should be treated as hazardous. Puncture-resistant disposal containers must be available at the site if any of these substances are present. Proper biological hazard warning signs must be placed on the containers. Therefore, FS investigators and immediate accident responders should be inoculated for Hepatitis A and B. Non-disposable equipment such as boots and goggles shall be disinfected at the site. See Chapter 7 for further details.

d. Composite materials and toxic substances. Smoke and burning composite materials are toxic and hazardous to personnel and aircraft systems. Carbon fibre released from burning composite materials can be inhaled, become embedded in the eyes, or penetrate the skin or aircraft electrical system with adverse effects. Fibres can also be released in the atmosphere when this material is impacted or cut. For further details refer to C-05-040-012/TS001 – Post Aircraft Accident/ Accident Release of Carbon Fibre. Exposed carbon fibre should be covered with plastic or sprayed with a fixant such as floor wax. Some aircraft also contain plastics or other materials that give off toxins that may be inhaled or absorbed on exposure. Battery acid and Skydrol hydraulic fluid are highly corrosive.

e. Radiation hazards. Although efforts have been made to remove equipment containing radioactive substances, many of the older aircraft still have flight instruments containing radioactive material. The main hazard is from inhalation and ingestion of radioactive particles in dust when this equipment is broken or burnt. Refer to CFAO 34-24, Ionizing Radiation Safety.

f. Parts and equipment containing radioactive material are listed in C-02-040-003/TP-000. If a radioactive hazard is suspected, the Base Radiation Safety Officer shall be notified.

8. Once the site survey has been completed, the IIC will determine the protective clothing and PPE that personnel must use. See Chapter 7 for details on how to perform Crash Scene Hazards (CraSH) Management.

RESPONSE PROCEDURE FOR FIRST UNIT ADVISED

9. On the declaration of any air emergency in the area of a flying unit, the ERP should be implemented immediately. This ensures that medical, firefighting and rescue services are alerted and brought into position. Occurrences at non-flying units should be referred immediately to the nearest flying unit. The following actions may be required after an occurrence:

a. preventing loss of life, injury to personnel and damage to property through the provision of medical aid, firefighting, SAR and safetying of explosives, pressure systems and ejection seats;

b. security and protection of evidence, including wreckage (specific instructions regarding classified equipment are to be obtained from wing security officer. If COMSEC material is involved, the wing COMSEC officer should be consulted);

c. B-GA-100-001/AA-000 and CFMO 42-04 require that all personnel involved in an air or ground accident or physiological incident receive a medical exam, toxicology screen and human factor assessment. This should be completed as soon as practicable following the occurrence

> NOTE
> Should civilian personnel be involved in the occurrence and a medical examination is deemed required, then *MAIR* 10(2) applies and *MAIR*, Form 4 will need to be completed. Call DFS at 1-888-WARN-DFS for assistance in completing this activity.

d. If there is a possibility that a category “D” occurrence may be upgraded to an accident, then the medical requirements of CFMO 42-04 must be implemented; all personnel involved in an air or ground accident or physiological incident receive a medical exam, toxicology screen and human factor assessment. This should be completed as soon as practicable following the occurrence;

e. reporting the occurrence as quickly as possible to the unit of ownership;

f. taking photographs of the wreckage and other evidence before it is disturbed or obliterated by the elements;

g. making a preliminary wreckage diagram should it be necessary to move the wreckage prior to the arrival of the DFS investigator;

h. quarantining, impounding and/or taking samples from applicable items of evidence;

i. locating and identifying all witnesses to the occurrence, including start crew, supervisors and acquaintances of personnel involved (see CFAO 21-9 and A-GA-135-002/AA-001, Occurrence Investigation Techniques);

j. implementing investigative procedures as required;

k. assisting investigators by providing the following:

(1) administrative and logistic support,

(2) wreckage search-and-recovery teams

(3) transportation, and

(4) accommodation;

> NOTE
> If provision of these services is beyond the capability of the unit, refer to the Recovery and Salvage section (para 16) below.

l. When an FS investigation is convened, the recovery and salvage officer (RASO) assigned to the occurrence is to abide by the recovery instructions from the IIC. Prior to the complete recovery/salvage of the aircraft, the RASO is to liaise with the appropriate DFS investigator (see also DAOD 4003-0, Environmental Stewardship);

m. instituting or recommending measures to remedy the causes of the occurrence;

n. observing the deadlines and routing for all reports by the unit of ownership; and

o. disseminating information relating to the occurrence.

> NOTE
> When the unit of occurrence is also the unit of ownership, the actions listed in Para 10 also apply.

RESPONSE PROCEDURE FOR UNIT OF OWNERSHIP

10. On the declaration of any aircraft accident involving a unit aircraft, the ERP should be implemented immediately as follows:

a. ensuring that arrangements at the accidents site comply with above section entitled Response Procedures for Unit of Occurrence, and providing the necessary assistance to the unit of occurrence;

b. ensuring that the occurrence is reported as quickly as possible. The following may require notification or direction with respect to impounding or quarantining, depending on the severity of the occurrence:

(1) C Air Force, DFS (1-888-WARN DFS (1-888-927-6337));

(2) 1 CAD AOC or through CJOC or CANSOFCOM;

(3) the wing or unit of occurrence;

(4) unit(s) of last fuelling, servicing;

(5) last unit of departure and other units involved;

(6) other units involved (for example, the army unit owning the vehicle being airlifted having developed a fuel leak when airborne);

(7) TSB thru DFS if the occurrence involves civilian aircraft and /or ATC agencies;

(8) NDQAR (if the occurrence involves a civilian maintenance or servicing contractor); and

(9) Direction Quality Assurance (DQA) (if the occurrence involves aircraft at NDQAR).

NOTE
If an Address Indicator Group (AIG) is used, ensure that all other applicable addressees are also included in the message.

c. Wing maintenance shall immediately refer to their copy of the appropriate security guide, i.e., C-12-XXX(A/C type)-000/AS-000, and prepare a list of classified equipment carried by the accident aircraft. Copies of the classified equipment list are to be given as soon as possible to the following personnel at the designated support wing and NDHQ:

(1) the Wing Security Officer,

(2) the FSO,

(3) the DFS IIC, and

(4) NDHQ/DAEPM for the item manager;

NOTE
The wing custodian, assisted by appropriate personnel, shall determine the type and quantity of COMSEC equipment and material on board. The reporting procedures for loss and / or compromise of COMSEC material are contained in CIS/01/2, CF Instructions for COMSEC Material and Accountable Publications. This report must be sent without delay.

d. quarantining, impounding and/or taking samples from applicable items of evidence;

e. locating and identifying all witnesses of the occurrence, including start crews, supervisors, and acquaintances of personnel involved (see CFAO 21-9 and A-GA-135-002/AA-001, Occurrence Investigation Techniques);

f. conducting an appropriate investigation of the occurrence or requesting assistance;

g. disposing of evidence only as authorized. When an FS investigation is convened, the RASO assigned to the occurrence is to abide by the recovery instructions from the IIC. Prior to the complete recovery/salvage of the aircraft, the RASO is

to liaise with the appropriate DFS investigator (see also DAOD 4003-0, Environmental Stewardship);

h. instituting or recommending measures to remedy each cause;

i. observing the deadlines and routing of all reports by the unit of ownership; and

j. disseminating information related to occurrences.

RESPONSE PROCEDURE FOR OTHER WINGS OR UNITS INVOLVED

11. On being notified of the occurrence or when so requested, any other wing or unit involved in an FS occurrence shall immediately carry out the following actions as appropriate:

a. quarantine, impound and/or take samples from local items of evidence;

b. identify witnesses of the occurrence, including:

(1) servicing and start crews;

(2) tower controllers; and

(3) anyone else with pertinent information;

c. report the above actions by message to:

(1) the wing, base or unit of occurrence;

(2) the wing, base or unit of ownership; and

(3) C Air Force/DFS and 1 CAD;

d. assist investigators as required, e.g. providing administrative and logistic support, transportation and accommodation, as required;

e. institute or recommend measures to remedy each cause of the occurrence that has been assigned as a responsibility of that unit; and

f. disseminate information related to occurrences.

RESPONSE PROCEDURE BY DFS

12. The DFS occurrence response procedure includes:

a. for occurrences involving non-CF aircraft, notifying the owners of the aircraft as required by NATO STANAG 3531, Letters of Agreement, or other standing arrangements, so that the actual owners of the aircraft may discharge their responsibilities;

b. acting as FS advisor to test establishments, technical services agencies and their units;

c. monitoring 1 CAD, wing, base and unit actions;

d. initiating and conducting DFS investigations;

e. recommending special investigations when extraordinary circumstances prevail;

f. reviewing and amending each cause factor as required;

g. analyzing and recording PM;

h. recommending and monitoring PM as necessary; and

i. performing analysis, follow-up and dissemination of statistics and accident prevention information arising from occurrence reports.

RESPONSE PROCEDURE BY NDHQ

13. NDHQ agencies shall respond to occurrences by:

a. providing specialist advice, facilities and special testing as required; and

b. implementing those PM that are beyond the capabilities of subordinate formations.

SPECIAL ASSISTANCE IN AIRCRAFT ACCIDENT INVESTIGATIONS

14. The unit of occurrence and unit of ownership must provide the DFS IIC with the assistance required to conduct the investigation. If special technical, medical or other assistance is required beyond that available at the unit of occurrence or unit of ownership, such assistance will be requested by DFS. Special assistance might be in the form of:

a. airlifting personnel and equipment to and from the accident site;

b. ground search parties;

c. shelter and messing;

d. detectors for locating vital aircraft parts;

e. underwater recovery personnel and equipment;

f. infrared scanning for aircraft wreckage location; and

g. a receiver to detect the underwater acoustic beacon.

15. In addition, specially trained advisors may be approved by C Air Force or NDHQ to assist in salvage or analysis. In accordance with a service level agreement (SLA) with DFS, CFEME will provide a human factors specialist for all A, B and C Category accident investigations. In addition, a CFEME Toronto Human Factor/Life Support Equipment member will be provided if requested for examination of non-ejection seat life support equipment. For ejection seat accidents, an AETE ejection specialist will normally be assigned to the investigation team (in accordance with the SLA between AETE and DFS). Further, AETE provides expert advice and analysis for other aircraft, ALSE and associated components (ex. non-ejection seat and harness systems).

NOTE
In all cases, DFS must be advised of any such requirements in order to evaluate the benefits and arrange the support.

RECOVERY AND SALVAGE
COMMAND/CONTROL AND COMMUNICATIONS GUIDELINES

16. There are four basic accident scenarios for which different command, control and communications guidelines are applicable; the following directions shall apply:

a. On DND Property:

(1) The Unit CO, through a designated representative, shall retain command of the emergency response until the DFS IIC arrives. Upon completion of all pertinent on-scene investigations, control shall revert to the Unit CO's representative;

(2) Duties IAW this manual shall be carried out by the FSO or his/her representative(s);

(3) The Unit CO shall ensure the site is cordoned and secured. Access to the site is permitted only on the appropriate authority of the DFS IIC or the Unit CO's representative during the pre- and post-investigation process;

(4) The DFS IIC shall assume the responsibilities outlined in this manual and, in cooperation with the unit RASO, Medical Advisor, Environmental Officer and other experts as applicable, shall determine the hazards that exist and the level of protection required;

(5) The RASO assists the DFS IIC as required. The DFS IIC may direct that the wreckage be collected and relocated for further investigation;

(6) Accident site communications equipment shall be used, within reason, to ensure communications security. All requests for information should be directed to the DFS IIC through the designated PAO; and

(7) The Unit CO is responsible for the coordination of all activities that support recovery actions, salvage and clean-up of the site. Such activities shall normally be coordinated through the Environmental Officer, who will ensure that all reasonable efforts are made to leave the site in a condition that will not pose any hazard to the public (see also DAOD 4003-0, Environmental Stewardship).

b. Off DND Property:

(1) The supporting unit shall liaise with local authorities, and shall ensure coordinated support that may require a designated representative to be on site. If local authorities are present, military Emergency Response shall assist as required;

(2) Applicable duties IAW this manual shall be carried out by the FSO or designated representative(s);

(3) If the accident is in a remote area or military flying area, the supporting unit shall ensure site control until the DFS IIC arrives;

(4) The DFS IIC, in cooperation with the supporting RASO, Medical Advisor, Environmental Officer and other experts as applicable, shall determine the hazards which exist and the level of protection required;

(5) The supporting RASO assists the DFS IIC as required. The DFS IIC may direct that the wreckage be collected and relocated for further investigation;

(6) Accident site communications equipment shall be used, within reason, so ensure communications security. All requests for information should be directed to the DFS IIC through the designated PAO; and

(7) The supporting unit is responsible for coordinating all activities that support recovery actions, salvage, and clean-up of the site. Such activities shall normally be coordinated through the Environmental Officer, who will ensure that all reasonable efforts are made to leave the site in a condition that will not pose a hazard to the public (see also DAOD 4003-0, Environmental Stewardship).

c. Submerged Aircraft:

(1) Emergency Response and SAR shall be coordinated by the appropriate RCC. The supporting unit shall liaise with RCC and provide available support;

(2) Applicable duties IAW this manual shall be carried out by the FSO or his/her representative(s);

(3) DFS shall coordinate any external military/civilian assistance beyond the capabilities of the supporting unit for site security and aircraft recovery and salvage. If non-CAF assets are required, an NDCC Ops tasking will be issued;

(4) In cooperation with the supporting RASO, Medical Advisor, Environmental Officer and other experts as applicable, the DFS IIC shall provide the external agencies with technical advice, notification of possible hazardous material and the associated safety precautions;

(5) The DFS IIC may direct the collection and relocation of the wreckage by external military/civilian agencies for further investigation at another site;

(6) Accident site communications equipment shall be used, within reason to ensure communications security. All requests for information should be directed to the DFS IIC through the designated PAO; and

(7) The supporting unit, in cooperation with the external military/civilian agency, is responsible for the coordination of all activities that effect recovery actions, salvage and clean up of the site. Such activities shall normally be coordinated through the Environmental Officer who will ensure that all reasonable effort has been made to leave the site in a condition that will not pose any hazard to the public at large (see also DAOD 4003-0, Environmental Stewardship). If non-CAF assets are required, a NDCC Ops tasking will be issued.

d. Civilian Airport:

(1) Local Emergency Response authorities shall be in charge according to existing MOUs and Working Agreements and the *Aeronautics Act*. The supporting unit shall liaise with local authorities. The Working Agreement

in force with TSB shall govern the investigative agency that will lead any investigation;

(2) DFS shall coordinate any external military assistance beyond the capabilities of the supporting unit for aircraft recovery and salvage operations;

(3) In cooperation with the supporting RASO, Medical Advisor, Environmental Officer and other experts as applicable, DFS shall provide the external agencies with technical advice, notification of possible hazardous materials and the associated safety precautions;

(4) The supporting RASO assists the designated investigative agency as required; and

(5) Accident site communications equipment shall be used, within reason, to ensure communications security. All requests for information should be directed to DFS through the designated PAO.

FACILITIES AND EQUIPMENT NEEDED ON RETURN FROM AN ACCIDENT SITE

Facilities

17. The following facilities should be readily available so that investigators can compile their field reports:

a. a large secure room to which investigators may have 24-hour access;

b. a telephone (preferably a dedicated line);

c. competent administrative assistance with applicable security clearance;

d. a white or blackboard, markers, chalk and eraser; and

e. at least five large tables or desks for examining evidence.

Reference Materials

18. The following references should be available:

a. QR&Os, DAODs and CFAOs;

b. B-GA-100-001/AA-000, CF Flying Orders;

c. 1 CAD Orders;

d. local orders and instructions; and

e. complete CFTO series for the aircraft concerned.

Report Compilation Materials

19. The following materials should be available:

a. forms for Ditching Report, and Emergency Escape from Aircraft Report (held by DFS);

b. a computer with Microsoft Office (i.e. Word, Excel, Power Point, Outlook) applications; and

c. file folders and paper, pens and stationary (PP&S) as required.

Annex C
Chapter 6
A-GA-135-003/AG-001

ANNEX C – IMAGERY AND VIDEO COVERAGE

Reference: CF Imaging Instructions, A-PH-007-000/AG-001

INTRODUCTION

1. Any imagery or video coverage of an aircraft accident is an extremely valuable record. It assists in determining the exact cause(s) of an accident, thus facilitating remedial procedures and suggesting training to prevent a reoccurrence. The reference is the official document governing image acquisition and video coverage in support of aircraft accident investigations. This annex is based on ref document and shall serve as a quick field reference for any Imaging Tech or any personnel assigned to an investigative team.

IMAGERY WORK ORDER

2. Accident response procedures shall incorporate local procedures to facilitate the timely arrival of the Imaging Technician at the accident site. Image acquisition coverage will normally be carried out under the direction of the investigating authority on the scene. The investigating authority could be a DFS investigator or a FSO. Unless specifically stated otherwise at the time of the request, the request for imagery coverage will be considered an emergency, and the requirement for the originator to complete a CF 315 (Imagery Work Order) prior to the commencement of work will be waived. It is the responsibility of the Image Tech on site to ensure that a CF 315 is completed by a member of the accident investigation team as soon as practicable after the initial response.

IMAGERY COVERAGE

3. If the Imaging Tech arrives on the scene ahead of the investigating authority, he / she is to commence acquiring images in accordance with para 8 describing the minimum coverage required. Imagery must be acquired in the case where fatalities have occurred and the CO / OSCAR has authority from the coroner to remove the remains before his arrival (refer to Para 8.y. below).

PERSONNEL SAFETY

4. Imaging Techs, including contracted personnel, must be aware of the health hazards inherent in burning aircraft that are constructed of composite materials and the release of carbon fibres. Personnel are not to approach any burning aircraft until it has been established safe by a competent authority (OSCAR, AERE Technical or DFS investigating officer). Any Imaging Tech who potentially may be involved in acquiring imagery of burning aircraft shall become familiar with the content of *Post Aircraft Accident/Accident Release of Carbon Fibres* (C-05-040-012/TS-001). Appropriate caution must also be exercised where hazards are created by unburned fuel, POL, hydraulic fluids and possible unexploded armaments.

SECURITY CLASSIFICATION OF IMAGE RECORDS

5. It is the responsibility of the Imaging Tech on site to contact the investigating authority and confirm the security classifications that may apply, as soon as this is practicable. Digital images or video images constituting an imagery record shall be handled as CONFIDENTIAL until the investigating authority assigns a more appropriate security classification or designation in accordance with the *National Defence Security Policy*. Similarly, all imagery coverage that depicts human remains shall, as a minimum, be designated PROTECTED B until the investigating authority assigns a more appropriate security designation.

CONTROL OF IMAGERY

6. Imagery acquired by CAF Imaging Techs shall be identified and catalogued in accordance with the Reference, Chapter 8. All coverage of an accident site is considered part of the accident investigation. In addition to that provided by the Imaging Tech, it includes coverage obtained by the pathologist, DFS investigator, military police, firefighters, accident truck operators, ATC tower personnel or anyone else who, by virtue of their responsibilities, is required to be at the accident site and who may have taken such coverage with privately owned equipment. Under the direction of the investigating authority, all coverage of this type shall be turned over to the Imaging Section for official recording and processing. FS investigators and Imaging Techs may be the first persons on site. Because imagery is considered as factual info, it is releasable to a BOI and criminal investigators if required. Therefore, Imaging Techs involved in a FS investigation need to maintain an evidence chain of custody of the imagery taken on the accident site for possible release to other investigations. Digital images, prints and video tape recordings can only be released under the authority of DFS and shall conform to the provisions outlined in this publication.

STILL AND VIDEO COVERAGE OF FS OCCURRENCES

7. The Imaging Tech shall:

   a. label each digital storage media by inserting an identification card at the beginning of the shoot;

   b. maintain an image log describing every shot taken;

   c. include a scale reference such as a ruler in the picture, whenever practical; and

   d. when shooting video, pan slowly over the scene and leave room for editing.

8. When image acquisition is undertaken without the direction of the investigating authority, minimum coverage, where possible, shall include:

   a. once the emergency rescue team / OSCAR or accident crew have declared the area safe, the Imaging Tech shall ensure images and video coverage are taken before the wreckage / evidence are disturbed or obliterated by the elements;

   b. an overall view of the accident scene showing the damaged aircraft (with identification and insignia, if possible), supplemented by two general images from different cardinal setting positions; if facilities permit, and the wreckage is strewn over an extended area, a view from the air is desirable;

c. a general view from a vantage point closer than that taken above, clearly showing the aircraft number;

d. an overall view of the area surrounding the accident scene, including nearby objects, to show the approach of the aircraft and the weather conditions;

e. if the accident occurred in trees or bush, a view showing broken tree-tops with a person in the scene to indicate the approximate scale;

f. a view from the aircraft towards the first point of impact;

g. a view of each point of impact with skid marks leading to the aircraft or, where wreckage extends over a large area, general views taken at various distances from the first point of impact to the main part of the aircraft wreckage;

h. marks on aircraft from cartwheel impact to aid correlation with ground marks and possible loose paint flakes;

i. where wreckage is strewn over a large area, general views from the first point of impact to each main part of the wreckage as guided by marks made, and showing the marks made by parts of the wreckage on the ground;

j. close-up views of each main part of the wreckage such as the fuselage, wings, rotor blades, engines, tail assembly and tail rotor to record the damage;

k. a view of the flaps from the tail position, supplemented by a close-up of flaps to show the angle of flap deflection (include a ruler to indicate the scale);

l. views of the cockpit to include operating controls, fuel selector(s), fuel, radio, electrical control and circuit breaker panels; on dual control aircraft, similar views of both cockpits; if flying was solo in a dual control aircraft, a photograph of the physical positions of the stick/yoke, throttle, landing gear, flap controls and safety harness;

m. a general view of the undercarriage area; if undercarriage is retracted, views of the underside of the aircraft after the aircraft has been lifted at least six feet above the ground;

n. photographs of any fluid leakage on any parts of the aircraft, like the engine cowlings, windscreen and fuselage;

o. photographs of fire/heat damage or discolouration *;

p. photograph of human remains, injuries and blood/tissue smears on wreckage *;

q. photograph of extra or missing items *;

r. if the aircraft was propeller-driven, a view of any marks on the ground made by the propellers with the aircraft in the background and a view to show the degree of pitch on the propeller hub (with a scale indicator);

s. where appropriate, view(s) showing propeller impact marks on the ground that show length of slashes and distance between slashes, and detailed views of slash marks (front or rear) that show traces of propeller abrasion marks or paint flakes;

t. close-up views of damage to property that might result in a claim by or against the Crown;

u. close-ups of fracture surfaces *;

v. close-ups of improperly installed components or any components suspected of having contributed to the damage *;

w. photographs of seats, restraining harness, helmets, parachutes and all other items of life support and safety equipment used;

x. imagery of steps in removing, opening or cutting apart components *; and

y. when a fatality has occurred and before the remains are removed from the accident scene, imagery shall be taken and shall include views of the general position of the remains in relation to the aircraft, as well as medium to close-up detail views from all angles to show injury patterns and identification; in addition, imagery with a visible scale reference shall be taken to show the relationship of the remains to nearby life-support equipment.

* Asterix indicates that actions are not reflected in reference document

Annex D
Chapter 6
A-GA-135-003/AG-001

ANNEX D – FSO OCCURRENCE RESPONSE MONITORING CHECKLIST

1. This checklist is provided as a guide for the FSO when monitoring occurrence response procedures.

Requirements	Remarks
Receipt and dissemination of basic information. These procedures are to be carried out by the FSO.	Initiate and maintain a log to record critical information, such as names, phone numbers and locations.
Record the initial details of the occurrence.	Note the phone number and location of the contact at the accident site. Check that the information is genuine.
Initiate the ERP.	Confirm the aircraft tail number and unit of ownership. Determine if the aircraft was armed or carried dangerous cargo or COMSEC.
Give preliminary details to a higher authority by telephone. NDHQ/NDCC, 1 Cdn Air Div AOC, DFS and wing/base/unit must be notified.	Ensure DFS is advised via the toll-free hotline: 1-888-WARN DFS (1-888-927-6337).
Examine the flight plan for en-route stops and ATC agencies.	Advise ATC and servicing personnel of the occurrence and requirements.
Monitor occurrence response planning. Confirm the dispatch of the following, as required: • medical aid • firefighting and rescue • wreckage safety specialists • security crews and • photographers	All personnel dispatched to the accident site are to receive prior briefing on accident site hazards and evidence protection. Wreckage is not to be disturbed unless essential to prevent further injury or damage. Take colour photographs or videos before disturbing. Check provisions for: • transportation • accommodation • rations • finances • communications • special equipment

Requirements	Remarks
If the runway is blocked, are plans being made for the recovery of airborne aircraft?	
If an exercise, deployment or airshow is in progress, the unit should be umpired out and communications restrictions waived.	
Request all necessary external assistance (e.g., SAR, heavy equipment).	
Ensure that Public Affairs is aware of the details.	The exact accident location shall not be mentioned in radio or TV reports. The public should be advised to stay away from the site and its access routes.
Locate the flight data recorder/cockpit voice recorder and CPI, if fitted. Impound and quarantine these items and turn them over to the DFS investigator.	Shut off the CPI transmitter.
The ERP should have provisions for: • notifying the next of kin; • notifying a coroner or nearest civil authority IAW CFAO 24-6; and • reporting property and environmental damage.	
Obtaining initial evidence. These procedures are to be carried out by the FSO.	This should include written witness statements taken in isolation.
Determine the category of aircraft damage.	Always include the damage category in the initial report. If an accurate assessment is not possible within the time frame for the dispatch, indicate an estimated damage category.
Determine whether DFS investigative assistance is required.	DFS tasks all Class I and II investigations as per Chapter 9, Annex B. DFS should be informed of any significant D Cat Category occurrence.
Ensure all evidence and wreckage is photographed before being disturbed.	Record any instances in which evidence was disturbed.
Ensure an appropriate medical authority has been notified.	CFAO 24-1 injury Class.

Requirements	Remarks
NOTE B-GA-100-001/AA-000 and CFMO 42-04 require that all personnel involved in an air or ground accident or physiological incident receive a medical exam, toxicology screen and human factor assessment. This should be completed as soon as practicable following the occurrence. If there is a possibility that a D Category occurrence may be upgraded to an accident, then the medical requirements listed above must be actioned. For civilians that refuse to cooperate with the toxicology screen, DFS should be contacted immediately so that the provisions of *Aeronautics Act* , section 14 para 10(b) can be initiated.	
Prepare a preliminary wreckage diagram.	See A-GA-135-002/AA-001.
Record a brief description of the accident site.	Include the current and forecast weather and the extent of fire and property damage.
Ensure that impounding, quarantining and sampling actions are in hand (see Quarantining, this chapter).	
Ensure that special weather observations are taken.	
Record the events leading up to the occurrence.	Record: • the planned mission • the T/O time • the direction of the flight • the impact angle • whether the accident was preceded by fire or smoke • any ejections • any parachute descents • any unusual manoeuvres • or noises • the weather at the time
Note the present location of the aircraft commander or senior survivor.	
Locate all witnesses to the occurrence and preceding events. Include the last people to speak with the pilot, such as friends, supervisors and start crew. Try to secure a written statement from all witnesses available. Ensure the witnesses will be available by securing contact information, such as home and cellular phone numbers.	

Requirements	Remarks
NOTE If, at any time during the gathering of evidence or the investigation of the event, it becomes apparent that action should be taken before the completion of the investigation to prevent a recurrence of the event, that action is to be taken in consultation with the DFS investigator. Comments should be added to the investigation record detailing the action taken. This will normally be actioned by message.	
Complete the IR occurrence report (FSIMS or CF 215) in all available detail.	Ensure all necessary addresses are included. Report any sabotage in accordance with A-SJ-100-001/AS-001.
Convening the investigation. These procedures are to be carried out by the DFS, 1 Div FSO or FSO.	
Determine the type of investigation required.	See Chapter 9, Class of Investigation, commencing at Para 19.
Establish contact with the investigators.	
Determine if an interpreter or liaison officer is required, and if so, coordinate.	STANAG 3531 (10B), ICAO Annex 13 and ASCC Air Standards 85/2A deal with procedures for accidents involving foreign aircraft.
Establish the terms of reference.	
Issue tasking orders to all concerned e.g. heavy equipment and RAS.	
Arrange a briefing for the investigators.	
Provide for these administrative services: • administration • finance • photographic support • accommodation • rations • protective clothing • communications • transportation • special equipment	
Check kit contents and issue an investigation kit.	

NOTE
Casualties must be reported in accordance with CFAOs.

NOTE
When an accident or incident involves injury or death to civilian personnel, the occurrence must also be reported in accordance with A-GG-040-001/AG-001, DND General Safety Program. Ensure the coroner is also informed.

NOTE
If the occurrence results in the release of fibres from composite material, notification procedures must be completed in accordance with part 6 of C-05-040- 012/TS-001, Post Air Crash Accident.

NOTE
A register is to be kept to document the exposure of personnel to free composite material fibres in accordance with Part 4, Chapter 25 of C-05-040-012/TS-001.

INTENTIONALLY LEFT BLANK

Annex E
Chapter 6
A-GA-135-003/AG-001

ANNEX E – ACCIDENT INVESTIGATION KITS

HAND-PORTABLE ITEMS

1. The following items should be prepared for immediate issue and easy transportation.
   a. Publications;
   b. Survey Equipment;
   c. Tools and Sampling Materials; and
   d. Photographic Equipment.

Publications

2. The following publications should be available:
   a. A-GA-135-003/AG-001 (AIM) and A-GA-135-002/AA-001;
   b. photocopies or excerpts from frequently used CFAOs, DAODs and QR&Os (see Annex D to Chapter 9 for listing of publications);
   c. CFTOs for unit aircraft;
   d. the unit telephone directory and a list of local civilian authorities' addresses and telephone numbers;
   e. notes for the Conduct of Investigations Into Aircraft Accidents, B-GA-015-003/FP-001;
   f. FS investigation handbooks for the technical and aircrew members; and
   g. Human Factors Guide for the Conduct of Aircraft Accident Investigation, B-GA-015-001/FP-001.

Survey Equipment

3. The following equipment may be used:
   a. maps of the area (1:50,000);
   b. 1,000 feet of light rope or heavy cord, marked at 50-foot intervals;
   c. a 50-foot tape measure;
   d. a 12-inch steel ruler;
   e. a magnetic compass and/or a GPS;
   f. 50 lightweight stakes;
   g. a small box of accident investigation tie-on tags (Form CF 219);
   h. a small pad of accident investigation adhesive tags (similar to the above, but with no catalogue number);
   i. a knife;
   j. a hatchet;

k. a small shovel;
l. magnifying glasses (5X and 10X);
m. spray lubricant;
n. rags;
o. small stiff and soft-bristled brushes;
p. an aircraft fluids sampling kit (NSN 8115-21-886-4126, available through QETE);
q. three siphons of various sizes;
r. plastic bags (assorted), non-static bags for permanent memory chips;
s. carbon fibre ash stabilizer kit including:
    (1) paper coveralls (various sizes),
    (2) disposable latex gloves,
    (3) liquid floor wax,
    (4) manual spray pumper, and
    (5) dust masks;
t. masking and duct tape;
u. work gloves;
v. packaged wash cloths;
w. hand cleanser;
x. paper towels; and
y. an inspection mirror.

Tools and Sampling Materials

4. The following tools and smpling materials should be available:
    a. wrenches (adjustable);
    b. pliers and wire-cutters (assorted);
    c. screwdrivers (several, including Philips);
    d. flashlight (with spare bulb and batteries);
    e. hammer, chisel and small portable cutting torch;
    f. small magnet and string;
    g. hacksaw with spare blades;
    h. small wood saw; and
    i. knife.

Photographic Equipment

5. Digital still and video cameras may be used. Ideally the digital camera shall be a 5 megapixel camera with minimum 3X optical zoom with 2 GB of storage capacity.

Survey Equipment Kit

6. The survey kit shall contain the following:
   a. a small first-aid kit;
   b. pens, pencils, grease pencils and chalk;
   c. two clipboards;
   d. notebooks, graph paper and scratch pads;
   e. voice recording devices and batteries; and
   f. scale model(s) of unit aircraft.

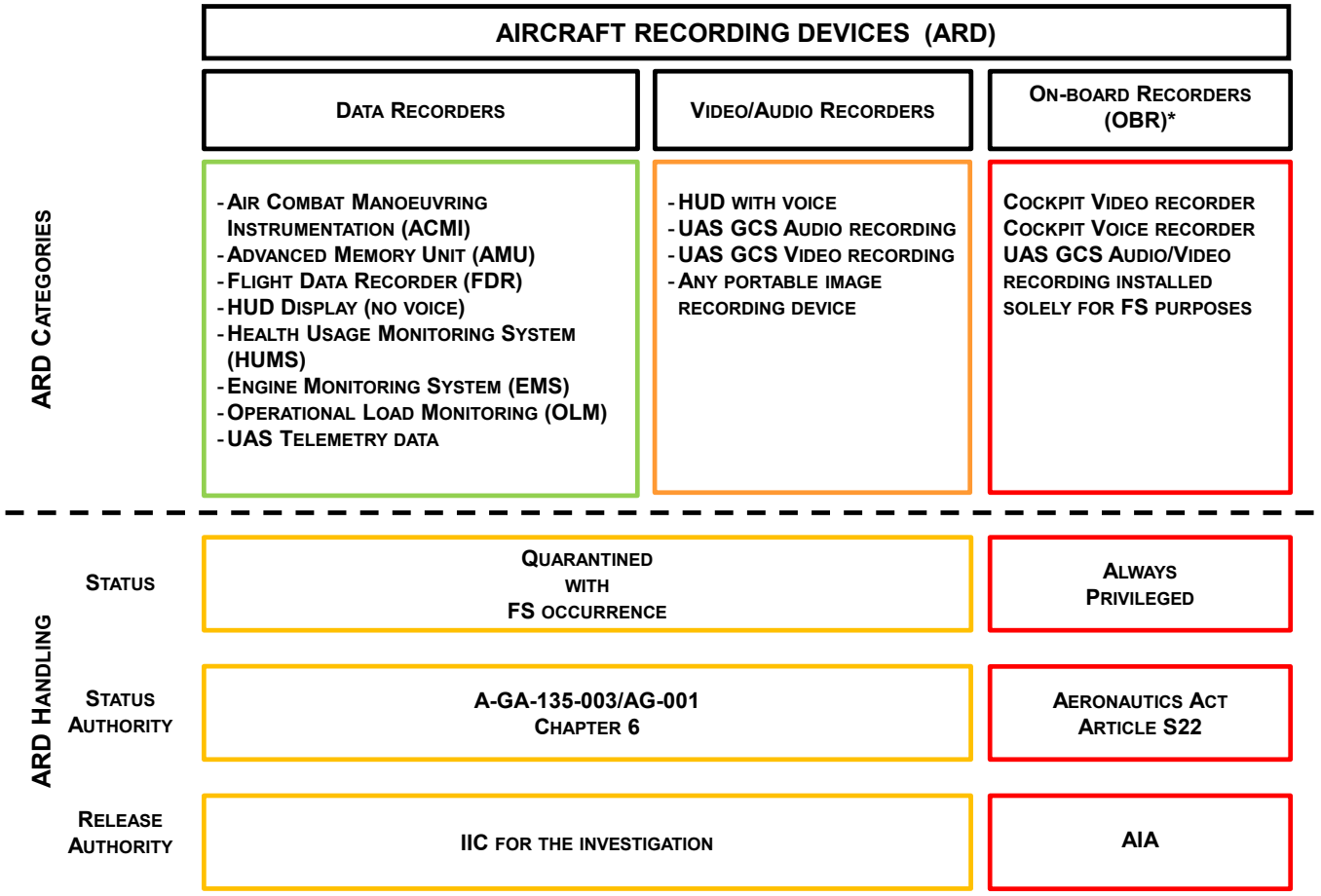
Contingency Items

7. The following items are needed only under certain conditions. Notwithstanding the above, all FSOs of frequently deployed units and all Base FSOs must have the items that are scaled on L-49-070-021/LC-092 in their kits and ready for use at all times. Also, all FSOs must arrange to have the following items available for issue to investigators when required, remembering also to provide for necessary transportation of the items to the accident site:
   a. PPE kit (see Annex A, Appendix 1);
   b. tents, bedding, rations and cooking gear;
   c. coveralls, boots, parkas and rain suits;
   d. emergency funds, including foreign currency if applicable;
   e. axes, machetes, chain saws, floodlights and other heavy equipment;
   f. assorted sieves (up to 3 feet square) to sift mud for evidence;
   g. portable lightweight means of on-site communication, e.g., field telephones, portable radio sets or loudhailers, and spare batteries;
   h. protective packing materials, containers and string for shipping evidence from the site;
   i. voice recording devices and batteries;
   j. a CPI receiver (normally available at SAR units and at the home bases of CPI-fitted aircraft); and
   k. an underwater acoustic beacon receiver (held by SAR units).

INTENTIONALLY LEFT BLANK

Annex F
Chapter 6
A-GA-135-003/AG-001

ANNEX F – AIRCRAFT RECORDING DEVICES BREAKDOWN AND HANDLING



* OBR refers to any recording of communication and/or video to and from the flight deck as per *Aeronautics Act*, Article S22.

INTENTIONALLY LEFT BLANK

Annex G
Chapter 6
A-GA-135-003/AG-001

ANNEX G – STATEMENT OF IMPOUNDING/QUARANTINING/SAMPLING FORM

STATEMENT OF IMPOUNDING/QUARANTINING/SAMPLING

I, (SN, rank, initials, surname), in my capacity as (position), did (impound/quarantine/sample) the items of evidence listed below which pertain to the occurrence on (date) to (type of aircraft) tail (number).

ITEM	DATE/TIME	IMPOUNDED/QUARANTINED/SAMPLED	DISPOSAL OF ITEM	PRESENT LOCATION OF ITEM

_____ _____
Date Signature

INTENTIONALLY LEFT BLANK

CHAPTER 7 - CRASH SCENE HAZARD MANAGEMENT

"It is almost impossible to separately identify and quantify safe limits of exposure…during emergency response and accident investigation activities."
ICAO Circular 315

References: A. International Civil Aviation Organization (ICAO) Circular 315 "Hazards at Aircraft Accident Sites."
B. B-GJ-005-502 FP-000 – EN (Nov 2007) – Risk Management for CF Operations
C. US Air Force Pamphlet 90-803 (11 Feb 2013) – Risk Management Guidelines and Tools
D. "Hierarchy of Controls" accessed at http://www.cdc.gov/niosh/topics/hierarchy/ Hierarchy of controls
E. A-GA-135-002/AA-001 Occurrence Investigation Techniques for the Canadian Force

INTRODUCTION

1. Occurrence scenes can be dangerous due to the presence of biological hazards, armament, ejection seats, caustic or otherwise dangerous liquids (such as hydrazine, Otto-fuel, liquids carried as cargo, aviation fuel and lubricants etc), fire, smoke, LOX, pressurized containers, damaged and inflated tires, jagged metals, carbon fibres, radiation from aircraft instrumentation or other aircraft components, hazardous cargo, and other substances that can harm personnel. Because investigators and other personnel must be on the occurrence scene they need an effective means to manage encounters with these hazards.

2. This chapter reflects an approach to the management of hazards associated with crash scenes which has been endorsed by DFS, TSB, CSASI and TC investigation experts. This chapter is designed to be utilized by the IIC and all AIA representatives and FSI team members in conjunction with the A-GA-135-002/AA-001, *Occurrence Investigation Techniques for the Canadian Armed Forces*, and in particular with Chapter 11 of that manual.

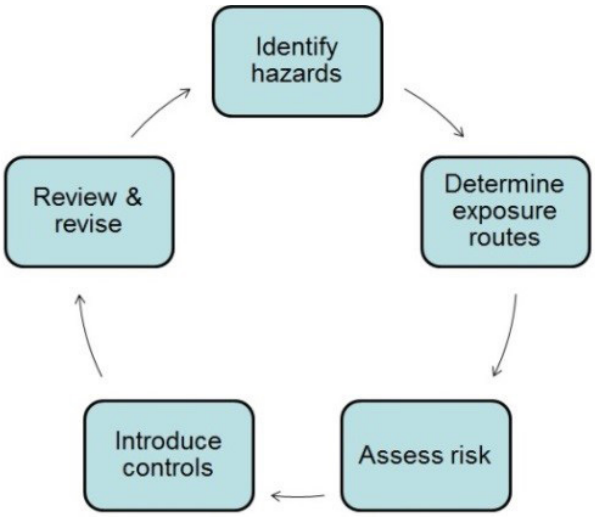
> NOTE
> The A-GA-135-002/AA-001 is a very detailed technical manual that deals with the techniques and procedures used by DND/CAF investigators; although not on wide distribution, it is available from DFS or local WFSOs.

GENERAL APPROACH

3. Crash scene hazard management requires a simple yet effective approach to assure an acceptable level of safety for investigators (and others on the scene). The systematic Risk Management (RM) approach described in this chapter ensures that all hazards are quickly and appropriately risk-managed. Annex A summarizes this RM approach and is provided as a "pocket guide" for quick reference in the field. It is also useful as a checklist for safely "handing over" a crash scene from one responsible agency to another.

SITE RISK MANAGEMENT (RM) PROCESS

4. The site RM process is a simple, systematic process for analyzing and managing crash scene hazards. Fig 1 illustrates the RM process (from Refs A & B), which consists of:



identifying hazards, determining the exposure routes, assessing the risk, introducing “control measures” to mitigate the risks, and reviewing/revising as necessary to ensure effectiveness.

Figure 1. Risk Management Process

IDENTIFYING HAZARDS

5. Aircraft crash scenes are hazardous due to the presence of multiple hazards. As pointed out in Ref A, it is impossible to separately identify and assess each individual hazard on a crash scene. Hazards are often extensively co-mingled and even chemically altered in post-crash fires. Thus, it is more practical to organize and manage crash scene hazards in broad categories rather than as individual hazards. The five categories of crash scene hazards are:

a. Physical: includes broken structures, carbon/composite fibres, stored energy vessels (eg. fire bottles, tires, oleos, etc.), explosives, and radiological hazards;

b. Chemical: includes POL (ie. petroleum, oil, lubricants), metals, metal oxides (ie. burned metal), Viton from burned rubber, Hydrazine (from F-16 Emergency Power Units), and Otto-II torpedo fuel;

c. Environmental: includes heat/cold, fatigue, insects, wildlife, and enemy activity;

d. Psychological: includes direct exposure to traumatic experiences (eg. handling human remains) or indirect exposure (eg. hearing survivor stories); and,

e. Biological: includes Human Immunodeficiency Virus (HIV) and Hepatitis viruses.

EXPOSURE ROUTES

6. Physical hazard exposure can result from inhalation of airborne particles (eg. carbon fibre), contact with sharp or penetrating objects, crushing by unbalanced loads, or exposure to explosive blast/projectiles. Radiological physical hazard exposure can be internal (ie. from ingestion or inhalation) or external (ie. from contact or proximity). Chemical hazards exposure is usually due to contact, inhalation or ingestion. Biological hazard exposure occurs with contact through broken skin (eg. cuts or punctures), but can also occur through contact with intact mucous membranes (eg. mouth and eyes). Psychological hazard exposure can be direct (eg. from witnessing traumatic events) or indirect (eg. from hearing survivor stories).

Environmental hazard exposure depends on the type of specific hazard. Fatigue hazard exposure is a function of time awake both in the short- and long-term.

ASSESSING RISK

7. The risk of a crash scene hazard is determined by considering the severity of injury or mission impact against the likelihood of an occurrence related to that hazard. The baseline risk of a hazard is the risk before the introduction of controls. The residual risk of a hazard is the risk remaining after the introduction of controls. Annex B shows the risk assessment matrix used for crash scene hazards.

CONTROL MEASURES

8. Control measures are applied to crash hazards to assure the residual risks are reduced to an acceptable level of safety. In general, control measures are organized in a hierarchy, with the most effective measures at the top and the least effective at the bottom (see Annex C). Examples of common control measures include: decontamination of wreckage (elimination), access control (administrative control), and use of respiratory protection (PPE). Access and PPE controls are applied universally to all crash scenes. Annex D provides an example of typical elements found in an Access Control Plan.

REVIEWING AND REVISING CONTROLS

9. The individual responsible for the crash scene must review control measures regularly to assure an acceptable level of safety. All personnel on the scene are responsible for reporting unsafe conditions, new hazards, or ineffective control measures. In such instances, the individual responsible for the crash scene must suspend activity on the scene and revise the controls to achieve an acceptable level of safety

CRASH SCENE HAZARD MANAGEMENT MATRIX

10. Annex A can be used as a “pocket guide” to help IICs and FSI team members to manage crash scenes. The matrix outlines the hazard categories, exposure routes, risk levels, and suggested control measures. The risk levels have been “pre-assessed” (using available scientific evidence and expert consensus) to the minimum levels expected for a typical crash. However, individuals responsible for crash scene management may increase the risk levels as conditions warrant. For example, the presence of hydrazine would elevate the chemical risk to high. The presence of enemy activity would elevate the environmental risk to high. The presence of multiple fatalities would elevate the psychological risk to high. Therefore, appropriate control measures to deal with these higher risks would be required.

SPECIFIC HAZARDS

11. There are special considerations for some specific hazards that may be encountered on an occurrence site.

a. Human remains. Ref D details a biohazard exposure control plan, which must be available and consulted whenever human remains are expected on a crash scene. In addition to the bodies of the deceased, an accident site may con-

tain liquid, semi-liquid and dried blood, other bodily fluids, and fragmented and otherwise unrecognizable bone, tissue and internal organs. Appropriate controls including PPE are necessary, but investigators may be reassured that the actual risk of disease transmission from the crash scene is low. However, the risk of psychological injury to FSI team members will be medium to high, and IICs should ensure appropriate controls are in place to mitigate the psychological risks of exposure to human remains.

b. Radiological Hazards. Analysis of the types and amounts of radioactive hazards typically found on RCAF aircraft reveal that the radiological risk normally expected on a crash site is low. Radioactive sources are generally small, well-protected and therefore usually survive accidents intact. Radioactive cargo must be packaged IAW practices that will contain radioactive sources on impact. Depleted uranium, found in ammunition and structures in limited number of RCAF aircraft, represents a risk as a heavy metal (ie. a chemical hazard) more than a radiological risk. Normal controls imposed at crash sites (eg. access control, PPE, and prohibiting eating, drinking and smoking on crash sites) are sufficient to mitigate the low risk of radiological hazards.

PRE-PLANNING

12. The investigator's pre-planning process, as a minimum, includes the following:

a. acquiring appropriate vaccinations;

b. training on principles of crash scene hazard management;

c. training on crash scene access control;

d. selection, donning and doffing of appropriate PPE;

e. training on work practices to minimize exposure to crash scene hazards;

f. training on decontamination procedures for investigative equipment and evidence;

g. training on appropriate shipping procedures for contaminated evidence to off-site examination facilities; and

h. training on appropriate first aid and medical treatment for an exposure incident.

INEXPERIENCED PERSONNEL

13. By necessity there will often be several and perhaps many personnel involved in the investigation of an occurrence that will have little to no training or knowledge regarding crash scene hazards. Therefore it is essential that the trained investigation team lead by example at occurrence sites. This means that the IIC shall brief all personnel that could be exposed to crash scene hazards, determine who is appropriately trained to handle the hazards, and constantly be vigilant regarding risks to personnel involved in the investigation. Under such circumstances, it is critical for investigation team members to demonstrate the correct behaviours around all of the hazards at a crash site so that untrained personnel can emulate the correct behaviour they observe by the professional investigators.

14. In a similar vein, the IIC and investigation team members should be alert for concerns raised by inexperienced personnel on the scene or observations from other experts, such as salvage officers, armament technicians, environmental officers or OSCAR personnel. Any of these personnel may have valid and actionable information that could minimize the hazard exposure risks, and all observations should be considered as the crash scene management plan is put in place and amended on a daily basis.

RECORD KEEPING

15. Careful records of all access to the crash scene shall be maintained to include, at a minimum, the names of personnel accessing the scene, dates and times. Any exposure incidents or injuries shall also be documented. This protects individuals from the consequences of exposure to crash scene hazards and possible associated health problems at a later date as the record might help with diagnosis and treatment. Also, the record may be of value from a pension implication perspective.

EQUIPMENT

16. At an accident site, there may be numerous substances that are hazardous to human health (ex. carbon fibre particles, chemicals, fumes, BBP, etc). It is essential to protect all personnel working at the accident site to avoid skin contact with and/or inhalation/ingestion of these hazardous substances. To meet this requirement for initial accident response, PPE kits are pre-positioned at various locations across Canada as detailed in Annex E.

17. AIA investigators generally should arrive at an accident scene with appropriate PPE for the first few days. This typically will be one “A” kit and two “B” kits (see Annex E, Appendix 1) with supplemental equipment such as heavy duty particulate masks and filters. The IIC should attempt to determine the extent of the hazards at the occurrence site and then request supplemental PPE supply through local suppliers or, if necessary, through DFS.

18. Of note, it is easy to become complacent about crash scene hazards since some effects on personnel may not manifest immediately; therefore, warnings and briefings must become part of the daily routine with appropriate updates as hazards change. Also, climate can be a real challenge in these situations when heat makes use of the PPE onerous and cold makes decontamination extremely difficult. The investigation team must deal with these challenges in a professional manner and seek advice when unexpected problems arise. Full details on practices, procedures and kit contents can also be found in the A-GA-135-002/AA-001, which should be continually consulted during any situation where hazards are encountered.

INTENTIONALLY LEFT BLANK

Annex A
Chapter 7
A-GA-135-003/AG-001

ANNEX A - CRASH SCENE HAZARD MANAGEMENT MATRIX "POCKET GUIDE"

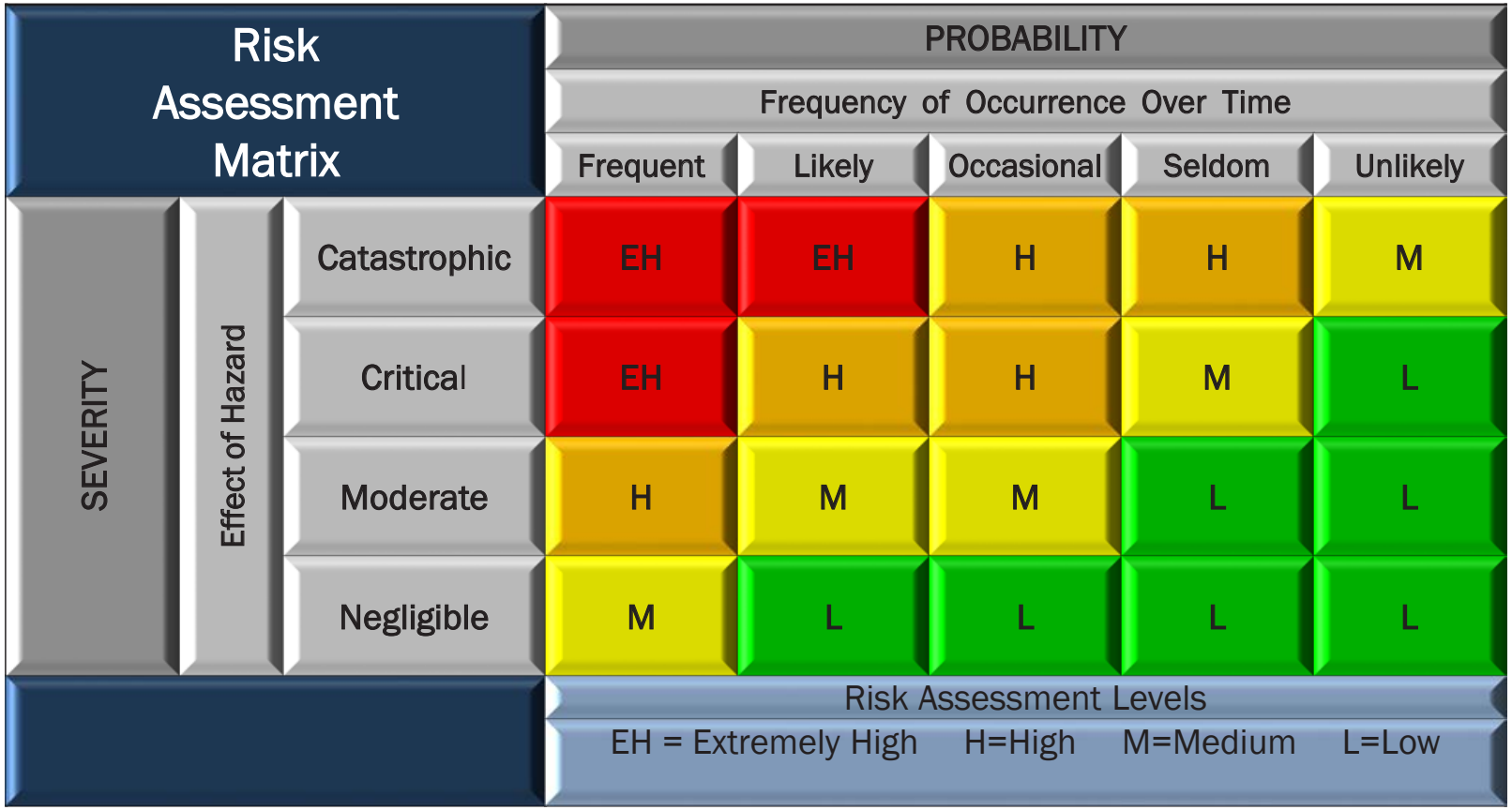
Crash Scene Hazard (CraSH) Matrix				
	Hazard	**Exposure Route**	**Risk**	**Control**
Physical	• Broken structures • Composite fibres (CF) • Explosives • Radiological† • Stored energy	• Cuts • Punctures • Crush • Inhalation/ingestion • Contact/proximity	**High** Likely Probability Critical Severity • Severe injury and/or • Severely degraded mission capability	• Control access • Avoid/cordon • Disarm • Decontaminate • No eating on site • Wear PPE • Apply Fixant (CF)
Chemical	• Petroleum, Oil, Lubricants/fluids • Metals/oxides • Viton (rubber)	• Inhalation • Ingestion • Contact	**Medium** Likely Probability Moderate Severity • Minor injury and/or • Degraded mission capability	• Control access • Avoid/cordon • Neutralize • Decontaminate • No eating on site • Wear PPE
Environmental	• Cold/heat • Fatigue • Insects/wildlife • Enemy/Security • Political Situation	Variable	**Medium** Likely Probability Moderate Severity • Minor injury and/or • Degraded mission capability	• Control access • Implement site security • Apply work/rest cycles • Feeding/hydration • Insect repellent/tick removal • Wear sunscreen • Wear clothing appropriate for the weather • Wear PPE
Psychological	• Traumatic exposure†† • Fatigue and circadian disruption	• Direct exposure • Indirect exposure (vicarious trauma, narratives)	**Medium** Likely Probability Moderate Severity • Minor injury and/or • Degraded mission capability	• Control access • Apply work/rest cycles • Monitoring • Limit exposure and control information release • Wear PPE
Biological	Blood Borne Pathogens • HIV • Hepatitis B/C	• Cuts • Punctures • Via mucous membranes	**Low** Unlikely Probability Critical Severity • Severe injury	• Control access • Decontaminate • No eating on site • Wear PPE • Vaccinate†††

† Although the injury sustained from Radiological hazards could be severe, the probability of exposure is considered improbable and therefore the risk is considered LOW.
†† The potential for severe traumatic exposure may increase the assessed risk level to HIGH in certain circumstances
††† Advance vaccination is encouraged and could be mandatory for all personnel who attend a crash scene

INTENTIONALLY LEFT BLANK

Annex B
Chapter 7
A-GA-135-003/AG-001

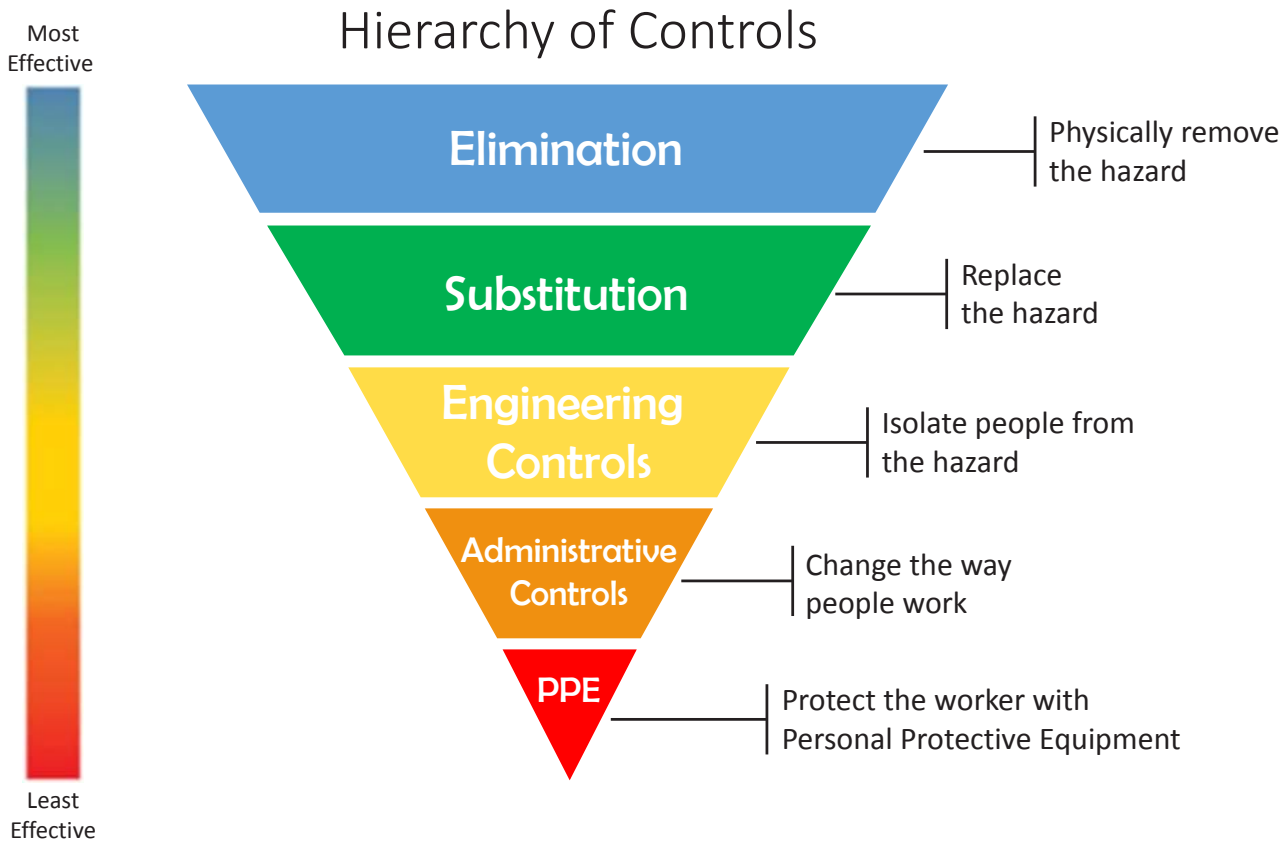
ANNEX B - RISK ASSESSMENT MATRIX



INTENTIONALLY LEFT BLANK

Annex C
Chapter 7
A-GA-135-003/AG-001

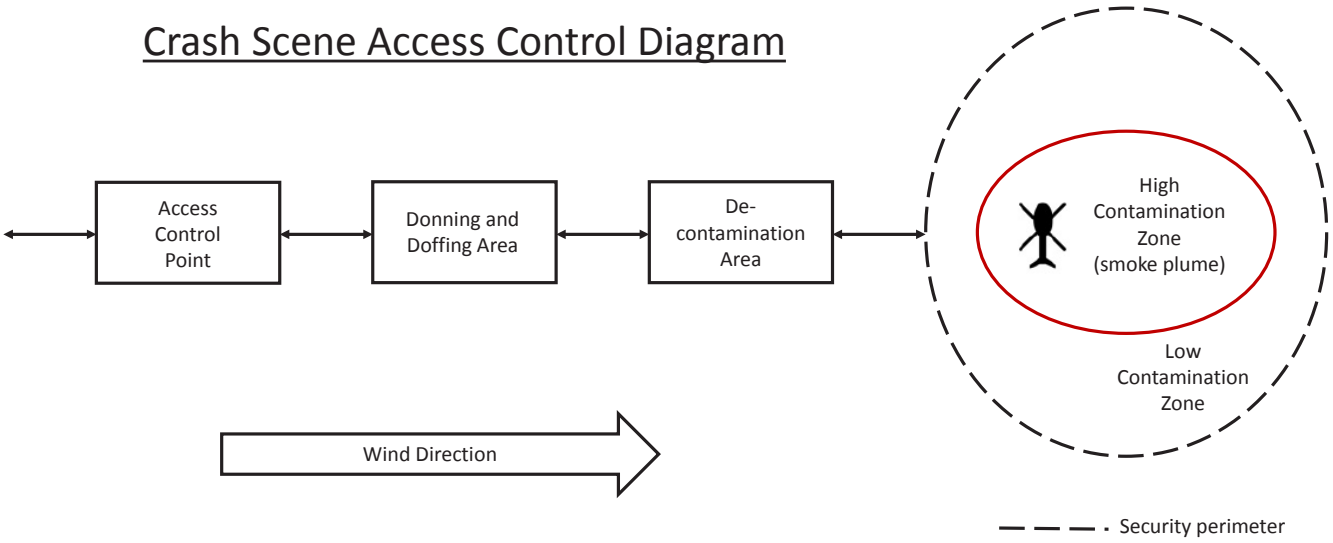
ANNEX C - HIERARCHY OF CONTROLS



INTENTIONALLY LEFT BLANK

Annex D
Chapter 7
A-GA-135-003/AG-001

ANNEX D - TYPICAL ELEMENTS IN ACCESS CONTROL PLAN



INTENTIONALLY LEFT BLANK

Annex E
Chapter 7
A-GA-135-003/AG-001

ANNEX E – PERSONAL PROTECTIVE EQUIPMENT (PPE)

EQUIPMENT REQUIRED

1. The following PPE shall be available:

   a. Coveralls. Coveralls shall be comfortable, light and repellent to the great majority of liquids. Since they are very distinctive, they will also assist in site security.

   b. Gloves. The gloves shall be leather work gloves or service gloves providing adequate protection for most contaminated situations. With liquid contamination, rubber overgloves shall be used. If there is biohazardous material present, nitrile gloves should be worn under the leather work gloves.

   c. Boots. Combat boots provide good protection and should be cleaned or changed before the wearer leaves the site. If there is liquid contamination, rubber over-boots shall be used.

   d. Goggles. The goggles shall protect against splashing liquids and flying debris and provide considerable protection from dust.

   e. Disposable Industrial Dust Mask (referred to as N95 mask). When this light, comfortable industrial dust mask is properly fitted to the face it allows very little unfiltered air to be inhaled. It provides adequate protection from particulate hazards such as composite fibres, lead oxide dust, depleted uranium dust and asbestos. The N95 mask requires a formal biennial fitting which can be arranged through Base Fire Halls or their equivalents. Instructions on use will be provided at the time of fitment.

   f. Reusable Half Face Piece Respirator. The half face mask provides filtering protection against particulates, many gases and vapours (depending on which filter is used). The half face mask is to be used instead of the N95 mask when the concentration of airborne contaminants is higher or if there are any concerns about the level of protection offered by the disposable industrial dust mask. The half face piece respirator is not a self contained breathing apparatus and should not be used when unknown fumes are present, ambient oxygen supply is short, or if there are substances present for which the filter was not designed. This mask requires a formal biennial fitting which can be arranged through Base Fire Halls or their equivalents. Instructions on use, storage and cleaning will be provided at the time of fitment. Due to current allotment levels, only designated FS personnel will be assigned a half face piece. Designation will be determined and subsequently tracked by the appropriate WFSO or UFSO.

NOTE
In the absence of a suitable half-face mask, the DND issued CBRN Gas Mask has been assessed as an acceptable alternate.

g. Miscellaneous PPE. Antiseptic hand-wipe, half face piece respirator cleaning wipes, masking tape for sealing ankle and wrist cuffs, etc.

> NOTE
> If in doubt as to the type or concentration of substances present, do not approach the occurrence site without consultation with fire fighters or preventive medicine technicians on the type of protective equipment that should be worn. Generalized questions regarding PPE should be directed to DFS.

DISTRIBUTION OF PERSONAL PROTECTIVE EQUIPMENT KITS

2. Personal protective equipment kits are issued for aircraft accident sites as per Appendix 1. These kits are the responsibility of the FSO. DFS distributes the kits as follows:

a. A Kit (15 person): 5 Wg Goose Bay; 9 Wg Gander; 16 Wg Borden; 22 Wing North Bay; CFB Edmonton; CFB Gagetown; CFB Wainwright; 3 CFFTS; 408 Sqn Edmonton; 427 Sqn Petawawa; 430 Sqn Valcartier; 438 Sqn St. Hubert; 440 Sqn Yellowknife.

b. B Kit (30 person): 2 Wg Bagotville (2 kits); 3 Wg Bagotville; 4 Wg Cold Lake; 8 Wg Trenton; 12 Wg Shearwater; 14 Wg Greenwood; 15 Wg Moose Jaw; 19 Wg Comox; 443 Sqn Pat Bay; 450 Sqn Petawawa (DFS will deploy this kit as required to augment the responding Wg's kit).

c. C Kit (50 person): DFS; 17 Wg Winnipeg (2 kits - DFS will deploy this kit as required to augment the responding Wg's kit).

3. Replenishment of kits can be coordinated through DFS 2-4-2.

Appendix 1
Annex E
Chapter 7
A-GA-135-003/AG-001

APPENDIX 1 – PERSONAL PROTECTIVE EQUIPMENT KITS

Personal Protective Equipment Kits			
Item (*indicates an item that expires)	Kit Type		
	A (15 Person)	B (30 Person)	C (50 Person)
Hooded coveralls	30	60	100
Boot covers (pairs)	30	60	100
Leather work gloves (pairs)	15	30	50
Chemical and oil protection gloves (pairs)	15	30	50
Nitrile / Latex gloves (pairs)	90	180	300
N95 particulate respirator (disposable dust masks)	90	180	300
Half-face respirators	5	10	10
*P100 organic vapor cartridges (filters for half-face respirators, in pairs)	5	10	10
Cleaning wipes for respirators (100/box)	1	1	2
*Antiseptic hand sanitizer (115 ml bottle)	5	10	30
Goggles	15	30	50
Masking tape (1.5 inch x 55 meters)	5	10	30
Bio-hazardous waste bags	15	30	50

INTENTIONALLY LEFT BLANK

CHAPTER 8 - AIRWORTHINESS INVESTIGATIVE STANDARDS

BACKGROUND

1. One of the basic tenets of the DND/CAF Airworthiness Program is that airworthiness activities will be conducted by authorized individuals, to an accepted standard. As outlined in Chapter 1, one of the specific tasks assigned to the AIA is to issue airworthiness investigative standards respecting the investigation of aviation-safety-related occurrences and issues that will meet the aviation safety requirements of the *Aeronautics Act*. This chapter of the AIM outlines the AIA's investigative standards.

CERTIFICATION AND AUTHORIZATION

2. In order for the AIA to authorize individuals to conduct the various activities associated with airworthiness investigations, the individuals must be certified to conduct the activities. Often the certification follows the successful completion of the appropriate training that may include formal courses, informal field training under the supervision of qualified individuals, the successful completion of exams and/or supervised completion of investigations and associated reports. In the case of some team specialists their certification comes from DND/CAF training on a particular aircraft type or a qualification in a special area (arrestor gear or flight test for example). Once certified, individuals become authorized to conduct the airworthiness investigations through the AIA tasking message or through the duties associated with their FS positions (ex. WFSO, UFSO) as outlined in the FSP.

SCOPE

3. The Airworthiness Program has made great effort to separate the responsibilities of the AIA, the TAA and the OAA; however, overlaps remain that are addressed by including appropriate procedures and direction within each authority's detailed program documentation. Also, the establishment of formal agreements to manage the interface between the various authorities is encouraged. In the case of the AIA these agreements include Letters of Understanding, various Memoranda and Service Level Agreements between the AIA and the expert investigative support organizations (AETE, QETE, DRDC, NRC, MCE, RCMP the OAA and TAA, etc) that establish the specific roles and responsibilities of the relationships associated with airworthiness investigations.

4. When the AIA becomes involved with investigations outside of the DND/CAF scope of activities, such as with the Transportation Safety Board, other Militaries (NATO, ASIC, etc) or other Airworthiness Authorities (NTSB (USA), AAIB (UK), etc) the interface is conducted through coordinated investigation protocols. Details on these instances are covered in Chapters 13 and 14 of this manual.

5. Within the DND/CAF Airworthiness Program, there is one "investigator" role and that is fulfilled by the AIA. While both the OAA and TAA staffs gather information, analyse it and make recommendations based on these processes, these activities are done for Operational or Technical Airworthiness assessment purposes and are not airworthiness investigations. For example, technical assessments deal with issues associated with the design, manufacture, maintenance or materiel support of an aeronautical product. Airworthiness investigations

are usually conducted as the result of an occurrence and / or to investigate matters of safety involving both an operational and a technical nexus. This manual is concerned only with airworthiness investigations. A non-exhaustive list of airworthiness investigation documentation, as well as other investigation-related reference documentation is provided at Annex A.

GENERAL

6. DND/CAF airworthiness investigations can be conducted by entities ranging from one person to large teams comprised of authorized accident investigators who are assisted by specialists. These specialists can include:

a. operational specialists for the particular platform or system involved in the occurrence;

b. technical specialists for the particular platform or system involved in the occurrence;

c. medical experts, usually Flight Surgeon qualified;

d. Human Factors (HF) specialists;

e. escape system specialists;

f. ALSE specialists;

g. Cockpit Voice Recorder/Flight Data Recorder (CVR/FDR) or other recording medium specialists;

h. engineering specialists provided by QETE;

i. flight test specialists provided by AETE;

j. wreckage scene mapping and documentation (MCE or RCMP);

k. other experts as required (such as aerodynamics or explosives experts); and

l. observers.

AIRWORTHINESS INVESTIGATORS

7. Airworthiness investigators receive special training on aircraft occurrence investigation. Proper occurrence investigation requires unique skills that must be developed through a combination of formal training and practical experience. The more complex an occurrence, the more developed the airworthiness investigator's skill sets must be to successfully and efficiently complete the assigned tasks. However, the variation in complexity of aircraft occurrences makes it impractical to expect all investigators to have the same skills and therefore to implement a universal standard for investigators. Accordingly, a hierarchy of standards is utilized for airworthiness investigators, to meet the requirements imposed by the occurrence classification system outlined in Chapter 5 of this manual with the details on the management and training requirements of the various investigator levels being contained in Chapter 9.

8. Each occurrence to be investigated will have an assigned Investigator-In-Charge (IIC). The IICs may investigate by themselves or a team of specialists may support them.

Regardless, the responsibilities of the IIC are as follows:

a. conducting, on behalf of the AIA, a thorough and efficient investigation of the occurrence (refer to Chapter 11 for details regarding investigation administration and ethos regarding this aspect);

b. leading and effectively managing assigned members of the investigation team. In the case of major investigations, this may include exercising operational control over the assigned members of the investigation team and various support elements, employing appropriate procedures that may include using *MAIRs* and completion of *MAIR* Forms, conducting required briefings and effectively using appropriate resource management techniques, thereby allowing these various support elements to be successful and safe in completing their assigned tasks. Further, IICs must ensure appropriate reports and other support documents are produced by all elements in both the field and the post field phases while ensuring all investigation information is safeguarded as required by the *Aeronautics Act* and *MAIRs*;

c. effectively conducting site management, site safety, identifying evidence to be shipped for further investigation, liaising with recovery and salvage teams, ensuring awareness of any hazards that are associated with evidence are positively identified and shipped via an appropriate mode of transport (i.e. Transportation of Dangerous Goods);

d. gathering, preserving and cataloguing evidence along with supporting notes and logs so that investigations can be pursued by other investigators should transfer of the investigation responsibility be necessary. This may involve leading major recovery efforts in remote areas or under austere conditions, detailed photo and film documentation, innovative survey, preservation and catalogue methods and / or any other state of the art investigation protocols;

e. identifying effective PMs as quickly as possible and recommending them to the AIA (for onward transmission to the CoC) in a timely manner and keeping the AIA informed of daily progress through Situation Reports (see Annex B for sample FSI Sitrep Template);

f. dealing with NoK, media and DND/CAF personnel as per AIA guidelines (Chapter 12);

g. ensuring that the resources expended on the investigation are justified and that the costs are captured and reported IAW the Financial Administration Act (FAA);

h. completing all required staff work as per AIA guidelines, including thorough, written reports IAW the published timelines and information security requirements of the *Aeronautics Act* and *MAIRs*; and

i. effectively carrying out or managing any tasks associated with the investigation in the field and post field phase as required by the AIA.

9. The IIC may be assisted by a team of one or more trained accident investigator(s). Normally an accident investigator will receive formal training as determined by the AIA before being authorized to participate in an occurrence investigation as a team member; however, the AIA reserves the authority to appoint any team members with or without formal training based

upon extant circumstances.

AIRWORTHINESS INVESTIGATOR TRAINING

10. Airworthiness Investigator training will be accomplished through formal courses and, for some investigator categories (IIC 2 & IIC 1), with field training.

11. Formal courses will consist of both in-service courses, such as the Flight Safety Course (FSC), as well as out-service courses conducted by accredited organizations and educational or other similar institutes (such as TSB (Canada), NTSB or FAA (USA), Cranfield University (UK), the Southern California Safety Institute (SCSI), Embry-Riddle Aeronautical University, etc). Due to the wide variation in out-service courses available, the AIA's staff will usually develop a customized training package for investigators based on the current yet changing requirements within the AIA investigator staff.

12. Field training consists of following an On Job Training Syllabus (OJTS) that is accomplished through field investigation exposure and two other types of formalized field training that will be conducted for training IIC 2s and IIC 1s. This formalized field training consists of shadow training and Acting-IIC training:

a. Shadow training is the first step in achieving specified qualifications. In this phase, the trainee monitors a qualified individual as they conduct an investigation from initial planning of the field portion of an investigation to submission of the final report. The IIC will submit comments on the Shadow Trainees performance to the DFS Senior Investigator (SI) and the Standards and Training Officer (DFS 2-7) for the training files. An example of these comments would include documentation of exposure to team safety briefs, site cordon procedures, donning of PPE, content of Hazmat kits, ejection seat examination procedures, witness interview observations, NoK contact, etc. A trainee normally completes the shadow phase of training prior to conducting the Acting-IIC phase; and

b. Acting-IIC training occurs when the trainee completes all IIC duties for the applicable classification of occurrence under the supervision of an appropriately qualified IIC. At the completion of the investigation, the supervising IIC submits a written progress report on the trainee to the SI and DFS 2-7. The SI and DFS 2-7 will use these reports to form the basis for any recommendations for IIC advancement to the Chief Investigator, who will in turn assess progress and make recommendations for IIC certification, when merited, to the AIA.

AIRWORTHINESS INVESTIGATOR CATEGORIES

13. Air accident investigators are divided into two categories: Basic Investigator (BI) and IIC. These categories are subdivided into BI 2 and BI 1 and IIC 3, IIC 2 and IIC 1. The AIA issues all investigator categories although, through letters of delegation and for reasons of efficiency and span of control, some of this authority is delegated to various individuals (see Annex C for an example of an AIA Delegation of Authority Letter). As required by the *Aeronautics Act* in Part II section 13(2) and section 14(14), investigators are issued formal identification cards indicating their authorized categories. This may be accomplished through endorsements to an existing identification card as higher categories are obtained. Tables summarizing the training/ experience requirements, duties and validity periods for each category of investigator are

found in the following sections.

BASIC INVESTIGATOR

14. The qualifications for the two sub-categories of BI are summarized in Table 1. All BI categories are valid for a period of five years from the date of issue. However, this period may be extended by the issuing authority if the individual has been continuously employed in a FS position (UFSO, UFS NCM, WFSO, WFS NCM, 1 CAD FS Staff or DFS staff):

a. BI 2. A BI 2 is qualified and certified to act as an airworthiness investigation team member of Class I to IV investigations and is qualified to conduct Class III & IV investigations. To qualify as a BI 2, the individual must have completed the FSC and obtain the AKYZ qualification. Further, they must complete the BI 2 exam and be issued a BI 2 certification as outlined in Chapter 9. The FSC may be waived for a period of up to 12 months by the AIA. A BI 2 is typically required for a UFSO or a UFS NCM position. A BI 2 category is normally required for individuals assigned to Wing FSO, WFS NCM or 1 CAD FS Staff positions and for individuals whose duties will entail regular membership on Airworthiness Investigation teams; and

b. BI 1. A BI 1 is qualified and certified to act as an airworthiness investigation team member of Class I to IV investigations. To qualify as a BI 1, the individual must be certified as a BI 2 and complete a basic aviation safety investigator course at an accredited or like institution. The FSC can be waived for a period of up to 12 months by the AIA. A BI 1 category is normally required for individuals assigned to DFS as Airworthiness Investigators.

Investigator Category	Training Required	Duties	Valid Period
Basic Investigator 2	FSC Completion of BI 2 Certification Exam	Investigation Team member for Class I to Class IV investigations	5 years from date of issue Extended if continuously employed in a FS position
Basic Investigator 1	As above plus Basic aviation investigator course	As above plus Commence upgrade for IIC of Class I & II investigations	5 years from date of issue Extended if continuously employed in a FS position

Table 1 - Basic Investigator Requirements and Duties

INVESTIGATOR-IN-CHARGE

15. There are three sub categories of IIC: IIC 3, IIC 2 and IIC 1. The qualifications for the categories of IICs are summarized in Table 2. All IIC categories are valid for a period of five years from the date of issue. However, this period may be extended by the issuing authority if the individual has been continuously employed in a flight safety position (WFSO, WFS NSM, 1 CAD FS Staff or DFS staff). A brief description of each of these categories is as follows:

a. IIC 3. An IIC 3 is qualified and certified to act as the IIC for investigations up to the Class III level. In order to be certified as an IIC 3, the individual must have a current BI 2 or BI 1 category and pass an AIA examination as outlined in Chapter 9. The FSC may be waived for a period of up to 12 months by the AIA. This will only be done in extenuating circumstances and only if the AIA is convinced through recommendation of the 1 CAD FSO that the individual concerned has sufficient experience to competently complete the tasks until formal training can be completed and that no other qualified IIC is available at the time of occurrence. An IIC 3 is normally a WFSO, WFS NCM or 1 CAD FS desk officer and is authorized to release, review or amend reports on this level of investigations;

b. IIC 2. An IIC 2 is qualified and certified to act as the IIC for investigations up to the Class II level. To be certified as an IIC 2, normally the individual must have a current IIC 3 and BI 1 category and pass an AIA examination. In addition, an IIC 2 normally should complete OJTS IIC phase of field training but the AIA may waive this training if he/she is satisfied that the investigator has appropriate field experience. A person awarded an IIC 2 category is normally an individual assigned to DFS as an airworthiness investigator or by the 1 CAD FSO as per the AIA delegation letter for that position (see Annex C); and

c. IIC 1. An IIC 1 is qualified and certified to act as the IIC for all airworthiness investigations. To be certified as an IIC 1, the individual should initially have an IIC 2 category. Normally the incumbent should have completed an advanced aircraft accident investigation course (or equivalent level specialty course). In addition, an IIC 1 should have completed the IIC OJTS; however, the AIA may waive the shadow and Acting-IIC field training if he/she is satisfied that the investigator has appropriate field experience. A person awarded an IIC 1 category is always an individual assigned to DFS as an airworthiness investigator.

Investigator Category	Training Required	Experience Required	Duties	Valid Period
IIC 3	FSC BI 2 Completion of IIC 3 Certification Exam	A/R	Act as IIC of Class III & IV investigations at Wing/Unit	5 years from date of issue Extended if continuously employed in a FS position
IIC 2	As above plus Basic aviation safety investigator courses (as determined by AIA/DFS) DFS OJTS Completion of IIC 2 Certification Exam	Participated in 2 investigations as a BI1 Recommended by Senior and Chief Investigators	Act as IIC of a Class II, III or IV investigation	5 years from date of issue Extended if continuously employed in a FS investigator position
IIC 1	As above plus IIC 2 qualified Advance aircraft investigation course (or equivalent) DFS OJTS	Participated in 2 Class I investigations Completed 2 Class II investigations as IIC Recommended by Senior and Chief Investigators	Act as IIC of a Class I, II, III or IV investigation	5 years from date of issue Extended if continuously employed in a FS investigator position

Table 2 – Investigator-in-Charge Requirements and Duties

INVESTIGATION TEAM SPECIALISTS

16. Investigation team member specialists often hold qualifications awarded by various professional organizations. It is not the intent of this manual to establish the standards of these professional organizations; however, the personnel that are assigned to fill a position as a member in a specialist capacity of an airworthiness investigation team are usually certified by the Commanding Officer, Head of Department, etc, of the applicable specialist organization as holding the appropriate qualifications. The objective of this section is to outline the general qualifications that must be held by an individual in order to participate in an aircraft occurrence investigation as an authorized investigation team specialist. The FSI tasking message is the vehicle that the AIA uses to authorize investigation team members to conduct airworthiness investigations for each occurrence.

17. Operations Specialists. Operations Specialists are included on airworthiness investigation teams to provide specialist knowledge with respect to the operation of the type of aircraft involved in the occurrence. These individuals are normally from the air operations MOSIDs. In order to act as an Operations Specialist, the individual should currently hold or have held (within the last 12 months, if possible) a qualification, as established by the applicable Standards and Evaluation Team, to operate the aircraft or one of its established crew positions. Ideally, this specialist should be a senior operator such as Formation Lead, Aircraft Captain, A-1 QFI, Instructor Pilot/ACSO/AEC, Standards Officer, Shift Supervisor, Wing Air Traffic Control Officer, etc. In addition, in order to enhance independence and credibility, all efforts must be made to find such specialists that are not directly or indirectly related to the occurrence unit. Although very beneficial, Operations Specialists do not need to have aircraft occurrence investigator training but it is crucial to the investigation that they possess a superior knowledge of their respective field of expertise.

18. Technical Specialists. Technical Specialists are included on airworthiness investigation teams to provide specialist knowledge with respect to the maintenance and/or engineering of the type of aircraft involved in the occurrence. These individuals are normally from the AERE or aircraft technician MOSIDs and must typically have sufficient rank and staff experience to handle the investigation role and follow-on report writing responsibilities. For some fleets, due to the support and technical arrangements in existence, this individual may be a contractor employee. In order to qualify as a Technical Specialist, the individual must currently hold or have held (within the last 12 months) the appropriate technical qualification to the occurrence circumstances. Although it would be very beneficial, Technical Specialists do not need to have aircraft occurrence investigator training but it is crucial to the investigation that they possess a superior knowledge of their respective field of expertise.

19. Medical Experts. Normally, the investigating medical expert will be the DFS Flight Surgeon. Should the DFS Flight Surgeon not be available, a Flight Surgeon will be appointed from another unit after appropriate consultation with medical authorities. Flight Surgeons are included on airworthiness investigation teams to provide specialist medical knowledge, evaluate the physical, medical and physiological factors that may have had input into the occurrence, and be the team's representative for medical processes such as autopsies and bodily fluids and tissue sampling. They will also be concerned with supplying expertise on survivability including crash dynamics-injury patterns and ALSE, and the broad spectrum of human factors and human performance aspects of the investigation. Additionally, the Flight Surgeon is usually the primary contact for the coroner and for NoK interviews. Normally, investigating Flight Surgeons will have achieved post-graduate training in Aerospace Medicine and ideally will have achieved or will be working to achieve post-graduate training in public or occupational health or another health-related field.

20. Human Factors Specialists. The Human Factors Specialist (HFS) member of the investigation team explores and recommends solutions to the many human factors related problems in aviation. The HFS must have a strong working knowledge of the various realms of human factors science. At the site, the primary task of the HFS will be to collect and process all human factors information associated with the occurrence. The HFS can also act as a conduit between the AIA and human factors researchers employed both in academia and in government, thus providing DND/CAF with the benefit of direct access to leading edge human factors research. An HFS should have their basic MOC training and achieved or are working towards achieving a Master's Degree in Human Factors or a related discipline.

These specialists must be certified by CFEME prior to becoming an authorized specialist airworthiness investigation team member.

21. Crew Systems Specialists. In order to qualify as a Crew Systems Specialist, the individual must have a combination of formal training and experience working with the restraint and ejection seat systems currently used by DND/CAF. The Flight Test Authority (FTA) will establish these qualifications and beyond the specific crew systems training, will normally include FS training (BI 2 category). These specialists must be certified by the FTA prior to becoming an AIA authorized specialist airworthiness investigation team member. Crew Systems Specialists are included in airworthiness investigations to safety, inspect and confirm the crew systems equipment functioned as designed.

22. ALSE Specialists. An ALSE Specialist is included on airworthiness investigation teams to inspect ALSE following an occurrence to determine how well the equipment functioned and to suggest improvements, if deemed necessary. The ALSE Specialist must possess extensive knowledge and experience in working with ALSE equipment from both a design and evaluation perspective. The ALSE Specialist should have their basic MOSID training and extensive ALSE operational experience. These specialists must be certified by CFEME prior to becoming an AIA authorized specialist airworthiness investigation team member.

23. Aeromedical Specialists. Due to the operational intensity associated with many incidents or accidents, the DFS Flight Surgeon will, at times, require assistance from trained medical personnel to achieve his / her goals during an investigation. The CAF possesses such qualified personnel in the form of Aeromedical Technicians (AMT). An AMT Specialist is included on airworthiness investigation teams to assist the investigating Flight Surgeon when/as required. An AMT Specialist should have their MOSID basic training and extensive experience as an Aeromedical Technician. These specialists must be certified by CFEME prior to becoming an AIA authorized specialist airworthiness investigation team member.

24. Cockpit Voice Recorder/Flight Data Recorder (CVR/FDR) Specialists. In order to qualify as a CVR/FDR Specialist, the individual must have a combination of formal training and experience working with the CVR/FDRs currently used by DND/CAF and any other medium employed for similar purposes. These qualifications will be established by the NRC Flight Recorder Playback Centre (FRPC) Manager and will normally include BI 2 category. CVR/FDR Specialists must be certified by the NRC prior to acting as an AIA authorized specialist airworthiness investigation team member.

25. Engineering Specialists. In order to qualify as an Engineering Specialist, the individual must have a combination of formal training and experience in aircraft accident investigations, along with engineering training or other special training or skills to offer expert advice to airworthiness investigations. These qualifications will be established by the Superintendent of QETE and will normally include FS training (certified BI 2 category), specialist courses and other accident investigation training as determined by QETE. Further, an OJT program will be set up for new engineers so that experienced Engineering Specialists can mentor and monitor personnel as they become qualified. Engineering Specialists must be certified by the Superintendent of QETE prior to acting as an AIA authorized engineering specialist airworthiness investigation team member.

26. Flight Test Specialists. Flight Test Aircrew, Engineers or Technologists must be certified by the FTA in order to participate in an aircraft occurrence investigation as an AIA authorized

Flight Test Specialist investigation team member.

27. Other Experts (as required). Sometimes due to the circumstances of an occurrence, special expertise is needed to properly investigate all aspects of the event. These personnel will be added to an investigation team as the circumstances dictate and are added to the team based on their special knowledge areas. Past examples include arrestor gear experts, aerodynamicists and explosive experts. These personnel will not likely have FS or accident investigation training.

BRIEFINGS

28. The IIC, or their designate shall provide briefings on the behaviours expected of investigation team members (information confidentiality, NoK contacts, releasing authority for information, etc) and the hazards and necessary protocols to mitigate them during the investigation (see Chapter 11, Annex A – IIC Checklist). These briefings must be conducted at the appropriate time, particularly for team members that are not FS qualified. During the investigation, similar briefings for all new team members should be part of the team joining protocols.

OBSERVERS

29. As indicated in the *Aeronautics Act* in Part II section 17(2) and *MAIRs* 6(1) and 6(2), and under any conditions the AIA may impose, a person may attend as an observer to an airworthiness investigation. The three general sets of circumstances under which an individual will be granted observer status are listed as follows:

a. an individual has been designated as an observer by a Minister of the Crown whose department has a direct interest in the investigation. This would normally only happen in the event of a civil-military occurrence;

b. an individual is an accredited representative pursuant to an international agreement or convention (such as STANAG 3531, ASIC Air Standard 85/2A or ICAO Annex 13); and

c. an individual is invited to attend as an observer if, in the opinion of the AIA, the person is likely to contribute to achieving the objective of the investigation. An example of this case would be a representative of the Original Equipment Manufacturer (OEM) of the aircraft or engine involved in the occurrence.

30. The AIA will determine the conditions and limitations placed on the activities of observers involved in an investigation by way of a formal letter granting observer status (see Annex D), which the IIC should discuss in detail with the observer.

31. Notwithstanding any of these conditions, observers will not have the right to participate in the formal (recorded) interviews of witnesses and will not have the right to have access to privileged information. However, the IIC has the authority to allow an observer access to these information sources if, in the opinion of the IIC, such access would further the investigation and no other means to accomplish such furtherance are apparent. Observers will be required to sign the Observer Non-Disclosure Agreement (see Annexes E and F as appropriate), stating that any information, privileged or otherwise, related to the on-going airworthiness investigation will not be discussed or disclosed to any person not assigned to the investigation without prior

approval by the AIA.

32. Failure to sign the non-disclosure agreement or unauthorized disclosure of information related to the on-going airworthiness investigation will result in the removal of observer status for the individual concerned. Furthermore, as indicated in the *Aeronautics Act* in Part II section 17(3), the observer may be removed if any condition set by the AIA is contravened or if the observer's attendance creates a conflict of interest that might impede the investigation.

33. Note that the non-disclosure agreement indicates to all observers that failure to abide by the communication of information restrictions is contrary to the *Aeronautics Act* section 24.6(2) and *MAIR* 6(2) and constitutes a punishable offence upon summary conviction.

INTENTIONALLY LEFT BLANK

Annex A
Chapter 8
A-GA-135-003/AG-001

ANNEX A – REFERENCE DOCUMENTATION

- *Aeronautics Act* *
- *Canadian Transportation Accident Investigation and Safety Board Act* *
- ICAO Doc 9839 AN/474, Safety Management System Manual Third Edition 2013 *
- ICAO Aircraft Accident Investigation Convention on International Civil Aviation, Annex 13 *
- A-GA-135-001/AA-001, Flight Safety for the Canadian Armed Forces
- A-GA-135-002/AG-001, Occurrence Investigation Techniques *
- A-GA-135-003/AG-001, Airworthiness Investigation Manual *
- B-GA-015-001/FP-001, Human Factors Guide for the Conduct of Aircraft Accident Investigation *
- B-GA-015-002/FP-001, Aircraft Accident Board of Inquiry Handbook–Technical Member *
- B-GA-015-003/FP-001, Notes for the Conduct of Investigations into Aircraft Accidents *
- B-GA-015-004/FP-001, Aircraft Accident Board of Inquiry Handbook-Aircrew Member *
- CFACM 2-350, Emergency Response Planning
- CFTO C-02-015-001/AG-000, Unsatisfactory Condition Report–CF 777
- CFTO C-05-010-002/AG-000, Aircraft Salvage Procedures
- CFAO 24-6, Investigation of Injuries or Death–Coroner's Inquest
- CFAO 59-3, Claims By or Against the Crown
- CFAO 210-1, Civilian Witnesses–Fees and Expenses
- QR&O 21.47, Finding of Injury or Death
- QR&O 21.56-57, Aircraft Accidents
- QR&O 24.20, Post-mortem Examination
- CFMO 42-03-04, Medical Investigation and Reporting of Aircraft Accidents/Aeromedical Incidents
- STANAG 3101, Exchange of Accident/Incident Information Concerning Aircraft and Missiles
- STANAG 3318, Medical Aspects of Aircraft Accident/Incident Investigation
- STANAG 3531, Investigation of Aircraft/Missile Accidents/Incidents
- ASCC Air Standard 85/2A
- B-MD-007-000/AF-003, CF Flight Surgeons' Guidelines for FS Investigation
- DAOD 3002-4, Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting
- Working Arrangement between the Transportation Safety Board of Canada Air Investiga-

tions Branch and the Department of National Defence Directorate of Flight Safety

> Note
> Documents annotated with an asterix are core references for the FS Course and contain essential information for FSOs.

Annex B
Chapter 8
A-GA-135-003/AG-001

ANNEX B – FSI SITREP TEMPLATE

FS INVESTIGATION SITREP #___

This report contains information related to an on-going FS investigation. Information shall not be released to the public in whole or in part except under the authority of the Director of Flight Safety, National Defence Headquarters.

Date/time: Use local time

Accident aircraft tail #:

Location:

Details of actions completed since last sitrep: For initial sitreps, include arrival status of team members. Include a summary of any pertinent factual information collected since last sitrep, like witness interviews completed, photographs taken and recorders removed/sent. Include any on-site analysis since the last sitrep sent. Avoid conjecture.

Information known to date: Include any information that the investigation has unfolded so far. If this contains privileged information as per the aeronautics act this information should be clearly labelled as such. The IIC might consider sending such information encrypted to teh AIA.

Details of next planned action items: Include plan for next day team action items. Identify any extra support required for the investigation like logistical support, administrative support, public relations and financial approvals.

PM taken: Include any immediate safety actions taken by the unit or any higher-level agency (not already reported in a sitrep).

Recommended immediate PM: Include any recommended measures that the team feels, after initial analysis, may prevent similar incidents / accidents in future (not reported in a previous sitrep).

Administration: Place to include investigation cost during the day and expected cost for coming day.

IIC hotel info: Only required in first sitrep unless it changes. Include hotel phone number.

CONTACT NUMBERS: ONLY REQUIRED IN FIRST SITREP UNLESS CHANGES OR ADDITIONS ARE MADE. INCLUDE ALL TEAM MEMBERS CELLULAR, SUPPORT CELL OR OPERATIONS DESK CONTACT NUMBERS, SATCOM AND / OR PAGER NUMBERS.

IIC NAME:

Le présent rapport contient de l'information relative à une enquête en cours de la SV. L'information ne doit pas être rendue publique, en tout ou en partie, sauf avec l'autorisation du directeur de la SV, quartier général de la Défense nationale.

Annex C
Chapter 8
A-GA-135-003/AG-001

ANNEX C - AIA DELEGATION OF AUTHORITY LETTER – DIVISION FLIGHT SAFETY OFFICER

1150-21 (DFS 2)

April 2014

Distribution List

DELEGATION TO 1 CDN AIR DIV FSO
OF AIA AUTHORITY FOR INVESTIGATOR CERTIFICATION

References: A. CDS Delegation Order to Airworthiness Investigative Authority, 18 July 2008
B. A-GA-135-003/AG-001 Airworthiness Investigation Manual (AIM)

1. IAW the authority delegated to the AIA in Ref A, the person holding the position of 1 Cdn Air Div FSO, in the event of the absence or incapacity of the 1 Cdn Air Div FSO or if the position is vacant, the officer performing the duties and functions of the 1 Cdn Air Div FSO is hereby authorized, IAW Ref B, on my behalf to:

   a. Train Airworthiness (Flight Safety) Investigators to enable them to perform investigative duties;

   b. Issue certificates for Basic Investigator Level 2; and

   c. Issue certificates and identification for Investigator-In-Charge Level 3 (IIC 3) to those Wing and Unit FSOs responsible for release of completed Class III and IV investigations and to personnel responsible for review of these released investigations.

2. IAW Ref B, the 1 Cdn Air Div FSO is to keep records of all personnel certified as BI 2 and IIC 3. A copy of this list is to be provided annually to DFS 2-7 by 30 June.

3. The 1 Cdn Air Div FSO is certified as an IIC 2.

S. Charpentier
Colonel
Airworthiness Investigative Authority

Distribution List
Action
1 Cdn Air Div FSO

Information
Comd RCAF
Comd 1 Cdn Air Div
Comd 2 Cdn Air Div
DGAEPM

Annex D
Chapter 8
A-GA-135-003/AG-001

ANNEX D - AIA LETTER AUTHORIZING OBSERVER ATTENDANCE

DATE

OCCURRENCE FILE NO

AUTHORIZATION TO ATTEND AN INVESTIGATION AS AN OBSERVER

Dear

1. The Airworthiness Investigative Authority (AIA), designated under Part II of the *Aeronautics Act*, is responsible for advancing aviation safety by investigating military-civilian occurrences and strictly military aviation occurrences, identifying safety deficiencies as evidenced by those occurrences and making recommendations to eliminate or reduce any of those safety deficiencies.

2. Pursuant to subsection 6(1) of the *Military Airworthiness Investigation Regulations* made under the *Aeronautics Act*, when the AIA is conducting an investigation, the AIA may authorize a person to attend as an observer if the person:

   a. is designated an observer by a Minister responsible for a department having a direct interest in the investigation;

   b. has observer status or is an accredited representative or an adviser to an accredited representative, under an international agreement or convention relating to transportation to which Canada is a party; or

   c. is invited by the AIA to attend as an observer because, in the opinion of the AIA, the person has a direct interest in the subject matter of the investigation and will contribute to achieving its objective.

3. An observer may, under the supervision of an AIA investigator:

   a. attend at the location of the occurrence;

   b. examine the aircraft involved in the occurrence and the component parts contents of the aircraft;

   c. to the extent permitted by the *Aeronautics Act*, examine any document or other information that is relevant and relates to:

      (1) the activity during which the occurrence took place;

      (2) the crew members involved in the occurrence;

      (3) the aircraft and its component parts and contents; and

   d. attend during the performance of laboratory tests or analyses.

4. Subsection 6(2) of the *Military Airworthiness Investigation Regulations* provides that an observer may communicate or use, or permit to be communicated or used, information that the observer has obtained during the investigation only if the communication or use of that information is permitted under the *Aeronautics Act* and the AIA authorizes the communication or use in the interests of aviation safety. Your communication or use of any such information without the authorization of the AIA will be a contravention of subsection 6(2) of the Regulations, an offence that is punishable on summary conviction under subsection 24.6(2) of the *Aeronautics Act*.

5. Subsection 17(3) of the *Aeronautics Act* provides that the AIA may remove an observer from an investigation if the observer contravenes a condition imposed by the AIA or if, in the AIA's opinion, the observer's participation is likely to create a situation of conflict of interest that will impede the conduct of the investigation.

6. Your attendance as an observer at the investigation will be at your own risk. You should realize the potential hazards associated with transportation to and from an occurrence site, with attending at the site, including the presence at the site of carbon fibres, other hazardous material, unexploded ordnance, wreckage and debris, with examination of aircraft and aircraft components, and with laboratory testing and analyses.

7. You must sign the enclosed Observer Attendance, Release and Non-Disclosure Agreement, to be witnessed by the Investigator-in-Charge or other official designated by the AIA, in order to be authorized to attend as an observer at the investigation of the occurrence described in the Agreement.

Sincerely,

J. Alexander
Colonel
Airworthiness Investigative Authority

Annex E
Chapter 8
A-GA-135-003/AG-001

ANNEX E – FEDERAL PUBLIC SERVANT OBSERVER ATTENDANCE AND NON-DISCLOSURE AGREEMENT

Federal Public Servant Observer Attendance and Non-Disclosure Agreement

1. In consideration of being authorized to attend as an observer at the investigation conducted by the Airworthiness Investigative Authority (AIA) concerning the:

_____ at or near _____ , on or about _____ ,
(occurrence) (place) (date)

I acknowledge and agree that, as a condition of being allowed to attend as an observer at the investigation, not to communicate to any person, body, organization or any other entity, not to use, or not to permit to be communicated or used, in any manner whatsoever, any information that I may obtain during the investigation unless the communication or use of that information is permitted under the *Aeronautics Act* and the AIA provides written consent authorizing the communication or use. Information includes, without limited the generality of the foregoing, witness statements, on-board recordings, communication records, results of laboratory tests or analyses, and AIA draft investigation reports.

2. I further acknowledge that communication or use of any information contrary to this agreement is a contravention of subsection 6(2) of the *Military Airworthiness Investigation Regulations*, an offence punishable on summary conviction under subsection 24.6(2) of the *Aeronautics Act*.

3. I further acknowledge and agree that I shall be under the supervision of an AIA investigator when doing any of the following activities that may be authorized by the AIA:

a. attendance at the location of the occurrence;

b. examination of the aircraft involved in the occurrence and its component parts and contents of the aircraft;

c. to the extent permitted by the *Aeronautics Act*, examination of any document or other information that is relevant and relates to:

(1) the activity during which the occurrence took place;

(2) the crew members involved in the occurrence;

(3) the aircraft and its component parts and contents; and

d. attendance during the performance of laboratory tests or analyses.

4. I agree to limit my activities at the occurrence site to those authorized by the Investigator-In-Charge and to ensure that my activities do not restrict or otherwise interfere with the Investigator-In-Charge or other AIA investigators in the performance of their duties.

5. I further acknowledge that subsection 17(3) of the *Aeronautics Act* provides that the

AIA may remove an observer from an investigation if the observer contravenes a condition imposed by the AIA or if, in the AIA's opinion, the observer's participation is likely to create a situation of conflict of interest that will impede the conduct of the investigation.

_____ _____

(Print Observer's name and sign) (Print Witness' name and sign)

Date: _____

Annex F
Chapter 8
A-GA-135-003/AG-001

ANNEX F – NON-FEDERAL PUBLIC SERVANT OBSERVER ATTENDANCE, RELEASE AND NON-DISCLOSURE AGREEMENT

Observer Attendance, Release and Non-Disclosure Agreement

1. In consideration of being authorized to attend as an observer at the investigation conducted by the Airworthiness Investigative Authority (AIA) concerning the:

_____ at or near _____ , on or about _____ ,
(occurrence) (place) (date)

and realizing the potential hazards associated with transportation to and from the occurrence site, with attending at the site, including the presence at the site of hazardous material, unexploded ordnance, wreckage and debris, with examination of aircraft and aircraft components, and with laboratory testing and analyses, I hereby acknowledge and agree that my attendance as an observer will be at my own risk and agree not to claim or take proceedings against the Attorney General of Canada, the Department of National Defence, the Canadian Armed Forces, their employees, members, agents, heirs, successors and assigns (hereinafter “the Crown”) for damages related in any way to my attendance as an observer, and agree to indemnify, defend and hold harmless the Crown from and against any suits or actions, any claims or demands and any claims for indemnity whatsoever which may be brought by any person for damages related to my attendance as an observer, whether under the provisions of any statute, common law, equity or contract.

2. I further acknowledge and agree that, as a condition of being allowed to attend as an observer at the investigation, not to communicate to any person, body, organization or any other entity, not to use, or not to permit to be communicated or used, in any manner whatsoever, any information that I may obtain during the investigation unless the communication or use of that information is permitted under the *Aeronautics Act* and the AIA provides written consent authorizing the communication or use. Information includes, without limited the generality of the foregoing, witness statements, on-board recordings, communication records, results of laboratory tests or analyses, and AIA draft investigation reports.

3. I further acknowledge that communication or use of any information contrary to this agreement is a contravention of subsection 6(2) of the *Military Airworthiness Investigation Regulations*, an offence punishable on summary conviction under subsection 24.6(2) of the *Aeronautics Act*.

4. I further acknowledge and agree that I shall be under the supervision of an AIA investigator when doing any of the following activities that may be authorized by the AIA:

a. attendance at the location of the occurrence;

b. examination of the aircraft involved in the occurrence and its component parts and contents of the aircraft;

c. to the extent permitted by the *Aeronautics Act*, examination of any document or other information that is relevant and relates to:

(1) the activity during which the occurrence took place;

(2) the crew members involved in the occurrence;

(3) the aircraft and its component parts and contents; and

d. attendance during the performance of laboratory tests or analyses.

5. I agree to limit my activities at the occurrence site to those authorized by the Investigator-In-Charge and to ensure that my activities do not restrict or otherwise interfere with the Investigator-In-Charge or other AIA investigators in the performance of their duties.

6. I further acknowledge that subsection 17(3) of the *Aeronautics Act* provides that the AIA may remove an observer from an investigation if the observer contravenes a condition imposed by the AIA or if, in the AIA's opinion, the observer's participation is likely to create a situation of conflict of interest that will impede the conduct of the investigation.

7. I further acknowledge and agree that any disagreement or dispute arising from the interpretation or application of this agreement, the *Aeronautics Act*, the *Military Airworthiness Investigation Regulations*, or any other applicable statute or regulations, shall be construed and adjudicated solely in accordance with the laws of Canada, and that the undersigned attorns exclusively to the jurisdiction of a Canadian court or tribunal of competent jurisdiction.

_____ _____

(Print Observer's name and sign) (Print Witness' name and sign)

Date: _____

CHAPTER 9 - AIRWORTHINESS INVESTIGATOR CERTIFICATION AND AUTHORIZATION

INTRODUCTION

1. One of the tenets of the DND/CAF Airworthiness Program is that the work is done by authorized individuals. As outlined in Chapter 1, one of the tasks assigned to the AIA is to "assign investigative authority to organizations and individuals involved in the investigation of aviation-safety-related occurrences and issues."

2. As explained in Chapter 8, in order to be a member of an investigation, individuals must be qualified to conduct airworthiness investigation activities (the AKYZ qualification from the FSC for example), require AIA certification as having the requisite knowledge demonstrated by successfully completing exams (BI 2 and IIC 3 for example) and then they may become authorized to conduct airworthiness investigation activities on behalf of the AIA. While the AIA is the authority from which this authorization flows, for reasons of efficiency and appropriate span of control some of this certification/authorization is performed by designated individuals that conduct airworthiness activities on the AIA's behalf.

3. AIA authorization to conduct airworthiness investigation flows to qualified and certified individuals in three ways: through the FSI tasking message that lists those individuals, through the duties inherent as a designated FS Officer/NCM and conducting activities for the FSP, or through specific delegation letters from the AIA to individuals that authorize specific functions (See Chapter 9, Annex B – AIA Delegation of Authority – OBRs). This chapter outlines the process by which airworthiness investigators will be certified and authorized to conduct specific types of airworthiness investigations.

4. As stated in the DND/CAF Airworthiness Program Manual (A-GA-005-000/AG-001, Part 1, Section 2, para 17), an important point of note is that the authority to conduct investigations is provided to individuals and is limited to an airworthiness context. Specifically, airworthiness investigative authorities "are not intended to interfere with the organizational command and control, management and resource authorities provided by other means such as the *National Defence Act (NDA)*, or the *Financial Administration Act (FAA)*."

CERTIFICATION OF AUTHORITIES

5. There are five individuals involved in the issuance of airworthiness investigation credentials. These are the AIA, the 1 CAD FSO, the DFS Chief Investigator (CI), the Senior Investigator (SI) and the DFS Training and Standards Officer (DFS 2-7).

6. AIA. The AIA is designated by the MND and is normally the officer holding the position of DFS. The AIA's authority, roles and responsibilities are expanded in a CDS Order issued on behalf of the MND. The associated authorities and responsibilities are detailed in the DAOD 2015 and Airworthiness Program documents (A-GA-005-001/AG-001) and are summarized in Chapter 1. All airworthiness investigation authorizations flow from the AIA to properly qualified and certified individuals.

7. 1 CAD FSO. The 1CAD FSO normally has a combination of FS and operational experience as well as the FSC. For appropriate span of control and efficiency reasons, the AIA, through a letter of delegation, has designated the 1 CAD FSO to conduct certain

investigator training courses and is the issuing authority for specific investigator categories and airworthiness authorizations on behalf of the AIA and as outlined below.

8. Chief Investigator. The CI is normally the officer appointed to the position of DFS 2. The AIA has designated the CI as having the responsibility for establishing and managing a training program for a sector of the airworthiness investigators as outlined below. This officer is also responsible for ensuring that there are a sufficient number of qualified/certified personnel to complete Class II and Class I investigations. The CI will recommend appropriately skilled individuals for certification of their qualification by the AIA.

9. Senior Investigator. The SI is an IIC 1 on the DFS 2 staff. This individual is responsible for monitoring DFS investigator training files, for monitoring the quality of DFS investigator activities and through these activities, in combination with DFS 2-7, recommending IIC Category upgrades to the CI.

10. DFS Training and Standards Officer. DFS 2-7 is an experienced investigator on the DFS staff. This individual is responsible for developing training packages and opportunities to move DFS investigators through the IIC upgrade process that includes formal training, shadow IIC training and acting IIC situations within DFS. DFS 2-7 is charged with accurate compilation of training records, monitoring skill advancement and creating investigation team opportunities that are essential for the proper documentation and form the structure for appropriate recommendation to upgrade DFS investigator personnel. DFS 2-7, in combination with the SI, recommends IIC upgrades to the CI.

AIRWORTHINESS CERTIFICATION FORMS

11. All investigators and IICs that hold a valid investigator category will be awarded a Certification Form in a form similar to the format shown at Annex A. In addition, airworthiness investigators will be given a laminated, wallet size card that identifies them as a certified airworthiness investigator or IIC. As an individual upgrades their investigator status, the airworthiness investigator card will be appropriately endorsed.

TRAINING RECORDS

12. A training file will be kept for each individual who has either a BI or an IIC Category. This training file can be maintained as either an electronic or paper file. Training files for Division, Wing and Unit FS personnel holding a BI 2 and IIC 3 Category will be maintained by the 1 CAD FSO. Training files for all other BIs (such as investigation team members) or IICs and for all DFS staff will be maintained by DFS. This training file will contain the following applicable information as a minimum:

a. FSC Course Report;

b. Records concerning the completion of certification exams (BI 2 and IIC 3 for example);

c. copies of all formal training certificates of completion or course reports (for in-service and out-service courses);

d. copies of other training certificates or records of training conducted such as media contact training, salvage and recovery courses, crash scene hazard management, etc;

e. tracking of all air accident investigation activities and the role assumed in the investigation (group involvement, planning, transfer of responsibility at various stages etc);

f. copies of all formal field training (Shadow and Acting IIC) reports; and

g. copies of all BI and IIC certification forms.

CERTIFICATION PROCESS

13. The 1 CAD FSO and the CI must assure themselves that the individual who is being recommended for an investigator or IIC category has met the appropriate standard (as indicated below). Training waived by the AIA will permit awarding of an "acting" category to these listed requirements but the requirements should be completed as quickly as possible.

14. As per direction issued in the Airworthiness Program manual (A-GA-005-001/AG-001, Part 1, Section 2, paras 14 & 15), the AIA may issue exemptions to airworthiness (training) requirements that "cannot be achieved without considerable or unacceptable impact on (AIA) operations." Normally it must be demonstrated that such exemptions would "not degrade safe operations, that they are justified and that it is in the interests of DND/CAF and the public." "Safe operations" for the AIA means the conduct of safe and effective airworthiness investigations. The AIA will review, on a case by case basis, any training file where candidates are not successful in obtaining the prerequisites listed below for investigator certificates. Details regarding such candidates should be forwarded to the CI who will then make disposition recommendations for the AIA's consideration.

15. Basic Investigator 2. Prior to receiving a BI 2 Category, the individual must complete the FSC and obtain the AKYZ qualification. Immediately upon conclusion of the FSC a BI 2 "open book" exam will be administered by FSC personnel on behalf of the AIA and the prospective BI 2 must achieve 80 percent. This exam will be corrected to 100%. A BI 2 certificate will be issued on behalf of the AIA to successful candidates.

16. Basic Investigator 1. The individual must be a BI 2 and have completed a basic aviation safety investigator course, such as those offered at the SCSI, Cranfield University, the NTSB Training Facility or a similar institution.

17. IIC 3. Prior to receiving an IIC 3 Category, the individual must complete the FSC to obtain the AKYZ qualification, successfully complete the BI 2 exam (mentioned above) and be in a position in the FSP structure that requires they be an IIC 3 (usually to release completed investigations – SRs or CRs). An additional IIC 3 "open book" exam will be administered by FSC personnel on behalf of the AIA and the prospective IIC 3 must achieve 80 percent. This exam will be corrected to 100%. An IIC 3 certificate will be issued on behalf of the AIA to successful candidates. For individuals on DFS staff with investigation responsibilities, a DFS staff IIC 3 open book exam (Part II) must be completed and the prospective IIC 3 must achieve 80 percent. This exam will be corrected to 100%.

18. IIC 2. Prior to receiving an IIC 2 Category, the individual must have a BI 1 and IIC 3 category. In addition, the investigator should have completed the DFS OJTS and Acting IIC phase of training as outlined in Chapter 8. The AIA can, in consideration of exemptions to airworthiness regulations as indicated above, waive this training. The IIC of the investigation in which shadow training is conducted must complete a brief report for the SI/DFS 2-7 that

includes the investigation aspects covered, the skills demonstrated and development levels noted of the trainee. The IIC of the investigation in which the Acting IIC Phase of training is conducted must complete a brief written progress report for the SI/DFS 2-7 on the trainee that assesses:

a. investigation skills;

b. organizational skills;

c. personnel management skills;

d. writing skills;

e. other skills (salvage and recovery, dealing with the media, NoK etc); and

f. a recommendation for employment as an IIC 2 or recommendations for further training.

19. Individuals upgrading to an IIC 2 category must also successfully complete an in-house training module dealing with the legal aspects of investigations. This module involves a self-study package developed by the SI/DFS 2-7 and certified by CFLA that includes an open book examination (legal exam part I) on the study module. The passing standard for this examination is 80%, corrected to 100%.

20. The SI/DFS 2-7 will conduct a thorough review of the training file of the individual being recommended for IIC 2 Category. If the SI/DFS 2-7 are satisfied that the individual has met all standards, then they will forward a recommendation to the CI for the upgrade to IIC 2 Category. The CI will then review the individuals training file and, if satisfied, nominate the individual to the AIA for consideration and approval of IIC 2 certification.

21. IIC 1. A very similar process occurs for the granting of IIC 1 status. Prior to receiving an IIC 1 Category, the individual must have held an IIC 2 Category (or completed the equivalent training as determined by the SI/DFS 2-7 and CI). In addition, the investigator should have completed the DFS OJTS and Acting IIC phases of training as outlined in Chapter 8. The AIA may, in consideration of exemptions to airworthiness regulations as indicated above, waive some or all of this training. The SI/DFS 2-7 will conduct the Acting IIC phase of training and will complete a brief written progress report for the CI on the individual that assesses the areas listed above (para 18).

22. The CI will conduct a thorough review the training file of the individual being recommended for IIC 1 category. If the CI is satisfied that the individual has met all standards, then he will forward a written recommendation to the AIA. If some of the pre-requisites for an IIC have not been met, then the CI must indicate the rationale for waiving these requirements or awarding an acting Category with restrictions.

23. The AIA will review the recommendations put forward by the CI and, if satisfied, award an IIC 1 category or A/IIC 1 category.

24. A summary of certification authorities is outlined in Table 1 below.

Airworthiness Investigation Category	Recommending Authority	Certification Authority
Basic Investigator 2 (BI 2)	FSC - Course Officer	1 CAD FSO
Basic Investigator 1 (BI 1)	SI and CI	AIA
Investigator In Charge 3 (IIC 3)	FSC - Course Officer	1 CAD FSO
IIC 3 at DFS	SI and CI	AIA
Investigator In Charge 2 (IIC 2)	SI and CI	AIA
Investigator In Charge 1 (IIC 1)	SI and CI	AIA

Table 1 - Certification Authorities

INTENTIONALLY LEFT BLANK

Annex A
Chapter 9
A-GA-135-003/AG-001

ANNEX A - SAMPLE CERTIFICATION CERTIFICATE

Airworthiness Investigation Authority
Autorité des enquêtes sur la navigabilité

This is to certify that / Le présent certificat atteste que

Major Joe Smith

is an authorised and qualified / est autorisé et accrédité

Investigator-in-Charge Level II / Enquêteur désigné niveau I

The individual named above is authorized to conduct investigations into aircraft occurrences within the limitations outlined in the Airworthiness Investigation Manual. These investigations are conducted under the authority of the Airworthiness Investigative Authority and in accordance with Section 4.2 (n) of the Aeronautics Act.

La personne nommée ci-dessus est autorisée à mener des enquêtes sur des incidents ou des accidents d'aéronefs, compte tenu des restrictions décrites dans le Manuel d'enquête sur la navigabilité. Ces enquêtes sont menées sous la direction de l'Autorité des enquêtes sur la navigabilité, conformément à l'alinéa 4.2 (n) de la Loi sur l'aéronautique.

I.M. Safe
Colonel
Airworthiness Investigative Authority
Autorité des enquêtes sur la navigabilité

Dated / en date

INTENTIONALLY LEFT BLANK

Annex B
Chapter 9
A-GA-135-003/AG-001

ANNEX B – AIA DELEGATION OF AUTHORITY FOR OBR ACCESS

1150-21 (DFS 2)

October 2013

Distribution List

AIA DELEGATION OF AUTHORITY FOR OBR ACCESS

References: A. CDS Delegation Order to Airworthiness Investigative Authority (2 February 2015)
B. *Aeronautics Act*
C. *Canadian Transportation Investigation and Safety Board Act*
D. Airworthiness Investigation Manual (AIM) (A-GA-135-003/AG-001)
E. Flight Safety for the Canadian Forces (A-GA-135-001/AA-001)

1. The Airworthiness Investigative Authority (AIA) is authorized IAW Ref A to delegate investigative authorities. IOT facilitate timely responses to flight safety investigators' need to both assess potential flight safety occurrences and to investigate confirmed flight safety occurrences, I delegate authority to download, analyze, and view certain on-board recorder (OBR) data as follows:

   a. The officers qualified as Investigator-In-Charge (IIC) III, or above, at DFS are, for their respective aircraft fleets, delegated the responsibility to authorize Wing and Unit Flight Safety Officers to download, analyze, and view OBR data;

   b. When monitoring WARN DFS, the officers qualified as Investigator-In-Charge (IIC) III, or above, at DFS are, for any aircraft fleet, delegated the responsibility to authorize Wing and Unit Flight Safety Officers to download, analyze, and view OBR data outside of normal working hours; and

   c. The officers holding the position of Wing Flight Safety Officer (WFSO) at 3, 4 and 15 Wings or, in the event of their absence or incapacity or if the positions are vacant, the officers performing the duties and functions of the WFSO at 3, 4, or 15 Wings, are delegated the authority to download, analyze, and view non-designated OBR data for their respective aircraft fleets for occurrences in which they are the IIC or will likely be the IIC.

2. When conducting activities as authorized above, delegated WFSOs shall keep the AIA informed, through the appropriate DFS desk officer, with respect to activities associated with the OBRs with which they are engaged.

3. This standing authority associated with the positions identified above will remain in

place until rescinded or modified by the AIA. This delegation in no way includes other retained authorities, such as distribution to the chain of command of privileged information, identified in Chapter 10, Annex C, of Reference D.

S. Charpentier
Colonel
Airworthiness Investigative Authority

Annex: Reference Links

Attachment: 1

Distribution List

Action

Internal
DFS 2

External
3 Wing WFSO
4 Wing WFSO
15 Wing WFSO

Information
1 Cdn Air Div//Comd/Div FSO//
Comd 2 Cdn Air Div
DGAEPM
DTAES
DAS Coord
3 Wg WComd
4 Wg WComd
15 Wg WComd
1 Wing WFSO
5 Wing WFSO
8 Wing WFSO
9 Wing WFSO
12 Wing WFSO
14 Wing WFSO
16 Wing WFSO
17 Wing WFSO
19 Wing WFSO
22 Wing WFSO

CHAPTER 10 - AIRWORTHINESS INVESTIGATOR AUTHORITIES

INTRODUCTION

1. The Airworthiness Program is supported by a well-defined documentation hierarchy that contains the necessary rules, regulations and standards to ensure an acceptable level of aviation safety. One of the main tasks of the Airworthiness Investigative Authority is to “assign investigative authority to organizations and individuals involved in the investigation of aviation-safety-related occurrences and issues.” Although this has been done effectively for the past several decades within the FSP, the process for doing so was not formalized.

2. The Airworthiness Program dictates that “the scope and depth of airworthiness authority within an organization must be based on the capability of the organization...and the authority assigned to individuals within the organization is based on their demonstrated skills, knowledge, experience and competence...nominated individuals must accept the responsibilities and authorities for which they have been nominated.” In keeping with the airworthiness principle that work is only done by authorized individuals, a process for assigning airworthiness investigative authorities was developed.

3. Of note, the authority placed upon the AIA by the MND through the *Aeronautics Act* and other Acts is quite broad and in some cases far reaching in its empowerment. Because of the nature of some of these powers, the AIA’s full authority is not delegated to all investigators at all times. The aim of this chapter is to outline how these airworthiness investigative authorities are assigned to individuals and organizations through time and circumstances associated with investigations.

SUPPORTING DOCUMENTS

4. Airworthiness investigative authorities are derived from the *Aeronautics Act* and the *NDA*. In order to exercise these authorities properly, BIs and IICs must have the appropriate training and the appropriate experience. Moreover, some authorities will require specialized training and, due to the nature of these authorities, can only be used in exceptional circumstances. These latter authorities will be retained by the AIA and only delegated to a specific individual for specific investigations and for a specified period of time.

5. Another complicating factor is that the DND/CAF utilizes contractors and Public Servants to provide a variety of services. These services include, but are not limited to, the dry lease of aircraft that are flown by DND/CAF personnel, a variety of aircraft maintenance work and contracted air training services. The civilian personnel engaged in conducting or supporting DND/CAF flying operations are generally not subject to the NDA, so to ensure contractors and Public Servants involved with military aviation conform to the Airworthiness and Flight Safety Programs, the *Aeronautics Act* was amended and specifically to respond to this need, Part II – Military Investigations Involving Civilians was added. Consequently, if these individuals are involved in an occurrence, airworthiness investigators now have the legal means to investigate.

TYPES OF AUTHORITIES

6. AIA Authorized DND/CAF accident investigators will have three types of authorities

available to undertake airworthiness investigations: standing authorities, retained authorities, and specifically delegated authorities. Standing authorities are assigned with a particular airworthiness investigator certification. Retained authorities are only delegated by the AIA in specific circumstances and for a specific period of time. Specifically delegated authorities are granted to certain individuals for routine investigation duties but are not granted to all investigators of similar standing. This last group is typically delegated through an AIA letter to individuals in specific circumstances, such as a WFSO at a particular location who is delegated the authority to download OBR information without seeking AIA permission to do so (see Chapter 9, Annex B).

GROUPS OF AIRWORTHINESS AUTHORITIES

7. Airworthiness Investigation Authorities are grouped into six general areas:

   a. authority to conduct interviews;

   b. authority to search, seize and test items (to destruction if necessary);

   c. authority to restrict access to investigation sites;

   d. authority to approve airworthiness investigation reports;

   e. authority to obtain medical information; and

   f. authority to gather and release information.

> NOTE
> Anytime a FS investigator has questions regarding legal authorities associated with the *Aeronautics Act* and/or the *MAIRs* or desires legal advice, contact DFS using 1-888 WARN DFS (1-888-927-6337).

Interviews

8. Airworthiness investigation interviews are traditionally done in a non-confrontational manner. In addition, as stipulated in the *Aeronautics Act* (section 24.1), witness statements provided to a FS investigator are treated as “privileged” meaning the statement and the identity of the person who made the statement are not to be communicated and these statements cannot be used for legal, administrative, disciplinary or other purposes. If witnesses are reluctant or refuse to provide information to an investigator, the *Aeronautics Act* section 14 (10) can be invoked using *MAIRs* Form #3 if the investigator believes that the person has information relevant to the investigation. This section requires that such a person must produce information, make a statement, attend before the investigator and make copies of any information the investigator considers necessary in carrying out the investigation.

9. The AIA has delegated the power to conduct interviews with cooperative witnesses to all certified investigators tasked with an investigation through normal investigation protocols (via standard SR production). These investigators should make it clear to witnesses and holders of information that they have the statutory right to conduct such interviews and gather this information but they (the investigators) also have an obligation to safeguard the “privilege” of the information as listed above. When non-cooperative witnesses are encountered the AIA has retained the authority to conduct such interviews and gather this information but has

delegated the power to conduct such interviews to DFS IIC3s, IIC2s and IIC1s tasked with conducting or supporting the investigation. Should uncooperative witness be encountered, field investigators should contact AIA investigators via 1-888-WARN-DFS (1-888-927-6337) so that the information and interviews can be conducted by authorized DFS personnel. Such interviews will involve engaging provisions in *MAIR,* Form #3. Of note, the AIA has decided that the interview of minors (persons less than 18 or 19 years of age, depending on the province of occurrence – see Chapter 10, Annex A, Note 2) without parental permission will not be conducted even though there is a statutory tool (*MAIRs*) for this to occur. In such cases the refusal to permit such interviews will be recorded in the investigation report and the investigation will proceed without this evidence.

Search and Seizure of Items

10. The *Aeronautics Act* section 14 (paras 2-6) and *MAIR* (Form 1 or 2), provides investigators with powers to enter and search any place and seize any thing that is relevant to an investigation.

11. Similar to the procedures for interviews, the AIA has delegated the power to search and seize items from DND property and from cooperative civilian companies or private civilians to BI2s and IIC3s tasked with conducting investigations through the normal investigation protocols (completing an SR). However, when non cooperative civilian entities are encountered, the AIA retains this authority and delegates the responsibility for conducting such searches and seizures to DFS IIC3s, IIC2s and IIC1s tasked with conducting or supporting the investigation. Should uncooperative civilian entities be encountered, field investigators should contact AIA investigators via 1-888-WARN-DFS (1-888-927-6337) so that the search and seizure can be conducted by the authorized DFS personnel. Such actions will involve engaging provisions in *MAIR,* Form #1 or #2.

12. Articles that have been seized after a FS occurrence are either impounded or quarantined. Impounding of articles refers to safeguarding the material to prevent their loss or alteration. Articles such as records, documents, films, tapes, and forms that may be required for the investigation are impounded. Quarantining refers to the withholding and safeguarding of physical evidence or hazardous items. Such items may include complete aircraft components, equipment, stores, and production lots or batches. Procedures to be followed for impounding and quarantining of materiel are outlined in Chapter 6. Of note, under *Aeronautics Act* section 15 (paras 1-4), any item seized for investigations and not being DND property or not tested to destruction, should be returned to its owner once its purpose has been fulfilled. Furthermore, there are provisions in the act for the owner to apply to a court for the return of such items except for OBRs. This latter court action situation should not likely occur often since the AIA's policy will be to return items seized to the owners after the purpose of the items within the investigation have been fulfilled.

Restricting Access to Investigation Sites

13. Limiting access to investigation sites is required for the safety of personnel (both military and civilian), the protection of evidence and the protection of information. The *Aeronautics Act*, section 14 (paras 7 to 9), permits investigators to prohibit or limit access to any area for any period necessary for the purposes of carrying out an investigation. Furthermore, the act stipulates that while exercising this power, any disruption of transportation services should be

minimized. Of note, the act makes a willful entry into a prohibited area by any unauthorized person an indictable offence under section 24.6 (1)(a).

14. The AIA has delegated the power to restrict access to an occurrence site to investigators at all levels in the FS system (BI2s, BI1s, IIC3s, IIC2s and IIC1s) when they are carrying out investigation duties. From the practical perspective this means that all FS personnel have the statutory right to erect and enforce a cordon around any occurrence site they are investigating or for which they are conducting supporting actions. It is important to note that enforcement does not imply physical restraint should be employed by FS personnel, rather that the FS personnel should utilize police to enforce the cordon because the statutory power within the *Aeronautics Act* has been delegated to them by the AIA.

Approval of Investigation Reports

15. According to the *Aeronautics Act* (sections 12(1)(d) and 18), AIA investigation reports are produced for the MND. Once a FS report has been drafted, it must be finalized and approved. Although ultimate approval authority rests with the AIA, some report approval authority is assigned to WFSOs/IIC 3s for IRs and SRs for efficiency purposes. Once a report has been approved (i.e. released into “Tracking” state in FSIMS), even though the functionality of the FSOMS/FSIMS permits report changes, an investigation report should not be substantively altered unless the proposed changes are discussed and approved by the AIA or AIA staff (DFS Desk Os).

Personal Health Information

16. Personal health information under the control of DND/CAF shall not, without the consent of the individual to whom it relates, be disclosed except in accordance with section 8 of the *Privacy Act*. Specifically, paragraph 8(2)(b) of the *Privacy Act* provides that personal information may be disclosed for any purpose in accordance with any Act of Parliament or any regulation made thereunder that authorizes its disclosure, including, but not limited to the *Aeronautics Act*.

17. Section 14(10)(c) of the *Aeronautics Act* stipulates that an investigator can require a physician or health practitioner to provide information concerning a patient that the investigator believes may be relevant to the investigation. Furthermore, under section 14(10)(a)(i), an investigator may require any person to produce information, attend to the investigator and give a statement regarding the information. This combination of statutory powers permits AIA investigators to have access to any pertinent personal health information for investigation but there are obligations for safe guarding and keeping such information privileged both within the *Aeronautics Act* and the *Privacy Act*. *MAIR*, Form 5 is utilized for this action.

18. Personal health information collected during a FS investigation shall only be used for the purpose for which it was obtained or compiled or for uses consistent with that purpose. The gathering and particularly the results of toxicological samples from involved persons is included in this information restriction. Personnel involved in a serious occurrence are required to report to medical authorities to undergo medical examination and to have toxicology samples taken (ex. urine). For willing persons, the AIA has delegated the authority to all IICs and BIs to ensure that these collection tasks are undertaken; however, for toxicological testing of unwilling non-military persons, 1-888-WARN-DFS (1-888-927-6337) must be contacted immediately to

obtain direction on the desired course of action (see Chapter 10, Annex A, serial 5). Note that one of the uses for this information includes ensuring individuals get any treatment they require as a result of a FS investigation toxicological test result. Further, the extent of use of personal health information by authorized individuals shall be proportionate to the FS investigation being fulfilled and shall extend only as far as is necessary to achieve the FS investigation purpose. This means that the personal health information shall only be shared with investigation team members based on the team members' requirement for the information to complete their role in the investigation. According to section 14(13) of the *Aeronautics Act*, personal health information collected during a FS investigation shall not be used for any legal, disciplinary or other proceedings purposes.

19. In addition to the permitted disclosures under subsection 8(2) of the *Privacy Act*, personal health information collected during a FS investigation shall only be disclosed in accordance with the *Aeronautics Act* and only as necessary for the interest of aviation safety. This means, for example, that personal health information may be reported if it is relevant to understanding the investigation analysis or that toxicology results may be reported to explain human factor degradations to cognitive behavior. As such, when medical factors are identified as cause factors, detailed personal health information shall be included in the medical report from the investigating Flight Surgeon to the IIC. Personal health information shall only be described by the IIC in general terms in the report (i.e. pilot was taking medications for a chronic condition that did/may have impaired his/her judgement). If deemed necessary after discussion with the IIC, the investigating Flight Surgeon may also create a Separate Medical Report with detailed personal health information. Distribution of this report shall be restricted to the Investigating Flight Surgeon, the AMA, and the Air Div Surgeon (the DFS Flight Surgeon should be included in the distribution list if they are not the investigating Flight Surgeon). At the discretion of the AIA, if the report is deemed to be of interest of aviation safety, the report may also be disclosed to the CO CFEME for the purpose of setting aircrew medical standards. Legal advice should be sought before personal information is disclosed.

Release of Information

20. There are four types of releasable airworthiness investigation information, which may be combined in forms such as in a "statistical release" and "reports" or singular categories such as "only factual information." They are:

a. factual information;

b. analysis;

c. findings and cause factors; and

d. recommendations.

Privilege of Certain Information

21. In addition to the four types of releasable information listed above, the concept of "privilege" as defined in the *Aeronautics Act* must be superimposed. Essentially, privileged information may not be communicated to any person. In the case of statements, there is an additional obligation to not disclose the identity of persons who made statements. The forms of communication/information to which "privilege" applies have particular legal protections that

are outlined in the *Aeronautics Act*. Privilege is applied to:

a. on board recordings (OBRs) *Aeronautics Act* section 22(1) and 23(1), which include:

(1) a recording of voice communications originating from an aircraft or received on or in the flight deck of an aircraft; or

(2) a video recording of the activities of the operating personnel of an aircraft; and

b. statements, *Aeronautics Act* section 24.1(1), which include:

(1) an oral, written or recorded statement relating to a military aircraft occurrence which is given to an airworthiness investigator; or

(2) a transcript or a summary of a statement referred to in subpara (1) above; or

(3) conduct that could reasonably be taken to be intended as such a statement; and

c. representations, *Aeronautics Act section* 18(2)(5) and (8), which are responses to the AIA draft reports, except for representations made by a minister responsible for a department that has a direct interest in the findings of an investigation. For the sake of clarity, representations are essentially Party of Direct Interest (PDI) comments on draft reports that are privileged and may not be communicated without the written consent of the author of a representation and representations may not be used in any legal, disciplinary or other proceedings. Of note, comments, reports and research supplied by OEMs for support to an AIA investigation are included in this category of information because they are supplied to draft the report or amend a draft report and should be treated as privileged information with these protections.

Communication records

22. These records, meaning the whole or part of any record, recording, copy, transcript or substantial summary of any type of communications respecting air traffic control or related matters, have special handling requirements as stipulated in *Aeronautics Act* section 24 (1) and (2). Note, these records are not privileged under the *Aeronautics Act*, but if obtained in the course of an investigation, are not to be used against any member of the Canadian Armed Forces or controllers in any legal proceedings or, subject to collective agreements, in any disciplinary proceedings. Based on these stipulations, the AIA policy is to not release such communication records, rather the records have to be obtained by any other authority through other authorized communication record holders.

Release, Viewing or Hearing OBR Data

23. The AIA has retained the release authority for all data associated with OBRs. Similarly, viewing or hearing of OBRs is retained by the AIA except to specific individuals through an AIA delegation letter (see Chapter 9, Annex B). This is due to the sensitive nature of such data and the legal complexities that must be considered for such circumstances. Any delegated

person is charged within the AIA delegation letter with being completely aware of the legal aspects associated with the release, viewing or hearing such data. OBRs that are in use with the DND/CAF and their identification and associated protocols are more complex due to the AIA permitting a dual purpose usage of certain devices as permitted by *Aeronautics Act* section 22(4). These devices and data are further explained in Chapter 6. Dual purpose usage refers to devices and data sets that can be used for one purpose, such as training or debriefing for normal missions, but become OBRs when the aircraft is involved in a FS occurrence. Sometimes viewing, hearing or processing the data from a dual purpose device is the only way to determine if the data is OBR data and for this reason, the AIA has made certain individuals responsible for such determinations through these specific delegations. Furthermore, so that missions can be completed (e.g. mission debrief) when an occurrence has happened and the dual use device has become privileged, quarantined or impounded, the AIA permits the use of the data sets by the occurrence crew and/or the UFSO/WFSO to complete their mission. Further use of the data set requires AIA authority, which is available via DFS Desk Officers, DFS 2 and/or 1-888-WARN-DFS (1-888-927-6337).

Release of Statements or Communications Records

24. The AIA retains all authority for release of statements or Communication Records. All requests for this information should be forwarded to the AIA for consideration and this information will only be released from this level. Generally, this information will not be released except as required by law because it may compromise the investigation or the principles associated with the FSP. In any case the AIA will maintain the “privilege” status as stipulated in the *Aeronautics Act*.

25. Also, there may be orders, intra-departmental protocols and AIA processes that effect the information gathered during an AIA airworthiness investigation and that must be considered when releasing such information. An example of such consideration is the manner that the DND/CAF handles FDR data. While not under any specific statutory or regulatory protection, there are Air Command Orders (ACOs) that must be respected when dealing with release of this specific type of information.

26. Chapter 6 provides detailed direction of the handling of Aircraft Recording Devices (ARDs) and Chapter 6, Annex F provides a quick reference chart, which may be consulted for appropriate actions with respect to ARDs.

Release of Other types of information

27. The AIA retains all authority for the release of investigation gathered information that includes comments received from PDIs or third parties (such as OEMs) and special reports prepared for investigations by experts or special organizations (such as QETE, AETE Escape Systems, NRC, MCE, RCMP and CFEME reports etc). First, personal comments (which PDI returns and OEM remarks fall under) must be tightly controlled and *Aeronautics Act* privilege, *Privacy Act* rules and *Access to Information Act* processes must be considered. The *Aeronautics Act* sections 18(6), 22(6) and 24.1(3) permit the AIA to decide that safety is an overriding factor and the AIA can choose to release such information from that perspective; however, every precaution to safeguard the identity and source of such released information will be taken. Similarly, reports by specialist advisers or expert team members prepared exclusively for the AIA in the course of an airworthiness investigation are generally

not released in whole but may be quoted in released information or form part of the final investigation report. In general, these reports are considered property of the AIA and he/she must be consulted by the specialist advisers or expert organization should release of an expert report be sought by other organizations or for purposes other than the airworthiness investigation.

Release of Photographs, Imagery & Videos

28. Another retained authority deals with the release of photographs, imagery, video tapes and prints, some of which may not be released except under the authority of the AIA. This is primarily due to *Privacy Act* considerations. Use of imagery by the investigation team or for Preventive Measures is permitted, but must be tightly controlled so the images stay within the investigation team's control until the AIA has approved release. All investigators are permitted to release still photos providing there are no persons in the photos, the photo is technical in nature and the photo concerns an investigation where they are the investigator conducting the investigation. Of note, the authority to release moving images (films, videos etc.) is retained by the AIA as is the authority to release images with persons in the image, regardless of who is conducting the investigation.

29. There are six entities to which airworthiness investigation information can be released. These are:

a. the Chain of Command;

b. the DND/CAF general population (the internal audience);

c. NoK (in several different categories - see Chapter 12);

d. the media;

e. the general public (the external audience); and

f. other investigating agencies, civil or military (in several different categories).

30. The protocols for release of information to other investigating agencies are outlined in Chapters 13 and 14.

Other Considerations for Release of Information

31. A factor that must be considered with respect to the release of information is whether or not the investigation is completed. The premature release of information prior to the completion of an airworthiness investigation can sometimes compromise the investigation. Information concerning ongoing investigations must be very tightly controlled because the distribution of information within draft reports or within information sources gathered for investigation purposes could be incomplete or inaccurate. Also, the publication of information prior to the appropriate time could prejudice safety measures or prevent the implementation of timely, voluntary PMs. Therefore when considering the distribution of information the distinction will be made between ongoing and completed investigations. Of note, the onward release of any privileged information and draft reports is illegal under *Aeronautics Act* section 24.6(2). Furthermore, *Aeronautics Act* section 18(3) specifies that the communication of AIA draft reports is not permitted except to take remedial measures or to study the draft report for making appropriate representations.

32. The format of released information is also a consideration. For example, various products may be produced at certain times during an investigation such as the From the Investigator (FTI), Epilogue or a completed and published FSIR. The release of this information already has the AIA's approval and therefore can be released to groups such as the NoK or media. FS personnel may be asked questions regarding the information contained in such publications and the AIA should be informed about such requests so that appropriate notification to the CoC can take place. Explaining the information in these products to add clarity or understanding is considered within the purview of the associated IIC; however, expansion on the information or the addition of information is not delegated and approval for such release must be sought from the AIA.

Delegation of AIA Authority to Individuals

33. Standing Authorities. Standing authorities are exercised by the individuals holding a current category of the type specified in Annex A. These standing authorities are continuously active unless specifically revoked by the AIA. For the sake of clarity, the Standing Authorities for each category of investigator are listed in Annex B.

34. Retained Authorities. A list of AIA retained authorities is provided in Annex C. These authorities will normally only be delegated to a particular individual and for a specified period of time and will be delegated in writing by the AIA. For the sake of brevity, the authorities to be delegated will refer to the serial number listed in Annex C. A sample FSI Tasking Order provided in Chapter 5, Annex A includes such an AIA delegation (see para 5).

INTENTIONALLY LEFT BLANK

Annex A
Chapter 10
A-GA-135-003/AG-001

ANNEX A – STANDING AUTHORITIES

Serial	Authority	Delegated to Investigator Category:
SA 1.	Conduct Interviews	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline	IIC 3, IIC2, IIC 1, BI 2, BI 1
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed	IIC 3, IIC 2, IIC 1 BI 2, BI 1
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 1.i.	Conduct interviews with civilian personnel who will not voluntarily agree to be interviewed and interview requires use of Aeronautics Act section 14(10)(a)(i)or(ii) and the use of *MAIR*, Form 3.	Retained (see Note1)
SA 1.j.	Conduct interviews with minors (persons less than 18 or 19 years age depending on province) without parental permission	Retained (see Note 2)
SA 2.	Search, Seize and Test to Destruction	See Note 3

Serial	Authority	Delegated to Investigator Category:
SA 2.a.	Search military facilities for items related to an aircraft occurrence	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.b.	Impound military items required for an aircraft occurrence investigation	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.d.	Order that a military item be tested (possibly to destruction)	IIC 3, IIC 2, IIC 1
SA 2.e.	Search civilian facilities/property for items related to an aircraft occurrence with the owner's permission	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.f	Search civilian facilities for items related to an aircraft occurrence without the owner's permission	Retained (see Note1)
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner's permission	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.h	Impound civilian items required for an aircraft occurrence investigation without the owner's permission	Retained (see Note1)
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner's permission	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 2.j	Quarantine civilian items required for an aircraft occurrence investigation without the owner's permission	Retained (see Note1)
SA 2.k.	Order that a civilian item be tested (possibly to destruction) with the owner's permission	IIC 3, IIC 2, IIC 1
SA 2.l.	Order that a civilian item be tested to destruction without the owner's permission	Retained (see Note1)
SA 3.	Restrict Access to an Investigation Site	
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian controlled waters or territory as per *Aeronautics Act*, section 14 (paras 7 to 9).	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see Note 4)
SA 4.	Approve Investigation Reports	
SA 4.a.	Approve a Supplementary Report (SR)	IIC 3
SA 4.b.	Approve a Combined Report (CR)	IIC 3
SA 4.c.	Approve an Initial Report (IR)	IIC 3, IIC 2, IIC 1, BI 2, BI 1

Serial	Authority	Delegated to Investigator Category:
SA 4.d.	Approve an Enhanced SR (ESR)	Retained
SA 4.e.	Approve a Flight Safety Investigation Report (FSIR)	Retained
SA 5.	Medical Information	See Note 5
SA 5.a.	Gather and quarantine Personal Health Information from willing sources and authorities. Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered.	IIC 3, IIC 2, IIC 1, BI 2, BI 1
SA 5.b.	Gather and quarantine Personal Health Information from unwilling sources and authorities.	Retained (see Note 6)
SA 5.c.	Share appropriate Personal Health information with selected and appropriate investigation team members.	IIC 3, IIC 2, IIC 1
SA 5.d.	Create Separate Medical Report	Medical Member
SA 5.e.	Require a person who is directly involved in the operation of an aircraft submit to a medical examination as per Aeronautics Act section 14 (10) (b) and the use of *MAIR*, Form 4.	Retained (see Note 6)
SA 5.f.	Require a physician or health practitioner to provide information concerning a patient as per Aeronautics Act section 14 (10)(c) and the use of *MAIR*, Form 5.	Retained (see Note 6)
SA 5.g.	Require a person who has custody of a body of a deceased person or other human remains to permit the performance of an autopsy as per Aeronautics Act section 14 (10)(c) and the use of *MAIR*, Form 6.	Retained (see Note 6)
SA 6.	Gather and/or Release Information	See Note 7
SA 6.a.	Ongoing Investigations	
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation to Commanders	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see Notes 7, 8, & 9)
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation to Commanders	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see Notes 7, 8 & 9)

Serial	Authority	Delegated to Investigator Category:
SA 6.a.(3)	Release of factual information concerning an ongoing Class II investigation to Commanders	The IIC of the investigation (see Notes 7, 8 & 9)
SA 6.a.(4)	Release of factual information concerning an ongoing Class I investigation to Commanders	The IIC of the investigation (see Notes 7, 8 & 9)
SA 6.a.(5)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation to DND/CAF personnel	The IIC of the investigation (see Notes 7, 8 & 9)
SA 6.a.(6)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation to DND/CAF personnel	The IIC of the investigation (see Note 7, 8 & 9)
SA 6.a.(7)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class II investigation to DND/CAF personnel	Retained (see Notes 7, 8 & 9)
SA 6.a.(8)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class I investigation to DND/CAF personnel	Retained (see Notes 7, 8 & 9)
SA 6.a.(9)	Release of factual information concerning an ongoing investigation to NoK. There are very strict restrictions on this authority as explained in Note 10.	The IIC of the investigation (see Note 10)
SA 6.a.(10)	Release of factual information concerning an ongoing Class I, Class II, Class III or Class IV investigation to the media. There are very strict restrictions on this authority as explained in Note 10.	The IIC of the investigation (see Note 10)
SA 6.b.	Completed Investigations	
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation report to Commanders	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see Notes 7, 9 & 10)
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation report to DND/CAF personnel	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see Notes 7, 9 & 10)
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation report to the media	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see notes 7, 9 & 10)

Serial	Authority	Delegated to Investigator Category:
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation report to the public through ATI	IIC 3, IIC 2, IIC 1, BI 2, BI 1 (see notes 7, 9 & 10)
SA 6.b.(5)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class I & II investigation report to Commanders, DND/CAF personnel, NoK, the media or the public through ATI	Retained (see Notes 7, 9 & 10)

Note 1: Retained authority for these functions rests with the AIA and the powers that may be utilized to conduct investigations under section 14 of the *Aeronautics Act*. Typically DFS Desk Officers will conduct such tasks or provide help for *MAIR* forms.

Note 2: The interview of minors (persons less than 18 years of age in AL, MB, ON, PE, QC, SK and less than 19 years of age in BC, NB, NL, NS, NU, YT, NT) without parental permission will not be conducted even though there is a statutory tool for this to occur. In such cases the refusal to permit such interviews will be recorded in the investigation report and the investigation will proceed without this evidence.

Note 3: Of note, under *Aeronautics Act* section 15 (paras 1-4), any item seized for investigations and not being DND property or not tested to destruction, should be returned to its owner once its purpose has been fulfilled.

Note 4: Restriction of access to the occurrence site must be conducted utilizing the statutory powers listed in *Aeronautics Act*, section 14 (paras 7 to 9). Of note, minimization of disruption to transportation services should be considered. Persons knowingly entering such areas may be in contravention of *Aeronautics Act*, section 24.6 (1)(a), which is an indictable offence.

Note 5: Personal Health Information is discussed in detail in Chapter 10, paragraphs 17-20. It is essential that this information is reviewed and understood before gathering or any release of personal health information is made.

Note 6: Gathering Personal Health Information from authorities that are unwilling to supply such information may require utilizing the statutory powers listed in *Aeronautics Act*, section 14 (10)(a)(i) and (c). This will typically require DFS Desk Officers and consultation with DFS 2 to conduct such tasks or their assistance to utilize *MAIR*, Form 4.

Note 7: All information released from an airworthiness investigator to any individual must be de-identified. Names or individual call signs are not to be used and, to the extent possible, the identity of individuals must be protected.

Note 8: Information released under this authority to DND/CAF personnel may only be used to further remedial action or for PM purposes. The release of such information to DND contractors (such as OEM or AMO) is covered within this authority.

Note 9: All investigators are permitted to release still photos providing there are no persons in the photo, the photo is technical in nature and the photo concerns an investigation where they are the investigator conducting the investigation. Of note, the authority to release moving images (films, videos etc) is retained by the AIA as is the authority to release images with persons in the image, regardless of who is conducting the investigation.

Note 10: The information released in these events is governed by AIA policy and detailed in Chapter 10, paras 22-33 of this manual. Also, the information available to be released is strictly limited in scope. For example, information released to media or NoK for an on-going investigation is limited to the information released in the FTI and the explanation of such facts. Similarly, the release of completed Class I & II investigations is IAW AIA administrative procedures and only by assigned individuals. The release of such information to DND contractors (such as OEM or AMO) is covered within this authority. Anytime information is released, the AIA should be informed so that appropriate notice can be made throughout the CoC.

Annex B
Chapter 10
A-GA-135-003/AG-001

ANNEX B – SUMMARY OF STANDING AUTHORITIES BY INVESTIGATOR CATEGORY

Serial	Authority
Basic Investigator 2 (BI 2)	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed
SA 2.a.	Search military facilities for items related to an aircraft occurrence
SA 2.b.	Impound military items required for an aircraft occurrence investigation
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation
SA 2.e.	Search civilian facilities/property for items related to an aircraft occurrence with the owner’s permission
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner’s permission (see Note 2)
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner’s permission (see Note 2)
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian waters or territory as per *Aeronautics Act*, section 14 (paras 7-9) (see Note 3).
SA 4.c.	Approve submission of Initial Report (IR)

Serial	Authority
SA 5.a.	Gather and quarantine Personal Health Information from willing sources and authorities (see Note 4). Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered.
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation to commanders (see Notes 5 & 6)
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation to commanders (see Notes 5 & 6)
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to commanders (see Notes 5 & 6).
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to DND/CAF personnel (see Notes 1, 5 & 6).
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to the media (see Notes 5 & 6).
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to the public through ATI (see Notes 5 & 6)
Basic Investigator 1 (BI 1)	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed
SA 2.a.	Search military facilities for items related to an aircraft occurrence
SA 2.b.	Impound military items required for an aircraft occurrence investigation

Serial	Authority
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation
SA 2.e.	Search civilian facilities/property for items related to an aircraft occurrence with the owner's permission
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2)
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2)
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian waters or territory as per *Aeronautics Act*, section 14 (paras 7-9) (see Note 3).
SA 4.c.	Approve an Initial Report (IR)
SA 5.a.	Gather and quarantine Personal Health Information from willing sources and authorities (see Note 4). Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation to commanders
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation to commanders (see Note 5 & 6)
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to commanders (see Note 5 & 6).
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to DND/CAF personnel (see Notes 1, 5 & 6).
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to the media (see Notes 5 & 6).
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III& IV investigation to the public through ATI (see Notes 5 & 6)
Investigator In Charge 3 (IIC 3)	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline

Serial	Authority
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed
SA 2.a.	Search military facilities for items related to an aircraft occurrence
SA 2.b.	Impound military items required for an aircraft occurrence investigation
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation
SA 2.d.	Order that a military item be tested (possibly to destruction) for an investigation of which they are the IIC
SA 2.e.	Search civilian facilities for items related to an aircraft occurrence with the owner's permission
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.k.	Order that a civilian item be tested (possibly to destruction) for an investigation of which they are the IIC with the owner's permission (see Note 2)
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian waters or territory as per *Aeronautics Act*, section 14 (paras 7-9) (see Note 3).
SA 4. a.	Approve a Supplementary Report (SR)
SA 4. b.	Approve a Combined Report (CR)
SA 4. c.	Approve an Initial Report (IR)
SA 5. a.	Gather and quarantine Personal Health Information from willing sources and authorities (see Note 4). Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered
SA 5.c.	Share appropriate Personal Health Information with selected and appropriate investigation team members in an investigation for which they are the IIC (see Note 4).
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation to commanders (see Notes 5 & 6)

Serial	Authority
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation to commanders (see Notes 5 & 6)
SA 6.a.(5)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.a.(6)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.a.(10)	Release of factual information concerning an ongoing investigation (for which the individual is the IIC) to media (see Notes 5 & 6)
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to commanders (see Notes 5 & 6).
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the media (see Notes 5 & 6).
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the public through ATI (see Notes 5 & 6)
Investigator In Charge 2 (IIC 2)	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed

Serial	Authority
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed
SA 2.a.	Search military facilities for items related to an aircraft occurrence
SA 2.b.	Impound military items required for an aircraft occurrence investigation
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation
SA 2.d.	Order that a military item be tested (possibly to destruction) for an investigation of which they are the IIC
SA 2.e.	Search civilian facilities for items related to an aircraft occurrence with the owner's permission
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.k.	Order that a civilian item be tested (possibly to destruction) with the owner's permission for an investigation of which they are the IIC
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian waters or territory as per *Aeronautics Act*, section 14 (paras 7-9) (see Note 3).
SA 4.c.	Approve an Initial Report (IR)
SA 5.a.	Gather and quarantine Personal Health Information from willing sources and authorities. Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered
SA 5.c.	Share appropriate Personal Health information with selected and appropriate investigation team members for an investigation of which they are the IIC (see Note 4).
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(3)	Release of factual information concerning an ongoing Class II investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(4)	Release of factual information concerning an ongoing Class I investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(5)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)

Serial	Authority
SA 6.a.(6)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.a.(9)	Release of factual information concerning an ongoing investigation (for which the individual is the IIC) to NoK (see Notes 5 & 6).
SA 6.a.(10)	Release of factual information concerning an ongoing investigation (for which the individual is the IIC) to media (see Notes 5 & 6).
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to commanders (see Notes 5 & 6)
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the media (see Notes 5 & 6).
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the public through ATI (see Notes 5 & 6).
Investigator In Charge 1 (IIC 1)	
SA 1.a.	Conduct interviews concerning Class IV Investigations with personnel subject to the code of service discipline
SA 1.b.	Conduct interviews concerning Class III Investigations with personnel subject to the code of service discipline
SA 1.c.	Conduct interviews concerning Class II Investigations with personnel subject to the code of service discipline
SA 1.d.	Conduct interviews concerning Class I Investigations with personnel subject to the code of service discipline
SA 1.e.	Conduct interviews concerning Class IV Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.f.	Conduct interviews concerning Class III Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.g.	Conduct interviews concerning Class II Investigations with civilian personnel who voluntarily agree to be interviewed
SA 1.h.	Conduct interviews concerning Class I Investigations with civilian personnel who voluntarily agree to be interviewed
SA 2.a.	Search military facilities for items related to an aircraft occurrence
SA 2.b.	Impound military items required for an aircraft occurrence investigation
SA 2.c.	Quarantine military items required for an aircraft occurrence investigation

Serial	Authority
SA 2.d.	Order that a military item be tested (possibly to destruction) for an investigation of which they are the IIC
SA 2.e.	Search civilian facilities for items related to an aircraft occurrence with the owner's permission
SA 2.g.	Impound civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.i.	Quarantine civilian items required for an aircraft occurrence investigation with the owner's permission (see Note 2).
SA 2.k.	Order that a civilian item be tested to destruction with the owner's permission for an investigation of which they are the IIC.
SA 3.a.	Restrict access to an investigation site anywhere in Canada or in Canadian waters or territory as per *Aeronautics Act*, section 14 (paras 7-9) (see Note 3).
SA 4.c.	Approve an Initial Report (IR)
SA 5.a.	Gather and quarantine Personal Health Information from willing sources or authorities (see Note 4). Involved personnel are to be examined by medical authorities and provide toxicological samples (urine). Toxicological samples from willing persons should also be gathered
SA 5.c.	Share appropriate Personal Health information with selected and appropriate investigation team members for an investigation of which they are the IIC (see Note 4).
SA 6.a.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(3)	Release of factual information concerning an ongoing Class II investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(4)	Release of factual information concerning an ongoing Class I investigation (for which the individual is the IIC) to commanders (see Notes 5 & 6)
SA 6.a.(5)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class IV investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.a.(6)	Release of factual information, analysis, findings and cause factors and recommendations concerning an ongoing Class III investigation (for which the individual is the IIC) to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.a.(9)	Release of factual information concerning an ongoing investigation (for which the individual is the IIC) to NoK (see Notes 5 & 6).

Serial	Authority
SA 6.a.(10)	Release of factual information concerning an ongoing investigation (for which the individual is the IIC) to media (see Notes 5 & 6).
SA 6.b.(1)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to commanders (see Notes 5 & 6)
SA 6.b.(2)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to DND/CAF personnel (see Notes 1, 5 & 6)
SA 6.b.(3)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the media (see Notes 5 & 6)
SA 6.b.(4)	Release of factual information, analysis, findings and cause factors and recommendations concerning a completed Class III & IV investigation to the public through ATI (see Notes 5 & 6)

Note 1: This authority includes the release of this information to DND contractors (such as OEMs or AMO as required). Information released under this authority to DND/CAF personnel may only be used to further remedial action or for PM purposes.

Note 2: Of note, under *Aeronautics Act* section 15 (paras 1-4), any item seized for investigations and not being DND property or not tested to destruction, should be returned to its owner once its purpose has been fulfilled.

Note 3: Restriction of access to the occurrence site must be conducted utilizing the statutory powers listed in *Aeronautics Act*, section 14 (paras 7 to 9). Of note, minimization of disruption to transportation services should be considered. Persons knowingly entering such areas may be in contravention of *Aeronautics Act*, section 24.6 (1)(a), which is an indictable offence.

Note 4: Personal Health Information is discussed in detail in Chapter 10, paragraphs 17-20. It is essential that this information is reviewed and understood before gathering or any release of personal health information is made.

Note 5: All investigators are permitted to release still photos providing there are no persons in the photo, the photo is technical in nature and the photo concerns an investigation where they are the investigator conducting the investigation. Of note, the authority to release moving images (films, videos etc) is retained by the AIA as is the authority to release images with persons in the image, regardless of who is conducting the investigation.

Note 6: The information released in these events is governed by AIA policy and detailed in Chapter 10, paras 22-33 of this manual. Also, the information available to be released is strictly limited in scope. For example, the information released to media or NoK for an on-going investigation is limited to the information released in the FTI and the explanations of such facts. Similarly, the release of completed Class I & II investigations is IAW AIA administrative proce-

dures and only by assigned individuals. The release of such information to DND contractors (such as OEM or AMO) is covered within this authority. Anytime information is released, the AIA should be informed so that appropriate notice can be made throughout the CoC.

Annex C
Chapter 10
A-GA-135-003/AG-001

ANNEX C - RETAINED AUTHORITIES

Serial	Authority
RA 1	Conduct Interviews
RA 1.i.	Conduct interviews with persons who will not voluntarily agree to be interviewed and interview requires use of *Aeronautics Act* section 14(10)(a)(i)or(ii) and the use of *MAIR*, Form 3.
RA 2	Seize, Search and Test to Destruction
RA 2.a.	Seize, search and test (possibly to destruction) articles belonging to civilians and who will not give their permission to do so (see Note 1)
RA 2.b.	Release items from impound (see Note 2)
RA 2.c.	Release items from quarantine (see Note 2)
RA 4	Approve Investigation Reports
RA 4.a.	Approve an Enhanced Supplementary Report
RA 4.b.	Approve a Flight Safety Investigation Report
RA 5	Medical Information
RA 5.a.	Analyse and distribute Personal Health information (see Note 3)
RA 5.b.	Gather and quarantine Personal Health Information from unwilling sources and authorities (see Note 3).
RA 5.c.	Compose sanitized medical information for investigation report. Compose separate medical report (see Note 3).
RA 5.e.	Require a person who is directly involved in the operation of an aircraft submit to a medical examination as per *Aeronautics Act* section 14 (10)(b) and the use of *MAIR*, Form 4 (See Note 4).
RA 5.f.	Require a physician or health practitioner to provide information concerning a patient as per *Aeronautics Act* section 14 (10)(c) and the use of *MAIR*, Form 5.
RA 5.g.	Require a person who has custody of a body of a deceased person or other human remains to permit the performance of an autopsy as per *Aeronautics Act* section 14 (10)(c) and the use of *MAIR*, Form 6.
RA 6	Release of Information
RA 6.a.	Ongoing Investigations
RA 6.a.(1)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class II investigation to Commanders
RA 6.a.(2)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class I investigation to Commanders
RA 6.a.(3)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class II investigation to DND/CAF personnel (see Note 5)

Serial	Authority
RA 6.a.(4)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class I investigation to DND/CAF personnel (see Note 5)
RA 6.a.(5)	Release of analysis, findings and cause factors and recommendations concerning an ongoing investigation to NoK
RA 6.a.(6)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class IV, III, II or I investigation to the media
RA 6.a.(7)	Release of analysis, findings and cause factors and recommendations concerning an ongoing Class IV, III, II or I investigation to the public through ATI
RA 6.a.(8)	Release of factual information or analysis, findings and cause factors and recommendations concerning an ongoing investigation to other investigating agencies (coroner, police, NIS, summary investigation, BOI, etc)
RA 6.b.	Completed Investigations
RA 6.b.(1)	Release of analysis, findings and cause factors and recommendations concerning a completed Class II investigation to Commanders
RA 6.b.(2)	Release of analysis, findings and cause factors and recommendations concerning a completed Class I investigation to Commanders
RA 6.b.(3)	Release of analysis, findings and cause factors and recommendations concerning a completed Class II investigation to DND/CAF personnel (see Note 5)
RA 6.b.(4)	Release of analysis, findings and cause factors and recommendations concerning a completed Class I investigation to DND/CAF personnel (see Note 5)
RA 6.b.(5)	Release of analysis, findings and cause factors and recommendations concerning a completed investigation to the NoK
RA 6.b.(6)	Release of analysis, findings and cause factors and recommendations concerning a completed Class II investigation to the media
RA 6.b.(7)	Release of analysis, findings and cause factors and recommendations concerning a completed Class I investigation to the media
RA 6.b.(8)	Release of analysis, findings and cause factors and recommendations concerning a completed Class II investigation to the public through ATI
RA 6.b.(9)	Release of analysis, findings and cause factors and recommendations concerning a completed Class I investigation to the public through ATI
RA 6.b.(10)	Release of factual information or analysis, findings and cause factors and recommendations concerning a completed investigation to other investigating agencies (coroner, police, NIS, summary investigation, BOI, etc)

Note 1: Seize, search and test protocols are dependent upon the origin of the articles in question and may need to be treated differently or uniquely depending on that situation. The AIA retains this authority for all situations where civilian persons are involved and do not give their permission for the requested process (search, impounding, quarantine or test). Under such circumstances the statutory powers listed in the *Aeronautics Act* section 14 (paras 2 to 6) will need to be invoked and associated *MAIR* forms utilized by AIA authorized individuals, which

will usually be DFS Desk Officers.

Note 2: Processes to be followed and delegated authorities are detailed in Chapter 6.

Note 3: Personal Health Information is discussed in detail in Chapter 10, paragraphs 17-20. It is essential that this information is reviewed and understood before any release of personal health information is made.

Note 4: Medical examination of minors (persons less than 18 years of age in AL, MB, ON, PE, QC, SK and less than 19 years of age in BC, NB, NL, NS, NU, YT, NT) without parental permission will not be conducted even though there is a statutory tool for this to occur. In such cases the refusal to submit to a medical examination will be recorded in the investigation report and the investigation will proceed without this evidence.

Note 5: The release of this information includes release to DND contractors (such as OEMs or AMOs as required).

INTENTIONALLY LEFT BLANK

CHAPTER 11 - AIA ADMINISTRATION PROCEDURES AND ETHOS

INTRODUCTION

1. For the most part, the detailed AIA administration procedures are contained in DFS/AIA SOPs and amended as necessary through internal staffing within the various levels in the FS System. The purpose of this chapter is to lay out expected behaviours, general procedures and internal review protocols for airworthiness investigation team members, for the FS System staff at all levels and for the associated staffing of airworthiness investigation reports.

2. The general principles and obligations of the Defence Ethics Program are laid out in the Defence Ethics Statement. This statement rank-orders the principles of behaviour expected of DND/CAF personnel: first, respect the dignity of all persons (humanity); then, serve Canada before self (society) and; last, obey lawful authority (law). Furthermore, there are six obligations of equal weight that govern general actions: integrity, loyalty, courage, honesty, fairness and responsibility. This ethics statement has been used in combination with the guidelines for TSB investigators from their operations manual and the Code of Ethics and Conduct from the International Society of Air Safety Investigators (ISASI) to craft the Airworthiness/FS Ethos.

AIRWORTHINESS / FLIGHT SAFETY ETHOS

3. The perceived behaviour of AIA/FS personnel is every bit as important as actual behaviour. With this in view, all persons having contact with the AIA/FS system and its personnel expect the highest standards of professionalism and integrity as well as just treatment in an open and no blame atmosphere. This is essential to foster the self-reporting and admission of errors that allows the whole system to be successful. To accomplish this behaviour and ingrain these characteristics in AIA/FS staff, the following principles are the norms the AIA expects from all investigators and associated staffs as they investigate in an independent, non-partisan and responsive manner:

a. Respect. We are committed to respecting the dignity of all with whom we deal and always in a considerate and courteous manner;

b. Professionalism. As a core responsibility, we will maintain a highly competent, skilled and knowledgeable AIA staff through appropriate continuous personal education and the development, review and amendment of the DND/CAF airworthiness and FS system;

c. Integrity. We are guided by honesty and propriety in conducting all of our affairs and do so for the betterment of the whole system;

d. Openness. We accept and share information freely and openly, while respecting the identity of the information providers and the uses for which the information may be employed, to the full extent of the law; and

e. Fairness. We treat all individuals and organizations equitably.

INVESTIGATOR CODE OF ETHICS

4. All investigators associated with AIA investigations will carry out their duties in a

professional, equitable, expeditious, and open manner. In addition, investigations will be conducted IAW the *Aeronautics Act*, *MAIRs*, the *Access to Information Act*, the *Privacy Act*, other Acts, regulations, conventions and agreements as applicable, as well as within the policies, standards and processes listed in this manual and the A-GA-135 series of publications. Investigators are required to perform their duties with the highest personal integrity. In particular, AIA investigators shall:

a. Ensure that all evidence obtained in an investigation is given the significance it deserves relative to other evidence;

b. Ensure that all items presented as fact have been checked for validity, including judgements that are based on personal experiences;

c. Follow all avenues of fact determination which have reasonable probability of achieving appropriate PM recommendations;

d. Use the best available expertise, methods, and equipment in determining the validity of information;

e. Keep an open mind to the introduction of new evidence or relevant opinions, and be willing to revise one's own findings accordingly;

f. Ensure that investigations are conducted in an unbiased and objective manner, without prejudgments which might be perceived as being partial to any party:

g. Employ the highest ideals of courtesy and fairness in dealings with involved individuals, NoK, interested parties, industry and the public at large;

h. Investigators authorized to speak to the media, (generally IICs, WFSOs and Public Affairs Officers), will release only confirmed, factual information that they are authorized to release to those external to the investigation and must bear in mind the privacy rights of individuals and NoK at all times. All investigators will represent the AIA and DND/CAF in a professional manner;

i. Ensure that their investigator status is not used to effect personal gain or favour. In addition, disclose to the AIA or his representative, any potential for criticism of personal association, e.g. personal friendship with a key witness, previous work experience for a "party of interest," etc.;

j. Promote the FSP and occurrence investigation as fundamental elements in DND/CAF accident prevention; and

k. Contribute to the development of the profession by sharing knowledge and experience and by striving for the highest level of proficiency and effectiveness in their own service.

INVESTIGATION TEAM MANAGEMENT PRINCIPLES

5. The following protocols and staffing responsibilities will apply to occurrence investigations where diverse team support from personnel or units are called for and those investigations requiring inter-agency support (such as QETE, NRC, CFEME or AETE). The latter support situation is detailed in separate Service Level Agreements (SLAs) or Memoranda of Understanding (MOU) between the AIA/DFS and those agencies but the principles of team support, staffing and cooperation will be discussed in this section. These principles will also

be applied to situations where support from individuals or special units (Aircrew members, Technical members, Recovery and Salvage, Fleet Diving Unit, etc) is required for the investigation.

6. For each occurrence there is only one AIA investigation and one investigation team; however, the team composition may be adjusted as the investigation proceeds and more information becomes available that requires team membership adjustment. The AIA is the authority that convenes an occurrence investigation and in that convening process, appoints an IIC who is accountable for the overall conduct of the investigation. The AIA may change the IIC as required for any reason but all investigation team members will be informed of such changes. Such changes are usually for staffing, changes in priority or transfer reasons and should not be construed as having any other meaning. IIC changes will entail detailed transfer protocols within the AIA staff, specified in DFS SOPs. Investigation team members (inter-agency members) may be changed for similar reasons but the AIA may request details on supporting agencies decisions under such circumstances and the AIA retains the right to request reconsideration of such decisions.

7. During the field phase, the IIC has operational control; he/she will allocate investigation tasks and supervise personnel at the site, and, where necessary, coordinate activities with the appropriate managers/supervisors. Specialist personnel will conduct work IAW standards and procedures established by their respective agencies and the SLAs; however, in the interest of team cooperation or management, the IIC has the right to assign tasks that may be outside of the anticipated standard work areas for any team member.

INFORMATION PASSAGE PROTOCOLS

8. The AIA is the sole authority for information release of all information gathered for or by the investigation team unless he has delegated this authority IAW Chapter 10 (to the IIC) or provisions for its release is governed by an inter-agency agreement, such was the DFS / TSB Working Arrangement. Consultation by investigation team members or specialist members outside of inter-agency agreement protocols may occur but the IIC must be aware of the consultation, its purpose and then will limit the information passed for the consultation purpose. The purpose of this procedure is to stop the spread of incomplete information or speculation regarding information shared in the consultation process. Personnel that are consulted in such circumstances must agree to retain the privilege associated with this information. The *Aeronautics Act*, section 18 makes compliance with this directive a statutory obligation.

9. Throughout the investigation, team members and supporting agencies are responsible for maintaining the privilege of information entrusted to them as part of the investigation. During consultation, any information passed to a consultant must be tracked, accounted for and eventually retained by the member or destroyed by the member or agency conducting the consultation. Again, this protocol is to stop speculation or the release of incomplete information and to protect the privilege associated with some information sources. The *Aeronautics Act*, sections 22, 23 and 24.1 make compliance with this directive a statutory obligation.

10. Inter-agency reports are to be treated in a similar manner as other investigation information. The reports are prepared for the AIA and are not to be shared otherwise (except as specified in the applicable SLAs), without explicit permission of the AIA or his representative and then only for consultation purposes. Also, during the report composition phase or during inter-agency review and consultation, similar protocols will be observed by all investigation

team members. The *Aeronautics Act*, sections 18(5) and 24.1 make compliance with this directive a statutory obligation.

INVESTIGATION SITE MANAGEMENT ANOMALIES

11. Accident Site Access for Insurance Representatives: Occasionally insurance representatives or underwriters may request accident site access. After the requester's identity has been verified, the request has been validated and the site is appropriately safe, the IIC will grant site access to such persons in a closely supervised manner. This is to protect evidence on the site and the well-being of individuals conducting such surveys. In no circumstances shall site access be granted when wide spread hazards to persons are present.

12. Accident Site Access for Private Property Owners: Should the location of an accident be on private property, the AIA's investigation is permitted to prohibit or limit owner access to the site under *Aeronautics Act* section 14(7 to 9). However, the IIC or site manager will make it known to such persons the dangers associated with access to the site and the reason for the cordon. Should assistance of a transient nature be required by a property owner on an accident scene (such as turning power on or off or like activity), the investigation team or a representative (salvage team or OSCAR member) may assist the owner when reasonable to do so. Compliance with an accident scene cordon is a statutory obligation and *Aeronautics Act* section 24.6(1) may apply where the consequences of an intentional contravention of the cordon may become an indictable offence (upon conviction imprisonment of up to two years).

13. Accident Site Access for Accredited Observers: The IIC may allow a person granted Observer status for an AIA accident investigation to access an accident site. However, prior to being allowed access, Observers will receive an AIA letter granting them Observer status, must sign an Observer non-disclosure agreement (see Chapter 8), and must follow all protocols listed in the *MAIR*s and as determined by the IIC. Normally, the observer should be fully trained in hazards and accident site protocols and appropriate PPE will be provided to the Observer prior to accessing an accident site. In addition, Observers must always be accompanied by an AIA representative while at the accident site.

14. Accident Site Access for Others: Many other individuals may seek accident site access for various reasons, such as media, CASARA agents, police, coroners, NoK, DND/CAF personnel, etc. Again, the AIA's investigation is permitted to prohibit or limit access to the site under *Aeronautics Act* section 14 (7 to 9). Compliance with an accident scene cordon is a statutory obligation and *Aeronautics Act* section 24.6(1) may apply where the consequences of an intentional contravention of the cordon may become an indictable offence (upon conviction, imprisonment of up to two years). However, each case must be examined on an individual needs basis and the IIC or the appointed site manager must make decisions based upon the circumstances at hand. In no case will casual access be granted. When it is decided to grant access for whatever reason, the appropriate PPE must be donned and a qualified team member will accompany the site visitor. A record of such accident site access shall be maintained.

POST-FIELD PHASE EXPECTATIONS

15. Although personnel from other agencies or units return to their normal workplace after the field phase and are accountable to their own supervisors, they remain tasked by the AIA

until completion of the investigation. Supervisors must be made aware of these responsibilities and allocate sufficient time for personnel to discharge such AIA duties.

16. After the field phase is complete, the IIC will, in consultation with team members and supporting agencies, prepare an investigation work schedule that will outline the scope of work to be completed, significant investigation tasks, milestones, and due dates. For most investigations, this will be a standard timetable in order for the AIA to meet established investigation milestones. However, in complex investigation scenarios, this could involve protracted work plans that may require investigation team members to notify supervisors of this commitment. Should the work plan not be possible due to workload, the IIC and the AIA are to be notified in writing with the reasons. The IIC may request periodic updates to ensure that work is proceeding in an effective and efficient manner. Should undue progress be noted in work scheduled, the AIA may request milestone commitments from supervisors of team members so that investigation timetables can be maintained.

17. Upon return from the field phase, the IIC will brief the CI and SI on the work plan schedule that is anticipated with the next phases of the investigation. Depending on workload and personnel availability, a modification to the investigation team composition could be formulated at this stage to manage any anticipated complications or undue time delays in report production.

18. In addition, the IIC will conduct a “Hot Wash” debriefing at DFS where field party and rear party lessons learned will be shared with other DFS staff. This debrief should include all available investigators and any other staff that had a part in the conduct of this phase of the investigation. Sometimes the production of records of these lessons may be tasked to the investigation team should DFS or DFS 2 decide that they would be of value for future training or SOP amendment.

INTENTIONALLY LEFT BLANK

Annex A
Chapter 11
A-GA-135-003/AG-001

ANNEX A - IIC CHECKLIST

> Note:
> This checklist should be used in conjunction with the guidance and expanded checklists in the A-GA-135-002/AA-001 "Occurrence Investigation Techniques for the CF."

Pre-Occurrence Preparation

Documentation & Qualifications

» AIA Certification and Authority Limits

» AIA Issued Identification

» Biohazard Qualification

» Weapons Qualification

» CBRN Qualification

» Personal Training Status and Upgrade Requirements

» Financial Authority and Limits

» Passport (Green and Blue)/Visas

» Familiarity with ClaimsX and Travel Procedures

» Any other requirements as directed by CJOC HQ (for outside North America deployments)

Electronic Equipment Preparations

» Computer with required templates and "Go Kit" information/files loaded

» Photographic Equipment

» Recording Equipment

» Communication devices (to include international Blackberry, Sat phones, etc)

» Other Specialized Investigation Equipment

Personal Kit

» Climate/Uniforms (appropriate for up to two weeks)

» Remote Location Requirements

» Personal Protection Equipment & Comfort

» Packs and cases

Specialized Equipment

» PPE Biohazard Kit

» Breathing Apparatus and Filters

» Survey, tools and sample kits

Medical

» Vaccinations up-to-date (must include Hep B)

» First Aid qualification

Actions on Notification

Details of Occurrence

» Aircraft & Tail No

» Unit & Wing

» Crew & Pax (plus disposition)

» Date & Time

» Mission, Flight Itinerary, Occurrence Location & Destination

» Known Hazards & Cargo

» Nature of occurrence & estimate of damage or FSCL

» Flight Recorders & Disposition (all recorders to include HUMS, Op Load Monitors, etc)

» Characteristics of Site, Security & On-scene POC

Note:
Any AIA Investigation site can be cordoned off as per the *Aeronautics Act* (Section 14 (7 to 9)) and the AIA has delegated this power to all FS personnel.

Notification Confirmation (other OCIs and CoC)

Initial Team Build & Arrangements

» IIC

» DFS Members

» MOU/SLA Members (CFEME, AETE, QETE, NRC, MCE, TSB, RCMP etc)

» SMEs (for occurrence specifics)

» Consider Observers / Accredited Reps / Other Military, etc

» DFS Tasking Order

» CJOC ETA message for deployed occurrences

» Travel Arrangements

» Accommodations

» Local Transportation

» Notify Support Agencies (NRC, QETE, TSB, etc)

» Key Contacts List

Actions Pre-Departure

Travel

» Plan and Team Details (plus return TANs)

» ClaimsX

» Passport (Blue or Green situation dependant) / Visas

Data & Equipment Gather & Initial Set-Up

» FSIMS

» Investigation checklists, references

» AOIs, Checklists, SMMs, K Drive Go Kit Files (& others as Req'd)

» Investigation Equipment (gather & pack)

» Personal Equipment (home & office)

» Establish FS actions underway (ex. medical exams/toxicology samples, quarantine, POL samples, impound, witness statements & lists etc)

» Establish Comms with Security Agencies & Interim travel Comms Plan

» Plan for FDR/CVR or other recorders

» Admin support (work areas, interview rooms, conference rooms, phone/fax lines,

computers, etc)

» Back party POCs & Procedures

» Brief DFS 2 on Plan

Actions while Travelling

Prepare

» Team briefs IAW checklist (Crash Scene Hazard Management plan, team rhythm, evidence keeping, daily routine, etc)

» Consult Aircraft Type Hazards List (Annexes attached to Post-Crash Environmental Guidelines)

» WComd (or rep), WFSO, OSCAR in-brief

» Initial projected schedules

» Team meeting SOPs & considerations(timings, sitreps, forecast of requirements etc)

» Information release protocols, AIA expectations

» Security plan (site, evidence, information, OPSEC, etc)

» NoK plan and process

» Media plan and interview information

» Group Structure

Actions Upon Arrival

» Contact WComd (courtesy or in-brief)

» WFSO & OSCAR (initial situation & update)

» Obtain Detailed Location and Maps

» Establish Initial Organization Meeting Plan (time, place and attendees)

» Visit Site (biohaz/PPE Kits, Personnel Exposure Log, etc)

- Safeguard of wreckage
- Preliminary survey - ensure cordons (biohaz, armament, materials, hazmat cargo, etc) set
- Consult on-scene controller (OSCAR) for sitrep & comms
- Consult various experts (responders / Wing) for situation / site update (Police, Env O, RADSO, HazMatO, Medical O, Public Affairs, etc)
- Consult photographer and establish photo priorities

» Convene Initial Team Meeting

- Introductions of all Team Members & Observers (present and expected)
- Outline Process, Purpose and Products of Investigation
- AIA expectations (as per AIM)(+daily Sitreps)
- Assign Initial Groups (distribute checklists and requirement expectations) (eliminate, create or combine A/R)
- Consider Members of other Organizations (RCMP, TC, TSB, Police, Coroner, industry)
- Observers (status, protocols, sign AIA undertaking letter and non-disclosure agreement, IIC expectations, etc)

» Brief All

- Cooperation, communication and coordination (not independent action)
- *Aeronautics Act* powers - procedures for investigators for cooperating and non-cooperating agencies / persons / authorities
- Site location, directions & Maps (distribute)
- Site safety - Biohaz levels, site hazards, EOD and protocols, cordons, requirement to document site exposure the associated hazards and PPE requirements for all personnel, and site OPI
- Make available aircraft specific hazards Annexes (in Post-Crash Environmental Guidelines and Annex Z)
- Site OPI to establish and brief site protocol details, in brief late comers, etc
- Evidence keeping protocols & log (on site, documents, statements, reports, other, etc)
- Safeguarding and disposition of quarantined items and other evidence
- Initial projected schedules, Team SOPs & considerations (timings, forecast of special requirements, meeting attendance records, hazard exposure records, etc)
- Daily Sitrep Requirements
- Information release protocols (as per AIM)
- Security plan (site, evidence, information, OPSEC, etc)
- Checklist requirements for each Group (brief & distribute)
- Participant & Advisor ID cards
- Expected environmental conditions & transport plans
- Media Plan

- Privileged Information Safeguards(Medical, OBR and statements, reports, representations etc)
- Interaction Protocols for contact other Authorities (Coroner, BOI, Police, TC, TSB etc)
- Requirements for departure (end of field phase)
- Post field phase requirements

Field Investigation Phase

Assume Control of the Site from OSCAR or site OPI

» Appoint Investigation Team OPI for Site

» Security (review, accept, amend A/R)

» Communications

» Cordons and In/Out Procedures

» Contacts (Police, landowners, coroner, witnesses, W Env O, RASO etc)

» Hazards (documented, consultations undertaken & POCs, clean up steps taken, cargo, personnel exposure logs, etc)

» Event log copied

» Media – events observed, POCs, etc

» Photos, video & other media collection (and time log for each)

» Shelter, Food, Water and sanitary/hygene requirements

» Consumables and re-supply (Haz kits, gloves, goggles etc)

» Other points situation dependant

Establish Team Rhythm and Expectations

» Daily Meeting Plan and Attendance (& record)

» Comms plan & protocols

» Daily Sitrep Production

» Facilities & Other Special Requirements

» Financial Requirements (projected and seek authority)

» Assign Preliminary Report Composition Duties and Compile Report

» Team Information Sharing and Release Protocols (internally and externally)

» Evidence Preservation & Log

» Hazard Exposure Log

Monitor Group & Member Progress – Supplement A/R

» Consider requirement for specialized experts

» Assign duties not covered by established Group assignments

» Review Individual & Group field reports / notes, log & retain

» Shipment of Evidence for Further Analysis

Consider Release of Immediate PMs on recurrent basis (A/R)

Ensure all Required Info Collected, Preserved & Initially Analysed (Use Checklists In A-GA-135-002/AA-001)

» Technical Group

» Operations Group

» Witness Group

» Medical

» Human Factors Group

» Escape and Survival Systems

» Other Support Groups or Members

- Public Affairs
- RASO
- EOD
- W Env O
- Administration
- Legal
- Liaison
- Site Security
- Assisting Officer (A/R)
- Others

<u>Actions for Field Departure</u>

» Ensure Sufficient Data for Preliminary Report

» Collect all Field Notes and Reports (copies)

- » Establish Expected Work and Schedules for SMEs and Other Groups Post-Field Phase
- » Collect and Arrange Transport of Articles and Samples for Further Examination
- » Pass Control of Site to Wing or Other Clean up Authority
- » Compose and Conduct Out Brief for WComd (or Rep)

Initial Post-Field Activities

- » Conduct “Hot Wash” for DFS, DFS 2 and other Investigators on return
- » Prepare Preliminary FSIR
- » Prepare “From the Investigator”
- » Distribute FTI and supporting paperwork to MND A/R
- » Prepare and Arrange for NoK briefing prior to FTI release
- » Prepare and Liaise with Public Affairs for Media Release of FTI
- » Prepare Training Reports and Recommendations for all Personnel U/T
- » Ensure all Team Personnel and Medical Docs are updated with “Exposure to Hazardous Conditions” Log
- » Brief senior DFS staff on intended direction of investigation
- » Ensure Thank You Letters Prepared and Sent A/R
- » Prepare, Log and Store Evidence – Add To A/R

BOI Liaison - Establish and Log

Analysis Phase

- » Conduct Testing and Liaise with Support Agencies A/R for Test Activities
- » Monitor, Collect and Analyse SME and Group Supplementary Reports and Analysis
- » Accept or Request Follow-on Reports
- » Brief, discuss and develop Analysis with DFS 2 and Other Investigators A/R
- » Develop PMs in association with Analysis and Liaison with COC (+OAA & TAA A/R)
- » Consider Immediate PM Recommendations A/R

Initial Report Phase (Draft for Comment)

- » Prepare, staff internally and amend A/R Draft for Comment FSIR
- » Prepare Distribution List and associated Correspondence
- » Release Draft for Comment

» Prepare and store Comments Log for PDIs (Evidence File)

Final Report Phase

» Monitor, Collect and Analyse PDI Comments

» Accept or Request Clarification of PDI Comments A/R

» Brief, discuss and develop Report Amendments with DFS 2 and Other Investigators A/R

» Prepare, staff internally and amend A/R FSIR Final Report

» Prepare and Arrange for AIA Signing of Final Report

» Prepare Individual PDI Return Letters based on Report Amendments

» Prepare “Epilogue”

» Send FSIR and Epilogue for translation

» Prepare and staff “21 Day Letter” to OAA/TAA for C Air Force (FSIR only)

» Receive and Discuss OAA/TAA replies with DFS 2 and DFS (AIA)

» Draft “Action Directive” for staffing by D Air FR to C Air Force (FSIR only)

Release of Reports Phase

» Staff (A/R) Final Report and Epilogue to MND, through C Air Force/CDS

» Prepare and Arrange for NoK Final Report and Epilogue briefings

» Prepare and Liaise with Public Affairs for Media Release of Final Report and Epilogue

» Release Final Report and Epilogue

» Distribute PDI Comment Letters

» Conduct Media Events A/R

Post-Release Actions

» Prepare FSIMS Input of Final Report, Cause Factors and Associated PMs

» Monitor PM Implementation (fleet desk officer)

» Report PM Implementation to ARB

Follow-up Activities

» Close Completed FSIMS File

» File the Closed / Completed FSIR

INTENTIONALLY LEFT BLANK

CHAPTER 12 - NEXT OF KIN

INTRODUCTION

1. When personnel are fatally injured in an occurrence, the next of kin (NoK) expect appropriate treatment and release of information concerning their loved ones. To aid in this, DFS has adopted a process whereby the NoK are briefed on the accident investigation process and the contents of some DFS investigation documents prior to their public release.

2. There are two slightly different categories of NoK:

   a. those immediately related to crew members or personnel directly employed in the operations of the aviation asset (such as aircrew, maintenance personnel or SAR spotters); and

   b. those related to personnel who were killed collaterally or that were killed in the occurrence but were not directly connected to the operation of the aviation asset (such as persons on the ground, non-crew parachutists or passengers).

3. The first group of NoK have a vital role in the successful investigation of an occurrence, particularly from a Human Factors perspective since they may be the sole source of information that could help determine the cause of an accident. The first group is usually interviewed by the Medical Member and the Human Factor specialist during the initial information gathering stage of the investigation; they may be consulted later during the analysis stage. The second group may also provide key insight on the occurrence upon interview by the Operations Specialist, for example. Both NoK groups have the requirement for just treatment and the expectation that a professional and thorough investigation will be conducted and that appropriate information will be forthcoming when available. Beyond the information that is part of the initial briefing, all NoK should be given an investigation Point of Contact (POC), normally the Chief Investigator (DFS 2), so that they may make inquiries as they require.

NOK BRIEFING INTENT

4. There are two official briefings presented by DFS to both groups of NoK, the Initial and Final Briefings. The intent of these briefings is to keep the NoK informed about the investigation process and status, identify an investigation POC, and to help them prepare for the eventual public release of the FTI, Epilogue, and FSIR. The briefings must be tailored to the audience, particularly when discussing complex aviation systems or situations, and be presented in as sensitive a manner as possible. It is important that the audience understands the material so information should be presented in a manner that they can understand or question areas that may not be clear to them.

INITIAL BRIEFING

5. The purpose of the initial briefing is to describe in detail the investigation and FSIR processes and to provide the NoK with an advance copy of the FTI information prior to its official public release on the DFS Website. This briefing will take place after the CDS and the MND have been informed or briefed on the FTI.

6. DFS, DFS 2, or his designate will provide this briefing in person. The briefing will describe the role of investigation team in general, explaining the various specialists or groups involved. It may be of value to identify that other investigative processes might occur, such as a Board of Inquiry, and engage the NoK. More importantly, though, the point should be made that there is no relationship between the FSI and other investigations other than to pass strictly factual information. This briefing will also identify the FSI POC and explain the difference in role from the Assisting Officer; the FSI POC will update NoK regarding the stages of the FSI and explain any delays encountered in the normal investigation time lines.

7. Briefings will be coordinated with the affected Wing, particularly with respect to administration and attendance. Normally, the designated Assisting Officer and the padre would be present as the Wing's representatives, but this may vary according to the wishes of the NoK. After describing the FSIR process and associated documents, details of the FTI will be presented. Information relating to on-going analysis or hypotheses about the investigation shall not be released. The NoK should be left with a copy of the FTI and a copy of the investigation process summary, which, upon request by the NoK, may be forwarded under DFS cover letter to other family members.

8. The administrative details for this briefing should follow the considerations listed in DFS Standard Operating Procedures (SOPs).

FINAL BRIEFING

9. The purpose of this briefing is to provide the NoK and survivors with a briefing on the results of the FSI prior to the public release of the final FSIR and Epilogue. In circumstances where the results might be controversial, it is recommended that NoK and surviving crew members be briefed independently, unless requested differently by those involved. Coordination with Wing and Unit commanders and their advisors is essential to meeting the aim of the briefings while minimizing stress on the NoK and survivors. This briefing will contain:

a. a summary of the factual data;

b. a summary of the analysis;

c. the findings and causes as determined by the investigation; and

d. a summary of the recommendations made by the investigation.

10. The main briefer shall normally be the IIC. In addition, a suitably qualified individual (such as an IIC 1, the SI, DFS 2, or DFS) shall attend to address any questions related to the FSIR process, policy or legislative aspects of the Aeronautics Act. In preparing and presenting the briefing, the main briefer must bear in mind that the NoK may not be familiar with aeronautical terms or acronyms. Therefore, it must be presented in easily understood, layman's terms. The briefer must also bear in mind that the objective of the briefing is to explain the findings of the investigation, not to defend the findings.

11. This is a very emotional event for the NoK. They should therefore be asked if they would like to have either a military or civilian padre present at the debriefing. Normally, the designated Assisting Officer and a padre would be present on behalf of the Wing during the NoK briefing. Nonetheless, the wishes of the NoK as to the presence of supporting personnel, relatives or friends need to be considered, and where possible, respected.

12. The NoK should be left with a hard copy of the FSIR, the Epilogue and the briefing. Soft copies shall not be distributed until after the public release of the FSIR and then only if specifically requested.

13. Following the briefing, the NoK should be advised when the FSIR will be made public. Normally one week should be allowed between NoK debrief and release of the FSIR to the public. However, NoK requests for delay of the FSIR publication will be considered by DFS.

14. Administrative and financial details for these briefings are contained in DFS SOPs. In general, a relaxed atmosphere, a free and open question format should be sought and sufficient time must be allotted for the briefs. As well, the briefing will not contain detailed medical information; pictures of the deceased or autopsy photographs (i.e. no shocking pictures or information will be presented).

INTENTIONALLY LEFT BLANK

CHAPTER 13 - COLLATERAL INVESTIGATIONS

INTRODUCTION

1. Serious aviation occurrences often result in the initiation of not only airworthiness investigations, but also concurrently other investigations by the chain of command. These investigations all have different objectives and processes and are subject to different laws and regulations. Moreover, each investigation has an important role to fulfill and airworthiness investigators must respect this fact.

2. There are several problems associated with this situation. First of all, there is only one set of physical evidence associated with an occurrence. Therefore, ways must be found to ensure that the examination and analysis of this evidence is conducted properly and safely by qualified individuals. Furthermore, much of the information that can be derived from this physical evidence is time-sensitive and, therefore, the examinations must take place in a timely manner. Finally, there is only one set of witnesses and participants. Also, *Aeronautics Act* sections 22(1) to (9), 24(1) and (2), and 24.1(1) to (7) apply and specifically preclude the sharing of “privileged” information, such as witness statements and identities; however, section 23(1) to (8) specifies that under certain conditions a BOI may have access to on board recordings. As can be seen, there are several challenges associated with the passage of appropriate information between investigations.

3. The objective of this chapter is to outline how airworthiness investigations will deal with collateral investigations.

TYPES OF INVESTIGATIONS

4. There are eight types of investigation with which an airworthiness investigation may be asked to share information. These are as follows:

a. a Royal Commission convened under the Inquiries Act;

b. a Coroner’s Inquiry;

c. a police investigation;

d. a BOI or a Summary Investigation;

e. a foreign government investigation (possibly due to the location of the occurrence);

f. an investigation by another airworthiness authority (such as TSB, NTSB, TC or another military aviation safety organization);

g. an airworthiness technical assessment; or

h. any other official inquiry looking for access to investigation material.

Royal Commission

5. A Royal Commission convened under the *Inquiries Act* is relatively rare and is usually an investigation that has precedence and both extraordinary investigation powers and access to evidence. Normally, this type of investigation takes a while to initiate and so time should not

be a factor. Therefore, if such an investigation is convened, the AIA will normally seek legal advice from the CAF Legal Adviser as to what information can be passed to this investigation.

Coroner's Inquiry

6. A Coroner's Inquiry has very broad legal powers, which are laid out through various sections of the *Aeronautics Act*. For example, a Coroner's Inquiry must be provided "privileged" information if it is requested, the Coroner may view "representations" and Coroners can request that investigators appear before the proceedings and give opinions regarding evidence. All information provided to a Coroner's Inquiry will be released through the AIA. When this situation arises, the AIA will seek legal advice as well, so that privileged information is only released as required by law and its use will be known or followed by AIA staff. Note, this applies to Canadian Coroners only; foreign Coroners do not have jurisdiction in Canada and these provisions, therefore, do not apply (see para 13).

Police Investigations

7. A police investigation is normally conducted for serious aircraft occurrences, such as a category "A" occurrence, or associated with acts of malfeasance such as sabotage or vandalism. These investigations can be conducted by local or provincial police forces, the RCMP or the CAF National Investigation Service. The main focus of these investigations is to determine if there was any wrongdoing that could result in criminal charges. Given the different objective of this type of investigation from an airworthiness investigation, there is seldom any interaction between the two investigations. However, it is important to note that the OBR recordings are afforded privilege and their release is prescribed under the *Aeronautics Act*. Also, there's privilege associated with statements and interviews given to a safety officer so these things must be respected when interfacing with a police investigation. Finally, it is a good idea for FS personnel and qualified technical personnel to monitor such investigations so that shared evidence is preserved and aircraft or other aviation resources damage is minimized.

Board of Inquiry or Summary Investigation

8. A BOI or a Summary Investigation (SI) is the most common type of collateral investigation with which an airworthiness investigation interacts. The BOI or SI convening order can require findings to be made that closely mirror those of an airworthiness investigation. However, the BOI and SI are dramatically different from an airworthiness investigation. The most significant differences are as follows:

a. a BOI and an SI are convened under the *NDA* whereas an airworthiness investigation is convened under the *Aeronautics Act*;

b. a BOI or an SI is convened by the CoC and is responsive to CoC objectives, timelines and review whereas an airworthiness investigation is convened by the AIA, who is independent from the CoC; and

c. a BOI or an SI are administrative in nature and must make multiple findings whereas the sole purpose of an airworthiness investigation is to identify effective PMs that will either prevent or reduce the risk of a similar occurrence.

NOTE

Anyone who in the course of their FS investigation becomes aware of circumstances that require a collateral investigation is to advise the commanding officer or commander immediately. The FSO will only suggest the requirement of a collateral investigation and shall not give evidence as to what circumstances brought them to that determination. The chain of command, after having concluded there is a requirement of a collateral investigation, should act promptly to initiate the process in order to avoid the impression that information gained through the FSI precipitated the collateral action. Additional details on AIA process and procedures for such events is contained in Chapter 3.

9. In order to preserve the fundamental principles of the FSP, FSOs shall not be appointed to or participate in collateral investigations. Information gained by FSOs through the conduct of a FS investigation shall only be provided to a collateral investigation on the authority of the AIA. In dealing with BOIs and SIs, the following principles will be used:

a. the investigations will be kept separate to the maximum extent possible;

b. the Chairperson of the BOI or SI should be directed to contact the AIA's Chief Investigator (DFS 2) prior to any FSI interaction with either the BOI or the SI. The AIA's Chief Investigator will outline to the Chairperson the information that can and cannot be passed by the AIA to the BOI or the SI;

c. the airworthiness investigation will normally provide the BOI or the SI with factual information and a statement of cause (if known) only. If possible, Part 1 of the Preliminary Report will be provided to the BOI or SI;

d. all information provided to the BOI or SI shall only be released by the AIA or his designate IAW AIA authorizations (see Chapter 10); and

e. the AIA will identify, to the best of their knowledge, any legislation, orders or policy that should be brought to the recipients attention concerning the information's use and privilege that may affect further distribution or preclude disclosure (such as *Aeronautics, Privacy* or other *ATI Act* provisions, ACOs etc).

10. Factual information includes the following information:

a. general information such as the aircraft type, aircraft role, unit of ownership and number of crew;

b. history of the flight including the type of mission, aerodrome of departure and location of the occurrence;

c. a summary of injuries to personnel including the number of fatalities, critically injured and major injuries to crew, passengers and others. Names are not to be used and crew members will be referred to by their crew position (e.g. pilot, co-pilot, flight engineer etc);

d. damage to the aircraft;

e. aircraft salvage and any environmental damage;

f. a summary of the personal information of individuals involved in the occurrence including crew position, rank, qualifications, medical expiry date, total flying time,

total flying time on type, flying hours in the last 30 days, duty hours during the last 24 hours, flying hours during the last 24 hours and flying hours on the day of occurrence. Names are not to be used and crew members will be referred to by their crew position (e.g. pilot, co-pilot, flight engineer etc);

g. aircraft information including any significant aircraft maintenance information;

h. meteorological information;

i. pertinent information with respect to aids to navigation

j. pertinent information with respect to communications equipment;

k. aerodrome or alighting area information;

l. general information regarding flight recorders such as the type of recorders (CVR/FDR). In no case will specific information on cockpit voice recorders or video recordings of crew reactions be included except as provided by *Aeronautics Act* section 23;

m. wreckage and impact information;

n. general medical information;

o. fire, explosive devices and munitions information that is not classified;

p. survival aspects of the occurrence;

q. test and research activities but excluding any analysis from these activities;

r. organization and management information pertinent to the occurrence;

s. flight data recorder data;

t. pictures of the occurrence (still and video); and

u. pictures of the occurrence site other than those depicting human remains and/or injuries to personnel.

Foreign Government Investigation

11. Should a DND/CAF aircraft crash in a foreign country, usually a STANAG or similar agreement will take effect and the AIA will investigate the accident as per normal procedures but within the laws of the foreign government. However, not all situations will be covered by such agreements and in cases where no agreement exists, the AIA through the CAF CoC will attempt to get concordance with the government in question to try and proceed in the normal manner. Should that not be possible due to the laws of the foreign government, the AIA will attempt to gain DND/CAF presence in the investigation and will attempt to get the protections that would be present if the accident happened in Canada or a negotiated STANAG location. The next DND/CAF perspective will be to try and behave as if ICAO agreements applied to the accident. Regardless, the laws of a foreign government will be fully respected and cooperation to the extent possible will be offered.

12. Sharing information with another airworthiness authority or aviation safety investigation of a foreign military is determined by the AIA on a case-by-case basis. However, the principles from STANAGs, ICAO Annex 13 and/or the DFS/TSB Working Agreement will generally apply to this activity.

Other Official Inquiry

13. Occasionally an inquiry may arise that does not fit into any of the previously mentioned categories. Under such circumstances, the AIA will make decisions for release of information such that the integrity of the statutory privileges and the FS system are maintained. Typically, factual information may be released should the FS investigation be completed; however, the AIA will retain the authority for release of information to such inquiries.

INVESTIGATION PRECEDENCE

14. At each occurrence site, there is an order of precedence for the authorities charged to investigate the occurrence. When there has been a fatality, the Coroner has precedence over all other investigations. Because of this precedence and from the due diligence perspective, AIA representatives, such as on-scene FS personnel, shall make all data regarding hazards associated with aircraft crashes known to the Coroner or their representatives. This will include but not be limited to, aircraft component hazard data sheets, cargo hazard lists, WHIMIS data and any other information sources available. Occasionally the Coroner may wish to have an inquiry based upon “Public Safety” issues, but these typically arise at times well after the accident and the field phase of the AIA investigation may have already been completed.

15. Once the Coroner has released the site for investigation or with no fatality involved, a crash site may be considered a “crime scene” due to the value associated with the loss of an aircraft or damage on the ground, thus making the police investigation next in the order of precedence. However, this is quite rare and typically police are satisfied that the AIA is conducting an investigation and will make the report available to the police once the report is complete, particularly if it is established that no evidence of criminal activity exists.

16. Once the Coroner and the police are satisfied, the airworthiness investigation is next in the order of precedence. Typically, the police will have used their powers and resources to cordon the scene and restrict access. The IIC may take over an established cordon and should review any existing cordon to determine if a new or revised cordon should be established based on investigation requirements.

> NOTE
> The Aeronautics Act permits the AIA to establish a cordon, even on private property. This authority is delegated as detailed in Chapter 10.

INTENTIONALLY LEFT BLANK

CHAPTER 14 - AIA/TSB AND OTHER COORDINATED INVESTIGATIONS

INTRODUCTION

1. The *CTAISB* and *Aeronautics Acts* contain provisions for coordinated AIA/TSB occurrence investigations when both a “Military Conveyance” and some sort of Canadian civilian facility or aviation resource is involved. There is a detailed working arrangement in place to explain the way that such investigation should take place but this chapter outlines the general principles for such circumstances. This AIA/TSB agreement parallels the ICAO Annex 13 investigation standards and cooperation principles.

2. In general, the principles of this cooperation will be extended in like circumstances for situations where joint investigation is called for but no formal agreement has been reached. This refers to investigations when other military safety investigation bodies are involved with a DND/CAF aviation resource but neither a STANAG nor other agreement has been signed. Similarly, for situations where a DND/CAF aviation resource is involved in a foreign country and that country is required or wishes to investigate an occurrence, the principles of cooperation in this chapter will guide the actions of DND/CAF airworthiness investigators.

3. When the AIA is involved with investigations with other NATO nations, STANAG 3531 governs the investigation process. Similarly, other agreements exist with some allied forces, like the Air and Space Interoperability Council (ASIC) Air Standard 85/2A that applies to Canada, Australia, New Zealand, the UK, and the US.

NOTIFICATION FOR COORDINATED INVESTIGATIONS

4. Recognising that prompt and efficient occurrence notification is a key element in an effective investigation; the signatories to an agreement will notify each other immediately when they become aware of an aviation occurrence that could result in a coordinated investigation. Signatories may also inform each other regarding an occurrence that has the potential to advance FS even though they may not fall under the provisions of Section 18 of the *CTAISB Act*. Signatories will pass information on reported occurrences on a routine basis.

PURPOSE OF INVESTIGATIONS

5. Coordinated investigations neither assign fault nor determine civil or criminal responsibility, but rather advance aviation safety. This principle, already well-established in Canadian aviation safety organizations, will be used to guide coordinated investigations where no agreement is in place; this is also found in ICAO guidelines for aviation safety investigations, which may be useful in setting up general guidelines in cases when none exist.

6. Some coordinated investigation situations with other airworthiness authorities (such as TC) could lead to enforcement action by the authority and, in cases such as this, the sharing of information can be quite complicated. To guard the investigation principle of not “assigning fault” in AIA/TSB investigations, only the factual information may be shared with enforcement agencies; however, no portion of the investigation that uses privileged information (such as analysis) can be shared with enforcement authorities without specific AIA permission and concurrence (see paras 11-14 below).

PROCEDURES

7. The TSB investigation of an aviation occurrence will be conducted IAW the *CTAISB Act*, the TSB Manual of Investigations (Air) (MOI (Air) 2-4) and the TSB (Air) Major Occurrence Investigation Checklist. The AIA's investigation of an aviation occurrence will be conducted IAW the Canadian *Aeronautics Act*, the A-GA-135-001/AA-001 (Flight Safety for the Canadian Armed Forces), and this Airworthiness Investigation Manual.

8. In cases where no coordinated investigation agreement exists, the lead organization will likely wish to use their procedures manual as the basis for the investigation. DND/CAF investigators should try to assess the procedures manual in question to determine if there is some procedure in place that is contrary to AIA procedures, particularly for privileged information (OBR, witness statements or representations to the investigation), release of information and the use of final investigation information or recommendations. Should this assessment identify diametrically opposed purposes to DND/CAF norms or should the possibility of compromise for the position or reputation of the CAF FS system exist, the AIA must be notified and a means plotted to avert such circumstance.

COORDINATION

9. Within Canada, the coordinated investigation team will be comprised of both TSB and DND/CAF participants. The team lead, IIC, will be from either TSB or DFS IAW the DFS / TSB Working Arrangement. The agency with the member status will appoint a main POC for its personnel. A similar arrangement will be arrived upon when an investigation is required and no agreement exists.

NATIONAL SECURITY COMPROMISE

10. In cases where elements of the investigation of an aviation occurrence could, in the opinion of DND/CAF (as per Chapter 4, para 8), compromise national security and the required security clearance is not held by the assigned TSB investigators, the AIA will conduct an investigation of those elements and will advise TSB, in writing, of the specific reasons for this classification. To the extent that there is no threat to national security, DND/CAF will inform TSB of any findings and causes, including safety deficiencies identified in its investigation of security sensitive elements contributing to the aviation occurrence.

SHARING OF COORDINATED INVESTIGATION INFORMATION

11. Investigation information, including privileged information, obtained by one of the participants will be made available to the other participant's investigators without undue delay. Except as required by law, no information obtained from DND/CAF or TSB will be released without the mutual consent of DND/CAF and TSB.

> NOTE
> *Aeronautics Act* Section 23 contains a process that may permit the President of an NDA BOI to obtain OBR access. Should this occur for a coordinated TSB/AIA investigation, the TSB has no role in the process for the release of the information. The AIA will inform the TSB that this process is on-going and will make the result of this process known to the TSB.

12. Release of statement information will be IAW the *Aeronautics Act* section 24.1 and *CTAISB Act* article 30. On-board recordings, flight data recordings, event recordings, and communication records from coordinated investigations will be made available to the other participant, subject to protection of privileged information as per *Aeronautics Act* sections 22, 23 and 24 and *CTAISB Act* article 28 and 29 and the requirements of national security in relation to the MND as per *CTAISB Act* article 24 (7).

13. If a coordinated investigation takes place with an agency where no agreement exists, the DND/CAF investigators will attempt to determine if shared information can be offered the protection that applies in Canadian law. Should such protection be evident, then information will be shared in the above manner. If that is not the case, then the AIA will seek legal counsel regarding sharing of information, with the view to having a legally binding agreement signed by the foreign party, which will ensure information protection and privilege.

14. When the investigation is conducted under foreign law that does not recognize the privileges associated with this information, the AIA (through the DND/CAF lead investigator, legal counsel and foreign liaison) will make that fact known and seek such privilege. Again, if this is not forthcoming, the AIA will make a decision regarding AIA participation in the investigation with respect to harm possibly done to the CAF FS system should such privilege not be offered.

LEGAL ORDER FOR SUBMISSION OF PRIVILEGED INFORMATION

15. Where one participant is served with a legal order for production of privileged information or where it otherwise intends to release it as required by law, the other participant will immediately be notified so that it may, prior to any surrender of that information, have a reasonable opportunity to make representations to the appropriate court or other authority.

SUPPORT

16. Cost sharing, transportation sharing and mutual training details are contained in the DFS / TSB Working Arrangement. Essentially, extra costs brought on as a result of the other participant's needs must be borne by that participant. Similarly, while transportation is shared, incremental costs are borne by the participant that incurs those costs. Finally, each participant agrees that should training opportunities arise, the participants agree to allow each other to benefit from the situation. These principles will also be used to guide situations when DND/CAF investigators are involved in multi-participant investigations where no agreement exists.

NOTIFICATION OF SAFETY DEFICIENCIES REQUIRING IMMEDIATE CORRECTIVE ACTION

17. Should a safety concern requiring prompt corrective action be identified by either participant, the other participant will be notified immediately. The participant responsible for recommending corrective actions will advise the other participant of the recommendations made and of the corrective action taken, or planned to be taken, by the agency responsible. This allows each participant to retain its independence to take safety measures in an expeditious manner while respecting other participant's need to be aware because there is no requirement to negotiate a broad safety action with all participants that could entail lengthier response times.

EVIDENCE DISPOSAL

18. As per the *Aeronautics Act* Section 15 and the *CTAISB Act* Section 20, wreckage, things seized and other releasable information will be returned to the owner once the participants have mutually determined that there no longer is a requirement for their retention.

REPORTS

19. The DFS / TSB Working Arrangement contains details on review of reports, both at the draft and final stages. The arrangement calls for circulation, return of comments and appropriate amendments of reports prior to final release to the public. Of note, the arrangement calls for notification of safety recommendations that are directed to Other Government Departments (OGDs) such as TC or, in the case of TSB-led investigations, to the MND. This notification is aimed at providing advance notice of these safety recommendations to OGDs as provided for in the *Aeronautics Act* section 18 and *CTAISB Act*, subsection 24(6).

ACCESS TO OCCURRENCE SITES AND OTHER EVIDENCE

20. The participants recognize each other's investigators' authority in controlling access to occurrence sites, evidence and documentation IAW the legislation governing both participants' activities respectively.

AVIATION OCCURRENCES INVOLVING A TSB EMPLOYEE

21. A detailed process is identified in the DFS / TSB Working Arrangement for situations where a TSB employee is involved in an aviation occurrence. The TSB may, to avoid potential conflict of interest, delegate DFS to conduct the investigation of the transportation occurrence on its behalf. The arrangement calls on DFS to use its procedures and a slightly modified review process where TSB releases the final investigation to the public, though the report can only be altered by DND/CAF authorities. TSB assumes all costs for such investigations.

EXCHANGE OF TECHNICAL INFORMATION

22. The participants will, on a regular basis, exchange information on current and new investigative technology and procedures, which may be implemented by either participant. Both participants will provide information from each other's safety databases for aviation safety investigation purposes.

PRESS RELEASE

23. Public release of accident investigation information will be coordinated in advance by the lead participant with the member participant. The final authority for release of public information will rest with the lead participant.

AGREEMENT MODIFICATION AND REVIEW

24. Any dispute regarding the interpretation or implementation of the arrangement will be settled only by consultation between the participants; it will not be referred to a national tribunal or any other third party for settlement.

25. At least once a year, preferably in the first quarter of the calendar year, the appropriate staffs of both participants will meet to discuss their working relationship, investigations in progress and the need to amend the arrangement.

26. Either participant may propose to change to the arrangement at any time; amendments may be consented to in writing.

TERMINATION

27. Either participant may terminate the DND-TSB Working Arrangement on three months written notice to the other participant. The arrangement may be terminated at any time with the mutual written consent of both participants.

INTENTIONALLY LEFT BLANK

CHAPTER 15 – CAUSE FACTORS IDENTIFICATION

References:
A. James Reason (1990) Human Error; Cambridge UK, Cambridge University Press
B. Wiegmann DA, Shappell SA (2003). A human error approach to aviation accident analysis: The human factors analysis and classification system. England: Ashgate Publishing Ltd

PURPOSE OF CAUSE FACTOR IDENTIFICATION

1. The purpose of FS occurrence investigation is to determine cause and contributing factors and to establish PMs that will reduce the likelihood of recurrence. Identification of cause factors assists with a comprehensive and thorough understanding of the reasons why an accident or incident occurred. The “why” is an essential step toward the ultimate goal of finding relevant and effective PMs.

2. The use of standardized cause factor terminology assists with tracking and examination of cause factors. Tracking cause factors helps to determine the effectiveness of recommended PMs. A common definition and categorization of cause factors allows data to be collected in the FS database for analysis; this facilitates analysis of not only individual occurrences, but also of cause factor trends and PM effectiveness across the full spectrum of DND/CAF air operations.

DEFINITION OF CAUSE FACTOR

3. A cause factor is defined as the presence or absence of an action, condition or circumstance that leads to a FS occurrence. Cause factors are assigned for FS purposes only, they do not assign blame and they do not need to be substantiated in the strict legal sense or be in accordance with QR&O 21.47 concerning causes of injuries or death for Pension Board purposes.

ASSESSMENT OF CAUSE FACTORS IN FS REPORTS

4. Cause factors derived from the CAF Human Factors Analysis and Classification System (HFACS) will be assigned for all FS reports that involve human factors. For the Class I FSIR reports, causal and contributing human factors will be stated in plain narrative form. DFS will then convert the plain narrative form to HFACS for recording in the FS database. For SR and ESR formats, HFACS cause factors will be recorded in the FS database. The final authority for cause factor assignment and publication is the AIA.

5. The recommended PMs should normally address all cause factors. Therefore:

   a. Each cause factor will typically be associated with at least one corresponding PM;

   b. A number of related cause factors may all be addressed by one PM, or

   c. One cause factor may generate multiple PMs.

NOTE
It is rare that an assigned cause factor is not associated with a PM; however, a PM may not necessarily relate to any assigned cause factor.

NOTE
Any example given in this chapter for a specific condition does not exclude that other conditions were at play during the occurrence.

TYPES OF CAUSE FACTORS

6. There are six types of cause factors that are applied to DND/CAF aviation occurrences:

a. Personnel;

b. Materiel;

c. Environmental;

d. Operational;

e. Foreign Object Debris; and

f. Undetermined

PERSONNEL CAUSE FACTORS

Definition Personnel Cause Factor

7. A Personnel cause factor is an act of omission or commission by an individual or individuals or organization that lead to a FS occurrence.

Background of Personnel Cause Factor Classification System

8. There are many ways to define errors and to classify human factors. Prior to 2003, the FSP used a different taxonomy for the assignment of personnel cause factors. On 1 January 2003, the CAF adopted “CF HFACS V1.0” to document personnel cause factors. Subsequently, V2.0 was implemented in 2007 and the current iteration, V3.0, in 2013. The current “CF-HFACS V3.0” is provided in Annex A.

9. For statistical research, details of the pre-HFACS personnel cause factors or the “CF-HFACS V1.0/V2.0” classification system can be obtained by contacting DFS 3.

Identification of Personnel Cause Factors

10. The FS investigator should identify the most relevant cause factors when investigating occurrences. The process of deciding which cause factors are most relevant can be subjective, requiring critical evaluation. Though there can be multiple cause factors identified, it is important to note that some of them play only a minor role and may not be a productive area of focus. Identifying too many cause factors can dilute the impact of those most important, while not identifying enough can neglect a vital causal component. The investigator will often have to balance between these two extremes. Notwithstanding this, if a cause factor leads to an effective PM, it shall be listed in the report.

11. It is important to ensure that the most significant Unsafe Acts and Latent Conditions are identified and investigated. What constitutes the most important contributory conditions is context-dependant. Making one Unsafe Act may increase the chances of making a subsequent

one, so some Unsafe Acts simply follow sequentially from the ones before in what can be called an “error cascade.” Acts that initiate an error or deviation, or a cascade of either, may be more significant than those at the end of the sequence that are closer in time and space to the occurrence. Additionally, it is most likely that an error or deviation was facilitated by a Latent Condition that was even further removed in time and space from the initiating act that led to the occurrence. In sum, it is important to identify the conditions that:

a. Initiated an unsafe act or sequence of acts;

b. Had the greatest consequence in the occurrence; and

c. Were central, causal and contributory to the event.

Just Culture

12. As described in the FS Manual (A-GA-135-001/AA-001, Chapter 1, para 27e), the analysis of human factors in the FSP is done solely to prevent future occurrences, not to assign blame. The promotion of a “just culture,” along with the accurate identification of critical human errors and suitable PMs will reduce the probability of reoccurrence.

13. A “just culture” lies between a non-punitive culture and one of sanction and punishment. A non-punitive environment is fundamental to a good reporting culture; however, negligence or a wilful, deliberate or malicious act shall not be tolerated by leadership. A “just culture” recognizes that certain circumstances may require punitive or administrative action in order to define the line between acceptable and unacceptable behaviour. Accordingly, acts that are negligent or of a wilful, deliberate or malicious nature may also need to be addressed outside of the FSP. When investigators encounter this kind of situation, the AIA shall be notified immediately.

14. When circumstances described above are present, the *Aeronautics Act* section 23 provisions may become active where the AIA may decide to give access to an OBR when “the public interest in the proper administration of the Canadian (Armed) Forces outweighs in importance the privilege attached to the OBR by virtue of section 22.” Of note, an OBR that is made available to a BOI convened under the *NDA* S45 may be used in other proceedings related to competence of any person subject to the Code of Service Discipline.

“CF HFACS V3.0” Description

15. HFACS is the method used by the FS investigator to categorize human cause and contributing factors. The system is based on the work of James Reason (Ref A) and Shappel and Wiegmann (Ref B). Since its 2004 introduction, the “CF HFACS” model has undergone two modifications with notable changes to the taxonomy, grouping of factors and factor definitions. The complete “CF HFACS” model is now significantly different than the Shappel and Wiegmann model.

16. DFS extensively studied current literature on HFACS modeling and working systems prior to introducing “CF HFACS V3.0”. The most significant observation from this study was that any human factors model generates classifications that are subjective in nature and express differences of investigator opinion. The problem is compounded by variances in investigators’ familiarity with the system. Consequently, different conclusions may be reached by different investigators or re-examination of an occurrence may not provide repeatable

results. Therefore, HFACS data mining will not yield data that is scientifically beyond reproach, but rather data that provides a general understanding of those human factors involved in DND/CAF air operations.

17. Notwithstanding the above, the “CF HFACS” provides a taxonomy that analyzes and identifies, in general terms, the human element of an occurrence so that conclusions can be reached and PMs can be formulated. This endeavour is not a science with all its inherent certainty, but rather an art. The important point to the conduct of this analysis is not to document absolutely the HF involved in an occurrence, but rather to identify elements of the HFACS model that will aid in the determination of appropriate PMs.

18. The “CF HFACS” model, referred to hereafter as HFACS, is divided into two major sections:

a. First, the Unsafe Act covering the unsafe acts that lead directly to the occurrence; and

b. Second, the Latent Conditions covering the underlying conditions that influenced or predisposed the Unsafe Acts to take place. Latent Conditions are categorized according to the source of the factors that influenced an Unsafe Act to take place or how it influenced those individuals who were contributory to the occurrence. They are divided into three groups according to:

(1) Personnel Influence;

(2) Supervision Influence; and

(3) Organizational Influence.

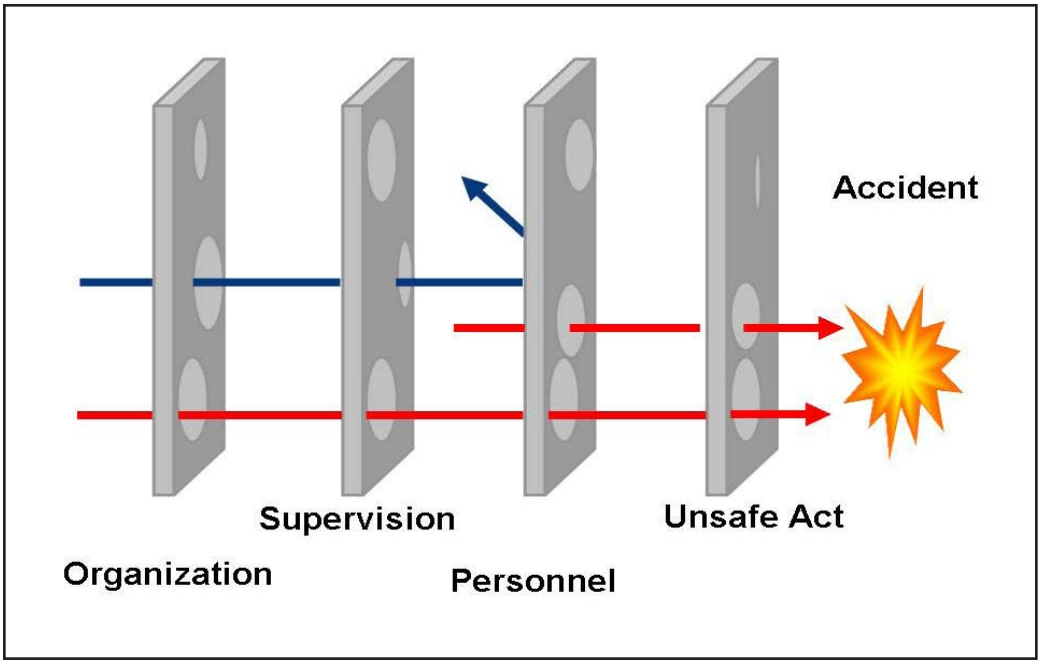


Figure 1: Reason’s “Swiss Cheese” Model Applied to “CF HFACS V3.0”

19. The HFACS model is often referred to as a systems model, assuming that many elements of a system must interact successfully for efficient and safe operation. Accordingly,

more than one aspect of the system is normally implicated when an unsafe event takes place. Thus, a FS occurrence can be conceptualised as a combination of issues at several levels of an organization where gaps in the defence layers line up like holes in Reason's "Swiss Cheese Model," Figure 1.

Unsafe Act Group

20. The Unsafe Act Group describes the actions or inactions of personnel who directly contributed to the occurrence. The most direct causes, or those most closely tied to an occurrence or flight safety compromise are referred to as Unsafe Acts. Unsafe Acts tend to be close to the occurrence in both time and/or space, but they may also be distant from the event as well. For instance, an investigator determines that the unsafe act in a gear-up landing occurrence was the pilot's omission to lower the landing gear while conducting the pre-landing check. Conversely, the investigator determines that the unsafe act in a near mid-air collision was ATC's incorrect assignment of an altitude clearance; in this case the controller passed the instruction several hours prior to the occurrence and from an ATC installation far away. Occurrences may involve many Unsafe Acts since multiple or compounding actions or omissions can be directly causal to the occurrence.

21. The Unsafe Act Group is shown at Figure 2. It is broken down based on the intention of the individual and is divided into two categories:

a. Error: When a planned or actual action did not go as intended; and

b. Deviation: When an individual intentionally did not follow approved procedures and regulations.

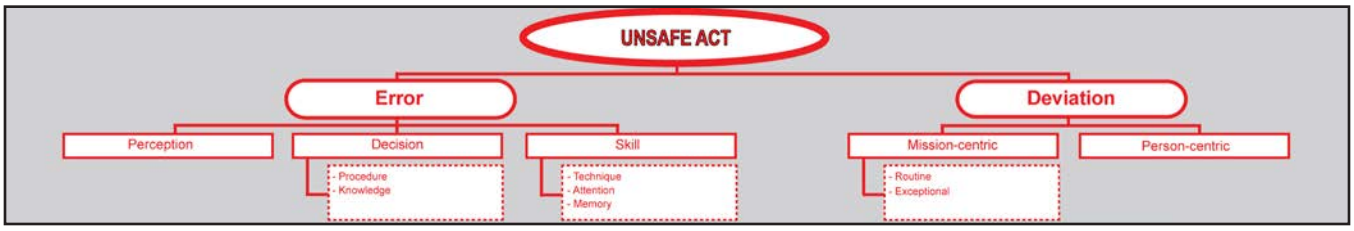


Figure 2 – "CF HFACS V3.0" Unsafe Act Group

Error Category

22. The Error Category refers to well-intentioned mental or physical actions, or inactions that were incorrect, that compromised flight safety. It is often referred to as an honest mistake where the intended outcome differed from the actual outcome. The Error Category is divided into three sub-categories:

a. Perception: A misperception of the situation, the occurrence happened due to the presence of this misperception;

b. Decision: An inappropriate selection of a course of action; or

c. Skill: A flaw in the execution of a course of action.

NOTE
There is a clear distinction between an Error and a Personnel Pre-Condition. The latter consists of one or more latent conditions that increase the individual's vulnerability to err, such as when fatigue increases the chance of making an error or deviation.

Perception Sub-Category

23. The Perception Sub-Category refers to the erroneous conversion of physical stimuli into a meaningful understanding of a situation; this involves both sensing and interpreting sensory information. A mistaken perception of the situation that differs from reality can lead to errors. Perception may involve any or a combination of visual, auditory, olfactory (smell), touch, proprioceptive (relative position of parts of the body), or vestibular senses.

24. Perception is not a passive process and processing can be influenced by one's background, training, memory, and expectation. Perception requires that physical inputs are received by detectors (detection). These inputs either are or are not attended to depending on the situation, environment, the nature of the stimuli, and the mental and physical states of the individual (awareness). The inputs that are unconsciously selected for attention then undergo a complex process of human information processing (understanding).

25. Perception requires information processing and interpretation; it is strongly influenced by one's expectation and understanding of the current situation. In other words, humans tend to see what they expect to see. It is important for the investigator to ask "what did you think was happening?" Perception is also influenced by an individual's training, experience, interruptions, time pressure, fatigue, distraction, preoccupation, etc, includes misidentification of objects or signals, and non-detection of problems during inspection or monitoring steps, and is present if the occurrence happened due to its' presence. The Decision Sub-Category might apply if the individual could have been reasonably expected to anticipate and counteract the misperception, such as a pilot who does not use flight instruments in IMC or a technician who does not make sure his work area is sufficiently illuminated for the task.

26. The Perception Sub-Category also relates to an individual who either does not detect elements of the environment accurately or who does not process information correctly, or when there is accurate detection and a conscious awareness of the elements of the environment but there is an erroneous interpretation of its meaning or significance. Examples of the Perception Sub-Category include:

a. Spatial Disorientation: The inability of a person to determine his true position, motion, or attitude relative to the earth or his surroundings;

b. Visual Cue: The false or unreal visual perception of reality. There are many different types of visual illusion, the most commonly known of which are the black hole, false horizon, or the height-depth misperception when flying over an area devoid of visual references;

c. Auditory Cue: Not detecting an unusual engine noise or mistaking it with another engine malfunction;

d. Olfactory Cue: Not detecting acrid smell of an electrical fire;

e. Proprioceptive Cue: Not detecting change in relative body position under G; and

f. Vestibular Cue: An illusion of the balance senses caused by movement of vestibular fluids. A Somatogyral illusion (the leans) occurs during angular acceleration while a somatogravic illusion occurs during linear acceleration.

Decision Sub-Category

27. The Decision Sub-Category relates to an occurrence where a deliberate and conscious action was intended and executed as anticipated, but it did not achieve the desired outcome. Decision-making begins after conclusions have been formed about the situation (for example, perception takes place and then a decision is made). Decision-making is a function of relevant training and knowledge of the task, the system and operations. It is influenced by previous experience and proficiency. The Decision Sub-Category, then, may be evident during the assessment of the situation or may be present right from planning the action.

> NOTE
> It can be challenging for the investigator to evaluate the Decision Sub-Category since the optimal decision may not be known. The investigator should ask the witness what he was trying to do.

28. It is important to note that simply not achieving the desired outcome does not necessarily imply a mistake was made. Every plan has a process and an outcome. The process could be sound but circumstances beyond the control of the planner can lead to an undesirable outcome. Similarly, an inadequate plan could lead to a good outcome. The Decision Sub-Category is divided into two sub-sub-categories:

a. Procedure; and

b. Knowledge.

Procedure Sub-Sub-Category

29. The Procedure Sub-Sub-Category relates to the incorrect application of a procedure despite correctly detecting and understanding the situation. Personnel tend to look for a pattern in a given situation and normally apply a pre-learned problem-solving action set. Often, choosing to carry out the correct procedure is based on the level of training and experience. For many situations there is a set response based on rules, SOPS, checklists, CFTOs, etc. The Procedure Sub-Sub-Category is present when the selected response to the situation was inappropriate. Examples of the Procedure Sub-Sub-Category include:

a. Misdiagnosed Situation: A normally good procedure is used in a situation for which it is not appropriate, e.g. the decision to takeoff after a pilot received a communication from ATC that was interpreted incorrectly as a takeoff clearance would be an application of a good rule set (correct takeoff procedures) that does not match the situation (takeoff without clearance);

b. Unrecognized or Ignored Situation: The appropriate procedure is not applied, e.g. a warning indicator is noted, but the decision is made to not apply the checklist procedure (failure to apply a good rule set); and

c. Suboptimal Procedure Applied: The situation is diagnosed correctly, but the selected action is flawed. Of note, the individual may not realise the procedure is flawed. This flawed rule set may have worked many times in the past, but on this occasion the flaw makes a difference. Application of a “bad” (suboptimal) rule set is often referred to as a bad habit, e.g. a technician that bends the tips of wires out of the way rather than cutting them off.

Knowledge Sub-Sub-Category

30. The Knowledge Sub-Category relates to when, in the absence of a set procedure, an original solution is applied that is not suitable for the situation. There are many situations that may be new to the individual and require an original solution rather than applying a pre-learned solution. The situation must be assessed and a choice must be made by drawing from knowledge to consciously find a solution. When combined with well-developed procedures, effective training and relevant experience the likelihood of an individual applying an unsuitable solution is lowered. There are no routines or rules involved in knowledge-based performance; slow and conscious thought is involved in these situations. New or unfamiliar tasks, unusual modifications or hard-to-diagnose system faults are typical circumstances that can lead to errors in knowledge. Examples of the Knowledge Sub-Sub-Category include:

a. Knowledge or Information: A lack of knowledge or missing information concerning the task, mission, tactics, systems, orders, directives, procedures, checklists, etc, interfered with optimal decision making; and

b. Problem Solving or Risk Management: Reasoning and risk management processes are needed to develop a proper course of action. If these processes are not employed properly then a Problem Solving or Risk Management element may be present. For example, the bias and thought processes that shape the way individuals process information (e.g. confirmation bias is the tendency to interpret information in a way that confirms one’s preconceptions) may lead to an incorrect course of action.

Skill Sub-Category

31. The Skill Sub-Category relates to an occurrence where an individual performed a routine action that did not go as planned. Skill-based behaviours are automated routines that require very little conscious attention. Once they are learned, control to non-conscious habit sequences is delegated. Therefore, skill-based acts consist of pre-set, rehearsed action patterns such as riding a bike.

32. While the Decision Sub-Category relates to when the intended course of action is flawed, the Skill Sub-Category relates to when the execution of the action is flawed. If there is no intent to act then the action may still be a learned automatic reaction and could also be classified within the Skill Sub-Category, such as, the reflex of a fixed wing pilot who is learning to accelerate a helicopter by raising collective, but inadvertently moves the collective like advancing his fixed-wing throttle and moves the collective down by mistake and this results in unintended deceleration. Skill-based behaviour is vulnerable to a variety of human factors; often there will be associated issues of attention (distraction), memory (missed items on a checklist), forgotten intentions, or, particularly, a lack of proficiency.

33. The Skill Sub-Category includes performing a task in the wrong sequence or using an inappropriate technique, tool, equipment, control or switch, etc. It also includes performing a task with a subtle lack of finesse (e.g. a hard landing may occur despite the application of correct technique but still be suboptimal). When one has not learned or practiced the skill adequately, skill-based performance will suffer (lack of appropriate training or a deficiency in proficiency or currency). The Skill Sub-Category is divided into three sub-sub-categories:

a. Technique;

b. Attention; and

c. Memory.

Technique Sub-Sub-Category

34. The Technique Sub-Sub-Category relates to an individual performing a task with workmanship, mechanical skills or any other aspect of operation that is below the level expected from an individual of their level of training and task experience. These are often linked to proficiency, training and currency deficiencies. Examples of the Technique Sub-Sub-Category include:

a. Inappropriate or Poor Technique: E.g. overcontrol, undercontrol, lack of appropriate visual scan technique, inadvertent activation or operation or non-operation of a pump or lever, unsuitable handling of a delicate component, using the inappropriate tool or equipment, etc;

b. Timing of Response: E.g. control inputs initiated too early or too late to correct for crosswind on landing; and

c. Finesse: Lacking delicacy or subtlety in performance of an action or skill. The individual's technique included correct elements but the overall performance was suboptimal.

Attention Sub-Sub-Category

35. The Attention Sub-Sub-Category relates to when an individual has difficulty maintaining attention and it compromises the safety of the task. Deterioration in attention can be the result of maintaining sustained attention to one task to the exclusion of others, overload by too many elements of one or multiple tasks, or stress, whether self-imposed or external. Conversely, it can be difficult to sustain attention when under-stimulated, such as when conducting an automated routine like driving to work when you intended to go a different route to get groceries. Examples of the Attention Sub-Sub-Category include:

a. A technician attempts to complete a repair task while pre-occupied with stressful family problems and commits a mistake;

b. The wandering mind of a radar controller monitoring an inactive screen over a long period of time causes him to miss a lone radar contact; and

c. A pilot channelized attention on a minor emergency to the detriment of proper aircraft control.

d. Un-Noticed condition such as a pilot not recognizing a hand signal or a technician not noticing a missing documentation entry; and

e. Negative transfer such as when an individual reverts to a highly learned skill routine used in a previous system or situation.

Memory Sub-Sub-Category

36. The Memory Sub-Sub-Category relates to when an individual does not remember, or recalls incorrectly, information that is required to complete a task. A memory lapse can be either detected immediately by the individual or remain undetected. Memory functions are very susceptible to interruption and distraction. Examples of the Memory Sub-Sub-Category include:

a. Information Recall when one knows but cannot bring to mind at that moment, such as the name of a particular switch;

b. Information Store such as when one loses place in a series of actions, e.g. forgetting a checklist item; and

c. Automatically performing actions without remembering them, e.g. having no memory of performing a routine maintenance or pre-flight action.

Deviation Category

37. A Deviation refers to an act that is intentionally carried out in contradiction of approved procedures, rules or regulations. A Deviation may be done for many reasons. Most Deviations are deliberate departures from procedure, rules or regulations made with the best of intentions; the person intends to deviate from procedure with the goal being consistent with the task, e.g. taking a “short cut” to get the job done faster. The decision not to abide by rules is influenced by motivation, context and social factors. There is often a cost-benefit consideration in which a shortcut or modification appears to save time, make the task easier, or more efficient.

38. The difference between a Deviation and an Error can at times be blurred, particularly since not following a procedure may be the result of a simple mistake. The principle difference between a Deviation and an Error is the intent of the individuals involved in the occurrence. A Deviation is an intended departure from the norm or procedures, whereas an Error is not.

39. A Deviation does not necessarily indicate an inadequate performance. On occasion, it may be difficult to do a job without deviating from the accepted norm. The Deviation may be the symptom of deficient, conflicting or insufficient rules, organizational problems or flawed procedures and regulations, and may point to an important FS issue with respect to those rules or regulations. The rule or regulation may be the primary issue rather than the action by the individual or team. The Deviation may have been recognized, assessed and sincerely determined by the individual to be the best course of action.

40. The Deviation Category relates to the motives that drove the actions of the individual and is divided into two sub-categories:

a. Mission-Centric; and

b. Person-Centric.

Mission-Centric Sub-Category

41. The Mission-centric Sub-Category relates to a deviation with the intent of achieving the mandate of the task at hand, keeping in mind the best interests of the DND/CAF (e.g. a pilot flies under a bridge to avoid cloud in order to complete a SAR mission or a technician uses amended procedures in order to expedite the turnaround of aircraft). Mission-centric Deviations can at times include actions that are entirely appropriate under specific circumstances, such those listed in the National Defence Flying Orders (B-GA-100-001/AA-001).

42. The Mission-centric Sub-Category is divided into two sub-sub-categories:

a. Routine; and

b. Exceptional.

NOTE
A Routine and Exceptional Deviation is differentiated primarily by whether the act is the norm within the organization (Routine) or is inconsistent with the culture or norms of the organization (Exceptional).

Routine Sub-Sub Category

43. The Routine Sub-Sub-Category relates to the organization's common and accepted use of an unapproved procedure to complete a task; inherent in it is the supervisor's awareness and tolerance of the unapproved procedure's use. It is often referred to as "bending the rules." Routine deviations normally have related latent conditions involving supervisors at multiple levels of the organization. It is important to consider that the Routine deviation may at times be a sign of a problem with rules and regulations rather than the supervision, culture, or structure of the organization. Routine deviations may require investigation of the supervisory chain or the unit culture to determine the extent of the acceptance of the behaviour. Examples of the Routine Sub-Sub-Category include:

a. Routine "Workarounds" or Shortcuts: Sometimes it is not possible to get the job done effectively by following the rules or the rules seem unnecessarily lengthy or laborious, e.g. an inspection procedure may call for multiple time-intensive steps to be done in sequence. In order to optimize the inspection, the steps are usually conducted all at once rather than sequentially at this particular unit. The "short-cut" version of the procedure may lead to missing a critical item and damage or injury; and

b. Lack of Time or Resources: An act intended to optimize time or resources but still get the job done, e.g. a crew on a busy squadron decides to skip a mission pre-brief so that they can meet their takeoff time and this is done regularly by other crews.

Exceptional Sub-Sub-Category

44. The Exceptional Sub-Sub-Category relates to a unique or isolated departure from established rules or regulations in order to complete the task. The deviation is totally unusual for that organization and is isolated to specific individuals. The Exceptional deviation is neither

sanctioned nor condoned by supervisors, leadership, or peers. Conversely, supervisors, leadership or peers may be unaware of the exceptional deviation. The Exceptional Sub-Sub-Category should be assigned only when an Error has been ruled out, e.g. flying an aircraft beyond operating limits even with a valid operational reason could be, depending on the context, an Exceptional Deviation if it was done deliberately; however, if flying outside the operating limits was not intended, the act is an Error. Examples of the Exceptional Sub-Sub Category include:

a. Ad-hoc Workarounds: E.g. a technician replaces a damaged part with another similar yet unapproved one in order to get the aircraft serviceable);

b. A technician knowingly conducts an unapproved repair action by not following the CFTO; or

c. A crew intentionally exceeds aircraft limits during a training flight to complete the mission within the scheduled timeframe.

Person-centric Sub-Category

45. The Person-centric Sub-Category relates to a deviation contrary to established procedures based on personal motives, gains or goals; this type of deviation can be said to be discordant. The Person-centric Sub Category involves reckless, wilful, or negligent behaviour or misconduct that may be carried out to demonstrate perceived prowess or skills. The discordant action may or may not be condoned by supervisors or peers. Examples of the Person-centric Sub-Category include:

a. A pilot intentionally flies an aircraft under a bridge or too low to the ground to impress peers;

b. An impromptu air show at low level to show off personal flying skills; and

c. Skipping procedural steps in order to leave work early for a social engagement.

NOTE
The Person-Centric Deviation is very rare in a professional organization.

NOTE
When aware that a Person-Centric Deviation has taken place, the FS Investigator shall notify the AIA so that a decision about engagement with the chain of command is coordinated concerning a separate investigation; the scope of the FS Investigation may be modified at this stage. The FS Investigator shall at no time provide to the chain of command any evidence that is privileged under the *Aeronautics Act*.

LATENT CONDITIONS

46. Latent Conditions describe a broad spectrum of underlying conditions that predispose individuals to commit Unsafe Acts. In fact, Unsafe Acts are only a small part of the causal picture of an occurrence. Once Unsafe Acts are identified and categorized, the next step is to

find out why they occurred. The “why” will normally be found within their Latent Conditions.

47. There could be a few or many Latent Conditions influencing an occurrence, and often they interact with one another, e.g. mental fatigue is a pre-condition that can increase susceptibility to another pre-condition such as emotion, which in turn can lead to an individual compromising flight safety.

48. Establishing Latent Conditions encourages the investigator to consider factors beyond the Unsafe Acts attached to an occurrence. Latent Conditions can be recent or longstanding and may have a direct or indirect influence on the occurrence. Some latent conditions may appear quite removed from the occurrence, but they may also have a strong role in causation that is extremely important. They often lead to the production of very effective, pertinent and worthwhile PMs.

49. Latent Conditions are divided into three different groups:

a. The Personnel Influence Group describes the working and personnel conditions and personnel practices that influenced personnel in an occurrence;

b. The Supervision Influence Group describes the supervisory aspects involved in an occurrence; and

c. The Organizational Influence Group describes the roles and influence of organizations in an occurrence.

Personnel Influence Group

50. The Personnel Influence Group covers conditions, excluding those related to Supervision and the Organization, that predisposed occurrence personnel to commit an unsafe act. The Personnel Influence Group is shown at Figure 3 and is divided into three categories:

a. Personnel Condition: Describes individual factors that had a direct influence on personnel;

b. Work Environment: Describes the surrounding job elements that personnel were confronted with while on-task; and

c. Team Practice: Describes how personnel interacted with each other during the planning and conduct of the occurrence task or mission.

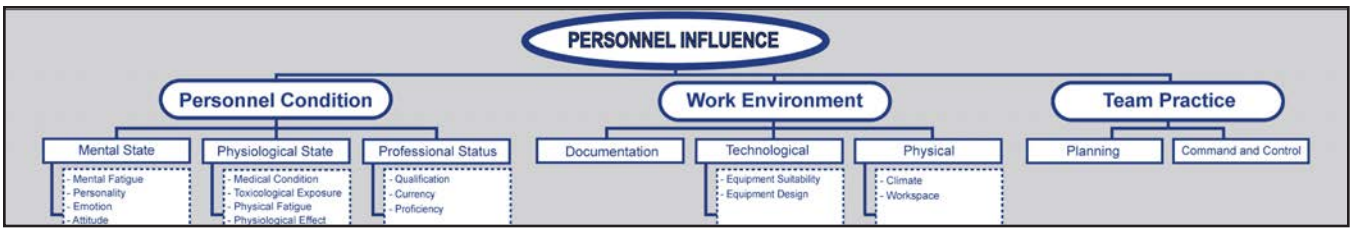


Figure 3 – “CF-HFACS V3.0” Personnel Influence Group

Personnel Condition Category

51. The Personnel Condition Category describes factors that had a direct influence on personnel and is divided into three sub-categories:

a. Mental State;

b. Physiological State; and

c. Professional Status.

Mental State Sub-Category

52. The Mental State Sub-Category relates to psychological conditions that adversely affect performance. A deficiency in mental preparedness can reduce cognitive performance; in this sense, cognitive refers to mental processes such as attention, perception, and reasoning. The Mental State Sub-Category is divided into five sub-sub-categories:

a. Mental Fatigue;

b. Personality;

c. Emotion;

d. Attitude; and

e. Mental Limitation.

Mental Fatigue Sub-Sub-Category

53. Mental Fatigue occurs when the safety of a task is compromised by an individual's low alertness or cognitive impairment usually associated with prolonged mental activity or stress. Many aviation tasks require individuals to process large amounts of information in a short period of time and to do this on a continuous basis, leading to a condition referred to as acute fatigue. The long-term demands of sustained operations can also degrade an individual's performance, which is referred to as chronic fatigue. Mental fatigue can manifest itself both as somnolence (decreased wakefulness) or a general decrease of attention and performance, not necessarily including sleepiness. Examples of the Mental Fatigue Sub-Sub-Category include:

a. An inexperienced Air Traffic Controller deploys to an operational airfield and is overwhelmed by high traffic density during a long shift, consequently delivering an invalid clearance; and

b. A Squadron Commander suffers a "burn-out" during a period of prolonged deployed operations.

Personality Sub-Sub-Category

54. The Personality Sub-Sub-Category relates to a person's enduring and consistent character traits that affect the individual's ability to perform the task safely. An individual's personality may affect their performance, decision-making, or communication and should not be confused with the transient Emotion or Attitude Sub-Sub-Categories. An individual's drive, hesitancy, overconfidence, ego or stubbornness, etc, can impede their ability to safely complete a task. Examples of the Personality Sub-Sub-Category include:

a. An authoritarian aircraft captain matched with a submissive co-pilot in a multi-crewed aircraft creates a breakdown of cockpit communications that leads to a missed ATC clearance and subsequent airspace violation; and

b. An aggressive maintenance supervisor who is not satisfied with maintenance results of the inexperienced crew is causal to the crew's omission of a maintenance check.

Emotion Sub-Sub-Category

55. The Emotion Sub-Sub-Category relates to the individual's compromised ability to perform the task safely due to a strong emotional response. Certain strong emotions, such as anger, frustration, sadness or happiness, may influence their ability to perform safely. Examples of the Emotion Sub-Sub-Category include:

a. An angered technician who was chastised by his supervisor performs a pre-flight inspection and misses a component unserviceability; and

b. A pilot frustrated with a recently announced posting carries out a maintenance test flight and records as serviceable an element of the flight when it was not.

Attitude Sub-Sub-Category

56. The Attitude Sub-Sub-Category relates to the individual's compromised ability to perform the task safely due to a negative or positive belief, feeling, value or disposition to act in a certain way. Examples of Attitude Sub-Sub-Category include:

a. Expectancy: People function with a mental framework or model of the situation they are in. This mental framework can create an expectation of what will happen next. When an individual's expectation of what is going to occur interferes with the processing of the actual environmental cues (what is actually taking place) expectancy is said to occur. Expectancy can predispose one to illusions and other information processing errors. Expectancy is generally part of a subconscious process of building mental models of the world so humans can function efficiently, e.g. a pilot carry out a pre-flight inspection sees a switch in the off position, when it is on;

b. Motivation: There are several aspects to motivation, including peer pressure, pride, misdirected motivation, inadequate or excessive motivation and hidden agenda. Misdirected motivation may include replacing the primary goal of a mission with a personal goal, or loosing the "big picture" to focus on a subtask, e.g. a SAR pilot proceeds with the rescue mission when weather conditions are below acceptable minimums;

c. Complacency: Complacency refers to a rare attitude in which a person knows they are not employing the mandated care and attention to a task but believes this makes no difference. When an investigator suspects complacency, the investigation should focus on why an individual's impression of contentment or satisfaction with a situation or procedure existed, and why it interfered with the assessment of a hazard or taking action, e.g. a maintenance crew not wearing proper protective equipment;

d. Overconfidence or Overaggressiveness: Too great a reliance on one's own skills, team or equipment, e.g., a macho pilot performs aggressive manoeuvres when the mission does not call for it;

e. Can-do Attitude: Overestimating one's own or crew's ability to perform a task, e.g. an aircraft commander accepts a mission even though he and his crew are completely fatigued due to previous taskings; and

f. Pressing or Haste: A type of misplaced motivation relating to time pressure, e.g. a crew pressing in marginal weather in order to return to home base (get home-itis).

NOTE

Situation awareness (SA) does not appear in the HFACS taxonomy. Although situation awareness is often discussed in aviation, the concept is very broad and ill-defined. For instance, geographical awareness (knowing where you are on a map) is a subset of SA that might describe what happened, but not why. The focus of a human factors investigation should be on the factors that lead to "loss of SA" or the "inability to achieve SA." Contributory issues often include reduced attention, workload, fatigue, time stress, inadequate proficiency or experience and many physiological states. Finding these contributing factors will guide the PM selection.

Mental Limitation Sub-Sub-Category

57. The Mental Limitation Sub-Sub-Category relates to limitations in the faculty of consciousness and thought of the human brain that impair an individual's ability to perceive and process the information required to safely complete the task. This may refer to limitations common to most people in general, or to a specific individual. Examples of the Mental Limitation Sub-Sub-Category include:

a. Human Capability Exceeded: The demands of the task exceeded the capability of the typical person. Humans have given limitations with respect to amount or complexity of data that can be processed, e.g. an excessively long and complicated approach clearance may be misinterpreted; and

b. Limited Aptitude: Inability to execute a mental task. The cognitive challenges involved with managing multiple tasks can result in either incomplete or inaccurate processing of information. Specifically an individual may have difficulty absorbing or processing a variety of information, adequately acquiring or remembering new information or lapsing in the recall of past experiences, e.g. the ATC controller's inability to maintain aircraft separation was due to the loss of air picture resulting from his not being capable of handling more than three contacts and this aircraft was the fifth contact.

Physiological State Sub-Category

58. The Physiological State Sub-Category relates to the physical capacity or medical conditions that impair performance.

59. Certain physiological and medical conditions can predispose the individual to adverse reactions and inaccurate sensations in an aviation environment. Important physiological conditions that can have a catastrophic influence on performance include spatial disorientation, illusions, G-induced loss of consciousness (G-LOC), almost loss

of consciousness (A-LOC), hypoxia, and physical fatigue. Further, there are numerous occupational health, pharmacological, and medical circumstances that can influence performance. The Physiological State Sub-Category refers to predictable and normal human performance limitations or the capability specific to an individual to carry out a task in that the task requirements may exceed the capabilities of the individuals involved. If the task exceeds the capabilities of many individuals, then human-machine interface or aspects of the task itself should be examined. If the task exceeded the capability of one specific individual, then examination of the tasking assignment, supervision, training or selection of standards, etc, may be necessary.

> NOTE
> Consult with a flight surgeon before assigning any Physiological State cause factor.

60. The Physiological State Sub-Category is divided into six sub-sub-categories:

a. Medical Condition;

b. Toxicological Exposure;

c. Physical Fatigue;

d. Physiological Effect;

e. Physical Limitation; and

f. Physiological Preparation.

Medical Condition Sub-Sub-Category

61. The Medical Condition Sub-Sub-Category relates to any medical illness or injury condition identified by a qualified medical professional or any direct, secondary or residual pharmacologically-induced effects from prescribed medication that compromised the individual's ability to perform the task safely. This includes mental illness determined when an individual meets diagnostic criteria for a personality, psychological or psychosocial disorder. Consultation with a Flight Surgeon should be undertaken before assigning this sub-sub-category. Examples of the Medical Condition Sub-Sub-Category include:

a. A pilot flying with an ear infection suffering from spatial disorientation; and

b. A maintenance technician operating specialized machinery while taking prescription medication that makes him drowsy.

> NOTE
> Non-prescribed, recreational, and homeopathic supplements are categorized in Physiological Preparation.

Toxicological Exposure Sub-Sub-Category

62. The Toxicological Exposure Sub-Sub-Category refers to exposure to a dangerous substance that degraded the performance and compromised the individual's ability to perform the task safely. Consultation with Preventative Medicine or a Flight Surgeon should be

undertaken before assigning this sub-sub-category. Examples of the Toxicological Exposure Sub-Sub-Category include:

a. A technician exposed to fumes in an aircraft fuel tank is injured after collapsing; and

b. A loadmaster becomes drowsy from carbon monoxide emitted from an unattended external aircraft power unit while he is loading an aircraft.

Physical Fatigue Sub-Sub-Category

63. The Physical Fatigue Sub-Sub-Category refers to non-mental fatigue. The source and kind of fatigue, whether acute or chronic, can vary greatly. It may be due to a lack of quality sleep or circadian rhythm changes, a build-up of sleep debt, or excessive physical effort to complete a work task. Examples of the Physical Fatigue Sub-Sub-Category include:

a. Inability to sleep in an unairconditioned tent prior to reporting for a night flight; and

b. A weapons loader drops a manually loaded weapon after loading 40 other similar weapons without proper rest between loads.

Physiological Effect Sub-Sub-Category

64. The Physiological Effect Sub-Sub-Category refers to medical effects resulting from the flight environment that compromised the individual's ability to perform the task safely. Examples of Physiological Effect Sub-Sub-Category include:

a. Motion Sickness: Sickness caused by exposure to movement, e.g. flight, simulator, etc;

b. Acceleration Effect: Relative incapacitation caused by application of positive or negative G, e.g. grey-out, black-out, G-LOC, A-LOC;

c. Decompression Sickness (DCS): Also known as the 'bends,' DCS symptoms follow exposure to a reduced atmospheric pressure, e.g. an aircraft with failed pressurization system, a hypobaric chamber run, or scuba diving;

d. Hypoxia: Hypoxia is an inadequate supply of oxygen to the tissues. Generally in aviation the hypoxic effect on the brain is most important and includes a potentially insidious and dramatic decrease in coordination, memory and judgement. This can happen following an aircraft depressurization or a malfunction of an oxygen regulator;

e. Hyperventilation: Hyperventilation is a rapid rate of respiration that decreases carbon dioxide and causes symptoms of anxiety, dizziness and decreased performance. Hyperventilation can be caused by anxiety, motion sickness, pain, high ambient temperatures, hypoxia, etc; and

f. Trapped Gas Disorder: A trapped gas disorder is an expansion or compression of gas contained in closed and semi-closed cavities of the body that may lead to severe sinus pain, eardrum pain or perforation, lung rupture, or bowel discomfort.

This can be caused by aircraft ascent or descent or loss of cabin pressurization, and can rapidly change the volume of gas held in closed areas of the body.

Physical Limitation Sub-Sub-Category

65. The Physical Limitation Sub-Sub-Category relates to any human physical limitation that impairs an individual's ability to perform a task safely, e.g. size, strength, dexterity, mobility, task-specific physical fitness level, psychomotor skills, or other biomechanical limitation. Examples of Physical Limitation Sub-Sub-Category include:

a. Anthropometric Limitation: E.g. body weight, arm reach, eye-height;

b. Visual Limitations: E.g. visual acuity, color vision, contrast sensitivity;

c. Auditory Limitation: E.g., hearing acuity, speech discrimination;

d. Motor Skill Limitation: E.g. coordination or reaction time is inadequate, "poor hands and feet coordination;" and

e. Strength Limitation: E.g. the inability of a helicopter pilot to fly with a hydraulic flight control system malfunction.

Physiological Preparation Sub-Sub-Category

66. The Physiological Preparation Sub-Sub-Category relates to self-generated physical or mental stress or an unreported medical condition that impairs performance and ability to complete the task safely. Each individual is expected to arrive at work ready to perform at optimum levels, but there are many factors that may cause performance to suffer. Additionally, Physiological Preparation deals with aspects of physical or mental preparation that are typically under the individual's control. Sometimes Physiological Preparation has associated rules and regulations, but much of the time it involves personal habits or judgement; it includes the self-evaluation of fitness to work with respect to illness. Examples of the Physiological Preparation Sub-Sub-Category include:

a. Poor Physical Fitness: Fitness in terms of a regular exercise program or a physically active lifestyle to meet task requirements;

b. Inadequate Rest: The individual did not rest appropriately after an extreme physical work out prior to reporting for a maintenance shift;

NOTE
Lack of sleep and "jet lag" from crossing several time zones or shift work can lead to either acute or chronic fatigue.

c. Unreported Medical Condition: An individual performs a task or mission with a known but unreported medical condition, e.g. flying with a cold or upper respiratory tract infection; and

d. Inappropriate Consumption: Self-imposed stresses such as poor nutrition, consumption of alcohol, dehydration, recreational drugs, supplements or self-medication (including over-the-counter drugs) that result in degraded performance. Examples of Inappropriate Consumption include:

(1) A technician shows up for work without having eaten breakfast, and faints while working on an aircraft;

(2) A pilot is legal to fly, but latent effects of alcohol impaired his performance; and

(3) An ATC controller is impaired by over-the-counter cold medication.

> NOTE
> Inappropriate Consumption could, in certain circumstances, constitute a Deviation.

Professional Status Sub-Category

67. The Professional Status Sub-Category covers the qualifications, currency, and proficiency of the individual to carry out assigned duties; it is divided into three sub-sub-categories as follow:

a. Qualification;

b. Currency; and

c. Proficiency.

> NOTE
> Professional Capability issues are often related to Supervision issues.

Qualification Sub-Sub-Category

68. The Qualification Sub-Sub-Category relates to the level of training or qualification standard provided to, or demonstrated by, an individual not being appropriate for the safe conduct of the assigned task. Examples of the Qualification Sub-Sub-Category include:

a. A pilot training syllabus that did not cover night unaided approaches to unprepared surfaces;

b. A technician performed a maintenance task for which he was not qualified; and

c. A newly qualified pilot on type using inappropriate automated procedures on a fully automated aircraft.

Currency Sub-Sub-Category

69. The Currency Sub-Sub-Category relates to a lack of recent task experience that led to the erosion of skill and knowledge. Normally, this currency status translates in a number of hours or sequences to be completed per month, quarter or year. Examples of the Currency Sub-Sub-Category include:

a. A pilot who did not complete the required number of quarterly instrument flight hours experienced an occurrence while flying in IMC; and

b. A flight engineer did not carry out the requisite number of maintenance actions to maintain his annual certification.

Proficiency Sub-Sub-Category

70. The Proficiency Sub-Sub-Category relates to an individual who is qualified and current but is not sufficiently competent or skilled to conduct the task safely or efficiently. Examples of the Proficiency Sub-Sub-Category include:

a. A fully qualified and current pilot descended below MDA during an instrument approach; and

b. A fully qualified air traffic controller who just returned from leave provided conflicting flight instructions that caused a near mid-air collision.

Work Environment Category

71. The Work Environment Category relates to the working conditions and immediate environment affecting the occurrence personnel. This category is divided into three sub-categories:

a. Documentation;

b. Technological; and

c. Physical.

Documentation Sub-Category

72. The Documentation Sub-Category relates to publications, rules, regulations, orders, policies, instructions, standard operating procedures, forms, informal guidelines, safety procedures, checklists, etc, or lack thereof, that contributed to an occurrence. This includes not just the content of procedures or regulations, but also the format and ability to convey information of documents, charts, maps, manuals, computer applications, and other automated systems. The content and organisation or physical arrangement of documents or computer applications can impede an individual's ability to perform safely and effectively. In order to achieve optimal operations, it is important to ensure that procedures are feasible and practical. The Documentation Sub-Category is appropriate when provided information is unclear or inadequate. Examples of this condition include:

a. A manual is wordy and difficult to understand;

b. A checklist layout is difficult to use;

c. A publication uses confusing symbology;

d. An approach chart is cluttered;

e. An operations manual content is not presented in a rational way;

f. A CFTO describes a procedure in unclear terms or lacks detailed step by step instructions; and

g. A touch down zone on an approach plate is incorrectly depicted.

NOTE
When the Documentation environment is a contributing factor the investigator should look closely at the Organizational Influence (typically in the Resource or Management areas), especially if policy or higher level guidance is at play.

Technological Sub-Category

73. The Technological Sub-Category relates to tools used to perform a task or to the interaction of the individual with that equipment. Technological issues may involve the design of equipment and controls, display or interface characteristics, confusion between automation modes, and automation. Equipment or vehicle design can influence performance when size, shape, arrangement, location, compartment space or other physical aspects of equipment negatively affect performance. Automation can include the function, reliability, use, guidance, symbology, logic or other aspects of automated systems that can influence performance.

74. The conditions of the Technological Sub-Category create circumstances in which an individual is forced to “make do” or adapt to the equipment, thus increasing the potential for error. The Technological Sub-Category is divided into two sub-sub-categories:

a. Equipment Suitability; and

b. Equipment Design.

Equipment Suitability Sub-Sub-Category

75. The Equipment Suitability Sub-Sub Category relates to equipment that is unsuitable for the task or impedes the individual’s ability to perform the task safely and effectively. Examples of the Equipment Suitability Sub-Sub-Category include:

a. An unapproved vehicle is used as a tow vehicle; and

b. An unauthorized tool is used for a given maintenance activity.

Equipment Design Sub-Sub-Category

76. The Equipment Design Sub-Sub Category relates to design, layout, control interface or automation of the equipment where an individual is unable to or has difficulty accessing or processing information, rendering the completion of the task unsafe. Poor conceptual design of computer-based systems can have a profound impact on human performance. Examples of the Equipment Design Sub-Sub-Category include:

a. A software design that does not allow the operator to trouble shoot an aircraft malfunction; and

b. A display screen colour that is not compatible with NVGs and reduces the operator-machine interface in night operations.

Physical Sub-Category

77. The Physical Sub-Category includes workspace elements that impede the completion of the task. The Physical environment can adversely affect vision, hearing, physical ability or information processing, e.g. vision might deteriorate due to poor lighting, smoke, haze,

adverse weather, dust, etc. Further, mental processing can be impacted by noise, vibration, temperature, etc. The use or non-use of Personal Protective Equipment may be a factor. The Physical Sub-Category is divided into two sub-sub-categories:

a. Climate; and

b. Workspace.

Climate Sub-Sub-Category

78. The Climate Sub-Sub-Category refers to exposure to climatic conditions, potentially also in the confines of a cockpit or hangar, that impede the ability of the individual to perform the task. Conditions applicable to the Climate Sub-Sub-Category include:

a. Temperature;

b. Cloud;

c. Precipitation;

d. Wind or Turbulence;

e. Density Altitude;

f. Lightning; and

g. Visibility.

Workspace Sub-Sub-Category

79. The Workspace Sub-Sub-Category refers to an inadequate work area that physically influences the safe completion of a task. The work area includes the cockpit, hangar, flight line, office, lab or other workspace where an individual performs a task. Examples of the Workspace Sub-Sub-Category include:

a. The poorly marked propeller danger zone allowed the civilian contractor to walk in front of an engine propeller;

b. The inadequately lit workbench prevented the technician from noticing an equipment failure; and

c. The flight line ambient noise level prevented good communications between the pilot and technician.

Team Practice Category

80. Team Practice Category relates to deficiencies and breakdowns identified within the team in preparation for and during the execution of a task. In the context of this category, the term “team” refers to the interrelationship within a crew and those personnel immediately involved with that crew during the occurrence. All phases of air operations and maintenance require successful teamwork. An effective team must be appropriately constituted, should make use of the knowledge, skills and abilities of all members involved and build on the interactions among them. It assumes that someone will effectively lead the team and that the team members will support and execute their roles as assigned. Deficiencies and breakdowns in human performance in military aviation (HPMA) can impact an individual or worse, the team

performance. The Team Practice Category is divided into two sub-categories:

a. Planning; and

b. Command and Control (C2).

Planning Sub-Category

81. The Planning Sub-Category refers to a failure at any stage of the task to collect information, analyze it, and integrate it within the activities of the team; to perform deliberate and contingency planning; or to properly risk assess, thus compromising the safe completion of the task. It may involve personnel actively conducting a task or supporting personnel and external agencies. It refers to all activities done by those intimately involved with the occurrence. This sub-category covers not just the pre-task planning but also the ongoing assessment and adjustment of the plan during task execution. Examples of the Planning Sub-Category include:

a. A loadmaster does not inform the AC of a change in cargo weight; and

b. A tow crew chief does not assign specific positions to his tow crew.

Command and Control (C2) Sub-Category

82. The C2 Sub-Category relates to any command and control activities that hinder safe task completion. It includes poor communication or coordination among a crew or between different crews or other organizations, such as ATC, maintenance, or support staff interfaces that may be involved in the occurrence. This sub-category covers all elements of interpersonal interrelations (HPMA, etc.) related to the execution of the task. Examples of the C2 Sub-Category include:

a. Leadership: Detrimental aspects such as an ineffective crew climate, not establishing and maintaining an accurate and shared understanding of the evolving task, or poor distribution of duties;

b. Communication: Verbal, written, or visual communication that results in misspoken, misread, misheard, incorrect, or otherwise misunderstood communications within the team. This includes miscommunication of critical information, use of non-standard or imprecise terminology, inappropriate challenge/reply/acknowledgement, inadequate shift turnover, inadequate log entry, e.g. an ATC controller does not brief his incoming replacement;

c. Performance Monitoring: Not monitoring crew or performance, assisting or providing back-up when needed, e.g. inadequate monitoring of the flying pilot by the non-flying pilot during an instrument approach or inadequate supervisor assistance provided to the apprentice technician during an aircraft repair; and

d. Authority Gradient: Inadequate communication of critical information due to a lack of persistence or assertiveness by a subordinate to a superior. This authority gradient exists in crews with members of mixed rank, age, qualification, experience, etc. Though the authority gradient is inherent in our organizations, how it is handled determines its role in mission outcome, e.g. a young co-pilot is afraid to warn his unit CO, who is at the controls, of the impending aircraft stall.

Supervision Influence Group

83. The Supervision Influence Group of conditions relates to methods, decisions, policies or implementation of doctrine used by the supervisors within the unit's chain of command and how this influenced and predisposed the occurrence personnel to commit one or more unsafe act. Supervisors often have a substantial influence on the Unsafe Acts committed by the occurrence personnel. Supervisory conditions may lie dormant or undetected for long periods but still contribute to an occurrence sequence of events.

> NOTE
> Standards, evaluation and testing, and work relating to staff functions of the headquarters are typically captured in the Organizational Influence Group of Latent Conditions.

84. The Supervision Influence Group is shown at Figure 4 and is divided into four categories:

a. Planned Activity;

b. Level of Supervision;

c. Problem Correction; and

d. Supervisory Deviation.

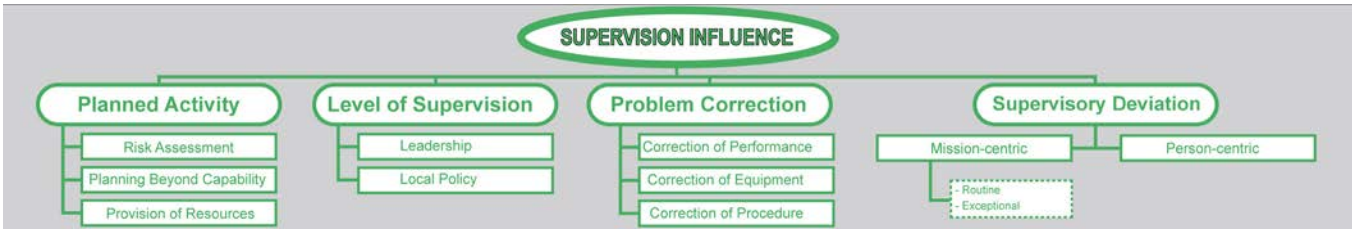


Figure 4 – "CF HFACS V3.0" Supervision Influence Group

Planned Activity Category

85. The Planned Activity Category relates to when the supervisor's assessment of hazards or resource provisioning hinders the individual's or team's ability to conduct its task. Good supervisors assess risks appropriately and plan and supply the resources needed for task completion. The Planned Activity Category is divided into three sub-categories:

a. Risk Assessment;

b. Planning Beyond Capability; and

c. Provision of Resources.

Risk Assessment Sub-Category

86. The Risk Assessment Sub-Category refers to when a supervisor who does not adequately evaluate the risks associated with the task, misjudges the crew pairing, or misjudges other factors affecting the performance of the individual or the crew. Examples of

the Risk Assessment Sub-Category include:

a. A unit CO authorized a mission manned with an unqualified crew without conducting a risk assessment; and

b. A maintenance shift supervisor who approved a non-standard aircraft repair.

NOTE
This sub-category applies to those actions before a task is executed; actions that apply during task execution apply to the Level of Supervision Category.

Planning Beyond Capability Sub-Category

87. The Planning Beyond Capability Sub-Category refers to when supervisors knowingly allow or authorize personnel to undertake a task beyond their ability, training, or qualification; the limitations of their equipment; or the limitations of their working environment etc. The analysis of these factors should reasonably have raised safety concerns in the mind of the supervisor. Examples of the Planning Beyond Capability Sub-Category include:

a. A supervisor allowed an inexperienced ATC to control two busy active runways;

b. A supervisor misjudged the impact of an unrealistic work tempo and caused a fatigued technician to work on an aircraft;

c. A supervisor authorized a pilot who has lost his night qualification to lead a formation at night; and

d. A supervisor directed crews to alternate too frequently between day and night shifts.

Provision of Resources Sub-Category

88. The Provision of Resources Sub-Category applies when the task is planned without proper manning and resources or when the composition of the crew is inadequate for the task at hand. Inadequate provision of support to meet basic individual needs and normal comfort such as food, water, heat, appropriate quarters, adequate work environment, etc, are part of this category. It also relates to the inadequate provision of training in terms of quality, quantity or timeliness within the span of the supervisor's control. Examples of the Provision of Resources Sub-Category include:

a. A supervisor assigns fewer aircraft than the mission called for, resulting in a task overloading of the assigned aircraft or the aircraft being overloaded to exceed weight limitations;

b. A supervisor fails to schedule NVG training prior to a night operational deployment; and

c. A supervisor tasks a tow crew with less than the minimum number of personnel.

Level of Supervision Category

89. The Level of Supervision Category relates to inappropriate supervision or a lack of

guidance, oversight, or training, etc. Supervisors at all levels should provide leadership, sound professional guidance, oversight, training opportunities, constructive feedback, motivation and be a positive role model to ensure that work is done safely and effectively. The Level of Supervision Category is divided into two sub-categories:

a. Leadership; and

b. Local Policy.

> NOTE
> This also applies to the inadequate identification and control of hazards and risk while the task is underway; if the task is in the planning stage hazard and risk recognition control fall under the Planned Activity Category.

Leadership Sub-Category

90. The Leadership Sub-Category relates to when the chain of command's availability, competency, and timeliness of decisions negatively affect the safety of the assigned tasks. Inadequate leadership includes poor supervision, weak oversight and lack of guidance by supervisory personnel within the unit of occurrence. Examples of Leadership Sub-Category include:

a. Inadequate Communication: An inaccurate exchange of information or a style or tone of interaction that interferes with an individual succeeding at a task. This can include personality conflict, incorrect information, inadequate feedback or hand-over based on quality or timeliness, and miscommunication of intent, e.g. an ATC supervisor confronts a ground controller regarding his performance, causing the ground controller to miss an important radio call; and

b. Inadequate Oversight or Guidance: Relates to a supervisor's unavailability, inadequate performance tracking, low proficiency, insufficient qualification, expired currency, invalid authorizations, improper inspection of work, etc, for the personnel under their control, e.g a check pilot pressures an aircraft captain to continue an instrument approach after the overshoot was initiated.

Local Policy Sub-Category

91. The Local Policy Sub-Category relates to the efficiency of local guidelines, policy, etc, or lack thereof, in terms of quality, quantity, dissemination or updating that is under the control of the supervisor to provide, that influence the safe conduct of the task. Examples of the Local Policy Sub-Category include:

a. Local ramp procedures not covering known conflict between taxing aircraft and a ramp inspection crew;

b. A new piece of ALSE is fitted to an aircraft and although everyone is briefed on its use, no formal record of the training is made; and

c. Cadet glider summer camp ramp procedures not being published, resulting in numerous runway incursions by personnel and vehicles.

Problem Correction Category

92. The Problem Correction Category refers to instances when deficiencies concerning individuals, equipment, training or related safety areas are known to the supervisor, yet are allowed to continue uncorrected. This includes instances when a supervisor does not take the time to identify individuals who exhibit risky behaviour or unsafe tendencies. Additionally, it includes when a supervisor does not do a risk assessment or institute remedial actions when an unreasonable risk is known. This category may be related to a Supervisory Deviation. The Problem Correction Category is divided into three sub-categories:

a. Correction of Performance;

b. Correction of Equipment; and

c. Correction of a Procedure.

Correction of Performance Sub-Category

93. The Correction of Performance Sub-Category relates to a supervisor's failing to correct the behaviour or performance of personnel impeding the safe completion of a task. Examples of the Correction of Performance Sub-Category include:

a. A supervisor ignores routine deviations carried out within his section;

b. A supervisor does not take action when observing substandard performance in his section;

c. A supervisor does not adequately correct known training deficiencies; and

d. A supervisor ignores warning signs given by an individual regularly reporting to work fatigued.

Correction of Equipment Sub-Category

94. The Correction of Equipment Sub-Category relates to supervisor who does not correct deficiencies in relation to materiel or associated documentation. Examples of the Correction of Equipment Sub-Category include:

a. A supervisor who does not submit a UCR for a known tow bar deficiency; and

b. A supervisor ignores the accumulation of minor discrepancies in an aircraft maintenance set.

Correction of Procedure Sub-Category

95. The Correction of Procedure Sub-Category relates to a supervisor who does not correct deficiencies or discrepancies in relation to standard operating procedures, regulations, standards or policy. Examples of the Correction of Procedure Sub-Category include:

a. A new regulation not documented in Unit Flying Orders; and

b. A supervisor allows a Unit Standards Officer to perform an unauthorized abbreviated Unit Checkout.

Supervisory Deviation Category

96. The Supervisory Deviation Category definitions match the Unsafe Act Deviation definitions. The category Deviation relates to the action or inaction of the immediate unit supervisors. In this case, the investigation should focus on the factors predisposing the supervisor to carry out a deviation. A Supervisory Deviation includes actions such as directing an individual to violate existing regulations, instructions, technical guidance, SOP or rules. The Supervisory Deviation sub-categories are also identical to the Deviation sub-categories. The Supervisory Deviation Category is divided into two sub-categories:

a. Mission-Centric; and

b. Person-Centric.

Mission-Centric Sub-Category

97. The Mission-centric Sub-Category relates to the supervisor's intent to ultimately achieve the mandate of the task at hand, while keeping in mind the best interests of the DND/CAF (e.g. a supervisor extends his flying crew's duty day beyond published limits). A Mission-Centric Deviation can at times include actions that are entirely appropriate under specific circumstances, such as defined in the National Defence Flying Orders (B-GA-100-001/AA-001). The Mission-centric Sub-Category is divided into two sub-sub-categories as follows:

a. Routine; and

b. Exceptional.

Routine Sub-Sub Category

98. The Routine Sub-Sub-Category relates to the unit's common and accepted use of an unapproved procedure to complete a task; inherent in it is the supervisor's awareness and tolerance of the unapproved procedure's use. It is often referred to as "bending the rules." It is important to consider that the Routine deviation may at times be a sign of a problem with rules and regulations or inadequate structure rather than the supervision or culture within the unit. Examples of the Routine Sub-Sub-Category include:

a. Routine "Workarounds" or Shortcuts: Sometimes it does not seem possible to get the job done effectively by following the rules or the rules seem unnecessarily lengthy or laborious, e.g. an inspection procedure may call for multiple time-in-tensive steps to be done in sequence. In order to reduce the time for carrying out the inspection and improve productivity, the supervisor permits personnel to the conduct the steps all at once rather than sequentially. The "shortcut" version of the procedure may lead to missing a critical item or other unintended results such as overtorqued bolts or gaskets; and

b. Lack of Time or Resources: An act that appears to optimize time or resources but still get the job done, e.g. the OpsO on a busy squadron allows crews to skip mission pre-briefs so that they can meet their takeoff times.

Exceptional Sub-Sub-Category

99. The Exceptional Sub-Sub-Category relates to a unique or isolated departure by a supervisor from established rules or regulations in order to complete the task. The deviation is totally unusual for that unit and is isolated to a specific supervisor. The exceptional deviation is neither sanctioned nor condoned by the supervisor's peers or leadership. Examples of the Exceptional Sub-Sub Category include:

a. A supervisor knowingly directs a technician to conduct an unapproved repair action to return the aircraft to the flight line as soon as possible; or

b. A supervisor allows a pilot to carry out a training mission below minimum weather limits so that pilot does not lose his currency.

Person-Centric Sub-Category

100. The Person-centric Sub-Category relates to a deviation contrary to established procedures based on the supervisor's personal motives, gains or goals that reflects badly on the professionalism of the organization and its members; this type of deviation can be said to be discordant. The Person-centric Sub Category involves reckless, wilful, or negligent behaviour or misconduct that may be carried out to falsely inflate one's reputation or for motives not in line with the objectives of DND/CAF. The discordant action may or may not be condoned by the supervisor's peers. Examples of the Person-centric Sub-Category include:

a. A deployed maintenance detachment supervisor releases an aircraft for flight despite a lack of qualification and authorization to do so in order to meet a mission requirement and maintain an untarnished record; and

b. A flying supervisor accepts a tasking from a higher authority and then, in order to maintain credibility in the eyes of the higher authority, authorizes the mission to be flown knowing that the crew is not qualified to conduct it.

Organizational Influence Group

101. The Organizational Influence Group refers to methods, decisions or policies made above the unit level that contributed to the occurrence. This can include equipment, resources, procedures, manning, procurement, etc. Senior leadership decisions have a profound impact on the organization and its function, including supervisory practices or an individual's preconditions or actions. Organizational Influences, therefore, are an important set of Latent Conditions as the organization's leaders set the foundation for all of its activities.

102. The Organizational Influence Group is shown at Figure 5. It is divided into three categories:

a. Resource;

b. Culture; and

c. Management.

Figure 5 – "CF HFACS V3.0" Organizational Influence Group

Resource Category

103. The Resource Category refers to management's and leadership's allocation of proper and sufficient resources to the team for the safe conduct of the task. It is divided into four sub-categories:

a. Personnel;

b. Financial;

c. Equipment; and

d. Facility.

> NOTE
> Training issues at the organizational level may be implicated if any of these four sub-categories are selected. Additionally, training issues dealing with documentation may be present in the Documentation Sub-Category found under the Work Environment Category within the Personnel Influence Group.

Personnel Sub-Category

104. The Personnel Sub-Category refers to the lack of or inadequate allocation of human resources, including maintainers, operators, staff and support personnel. This could include deficiencies in staffing, manning, enrolment quotas, and availability of training programs. Examples of the Personnel Sub-Category include:

a. An improper unit manning level that forces excessive individual or unit workloads; and

b. OTU training that is unreasonably shortened in order to increase throughput.

Budget Sub-Category

105. The Budget Category refers to the lack of or improper apportioning of financial resources for assigned tasks, such as for funding of acquisitions, maintenance, and operation of equipment. Examples of the Budget Sub-Category include:

a. Flying gloves are not replaced in a timely manner due to a lack of funding, forcing aircrew to buy their own non-standard gloves externally; and

b. Runway maintenance unreasonably postponed due to budgetary reductions.

Equipment Sub-Category

106. The Equipment Sub-Category refers to issues related to unsuitable equipment in relation to design, or failure to correct known design flaws with aircraft, tools, support equipment, publications, etc. Examples of the Equipment Sub-Category include:

a. An aircraft CFTO supplied to maintenance units is out of date;

b. An aircraft hoist control switch design that lead to inadvertent cargo release; and

c. An organization did not action a UCR reporting a long-standing hydraulic test stand problem.

> NOTE
> Should an Organizational level documentation issue dealing with clarity or practical usability be present, it would be annotated in the Policy Sub-Category of the Management Category. However, should the documentation be out of date, not have a user-friendly format or not be accessible using supplied government documentation systems, it would be annotated in Equipment Sub-Category or the Resource Category.

Facility Sub-Category

107. The Facility Sub-Category refers to the inadequate design of workspaces or a failure to correct infrastructure issues. This includes inadequate design of workspaces such as cockpits, control towers, or hangar facilities, and suboptimal use and maintenance of training facilities, simulators, ranges, etc. Examples of the Facility Sub-Category include:

a. An ALSE workshop operating out of a very small and cluttered work space that results in missing an item during a survival kit inspection; and

b. Improper hanger lighting compromises a visual inspection of an aircraft component.

Culture Category

108. The Culture Category refers to the prevailing organizational cultural climate that adversely affects the team's performance and safety. It is made up of elements such as stress, cohesiveness, and morale, and it greatly influences the behaviour of personnel within an organization.

109. The Culture Category also relates to norms, values, attitudes, beliefs and customs within the organization that adversely influence safety in general. This includes misconceived rules, acceptance of lowered standards, misaligned values, negative attitudes, flawed beliefs, misplaced customs, and the lack of occurrence reporting and discussion. Elements of the organizational culture, such as the presence of "Group Think," disintegrating esprit de corps and discipline, or ill-conceived traditions can adversely influence safety and the way the task is conducted. Examples of the Culture Category include:

a. Pre- or post-flight debriefings that are superficially conducted; and

b. The non-reporting of FOD hazards in the belief that the FOD walk will resolve a flight line FOD issue.

Management Category

110. The Management Category refers to how higher HQs being ill-structured to manage and provide proper oversight of the team and the units for the safe conduct of a task. It is divided into three sub-categories:

a. Planning;

b. Policy; and

c. Command and Control (C2).

Planning Sub-Category

111. The Planning Sub-Category refers to undesirable characteristics or conditions of work established by leadership that ultimately impaired the safe completion of the task. These characteristics include unrealistic operational tempo, unreasonable workload, unworkable time constraints, overly optimistic production quotas, non-motivating incentive systems, impractical schedules, and inadequate training, standards, or certification plans. It can also include the lack of contingencies for unforeseen problems in complex operations. Examples of the Planning Sub-Category include:

a. The introduction of a new capability in an operational theatre without a proper risk assessment;

b. A capability that is not suitable for the roles assigned; and

c. A risk management process that is not followed thoroughly for a high risk operation.

Policy Sub-Category

112. The Policy Sub-Category relates to the inefficiency of documented rules, regulations, procedures, guidelines, etc. It relates to doctrine, or its lack thereof, in terms of quality, quantity, or dissemination that influences the safe conduct of the task. It also relates to poorly formulated directives, guidelines, etc, that negatively influence or compromise the safety of a task. This includes the policies and the handling of documents within the organization with respect to recruiting, promotion, posting, retention and release, or those that are ill-defined, adversarial, overly complex, conflicting or supplanted by unofficial rules or values. Examples of the Policy Sub-Category include:

a. A CFTO on a maintenance procedure is poorly written with overly complex or impractical processes;

b. A deployed unit has no means to consult or download electronic records or procedures for the aircraft with which they are deployed;

c. A personnel reduction program severely impacts unit supervision levels; and

d. The introduction of an untested electronic maintenance records system leads to multiple missed inspections.

Command and Control (C2) Sub-Category

113. The C2 Sub-Category relates to higher headquarters in terms of their oversight, structure, delegation of authority, and communications that influenced a subordinate unit's safe conduct of the task. This includes ambiguous delegation of authority, poor monitoring and scrutiny of resources used, unrealistic risk assessment and flawed processes that impaired the safe completion of a task and hindered the work environment. Examples of the C2 Sub-Category include:

a. An orphan unit not receiving proper oversight and guidance from higher HQs;

b. An aviation resource is assigned to an operational theatre with a mitigation strategy to deal with environmental challenges but the higher levels in the chain of command do not check to ensure that they are put in place; and

c. The assignment of a detachment to a UN mission without proper rules of engagement.

MATERIEL CAUSE FACTOR

Definition Materiel Cause Factor

114. A Materiel cause factor relates to a failure of any aircraft component, support equipment or facility used in the conduct and support of air operations that lead to a FS occurrence.

Assignment of Materiel Cause Factor

115. A Materiel cause factor can be assigned in a FS occurrence which identify:

a. A flaw in the basic material used to manufacture a part;

b. An improper design, manufacture, construction or assembly; or

c. A failure or malfunction of components when there was no overstress, abuse or misuse, and proper maintenance practices were carried out (undetected progressive breakdown).

> NOTE
> Although the improper design, manufacture, construction or assembly could ultimately have been caused by personnel at the OEM or fourth line level, these kind of flaws are categorized as Materiel cause factor rather than Personnel because the Canadian Forces had no control on how these activities were conducted.

116. Materiel cause factor includes all aircraft and / or engines, equipment and facilities used in the conduct and support of air operations. Although most materiel failures may be traced ultimately to some human origin, personnel causes are assigned only when failures result from incorrect maintenance by DND/CAF or contracted parties or from incorrect operating

procedures. It is preferable, both statistically and realistically, to consider the remaining cases as materiel failures of the items in themselves, regardless of the reason or mode of failure. Materiel cause factors are divided into the following categories.

117. The Materiel cause factor is divided in two categories:

a. Aircraft or Engine Component; and

b. Related Facility.

Aircraft or Engine Component Category

118. The Aircraft or Engine Component category relates to equipment failure or malfunction. The failed or damaged component must be specified in the investigation report. If it is beyond the capability of the unit to precisely determine the technical nature of the fault, then the component need only be identified. For example, it may require a repair contractor to determine that a bushing has failed in a generator. The unit should specify “generator” as the component.

Related Facility Category

119. The Related facility category relates to failure or malfunction of facilities or equipment that is not part of, but relevant to, the operation of aircraft, such as maintenance support equipment. The nature of the item is to be specified in the investigation report, for example:

a. Ground vehicles, test stands, ladders, chocks, tow bars, helicopter ground handling wheels, and similar equipment used in the vicinity of aircraft;

b. Personal safety equipment;

c. Ground equipment supporting air navigation and ground / air communication; or

d. Helicopter securing device such as the bear trap used in shipborne helicopter operations.

120. Materiel cause factors should be amplified with a short descriptive narrative including, when possible:

a. The mode of failure, e.g. fatigue, shear, corrosion, wear, seizure, overheat, out of adjustment; and

b. The reason for failure, if known, e.g. improper design, manufacture, construction or assembly.

ENVIRONMENTAL CAUSE FACTOR

Definition Environmental Cause Factor

121. An Environmental cause factor relates to external factors that affect the flight or aviation activity, be it a climatic (temperature, humidity, turbulence, convective weather, ceiling, wind, visibility, precipitation) or environmental (light conditions, degraded visual environment caused by snow, sand or lack of contrast) or other condition that leads to a FS occurrence despite all reasonable precautions being taken by the personnel involved.

Assignment of Environmental Cause Factor

122. An Environmental cause factor is assigned when the condition encountered was beyond human control to predict with the present state of the art equipment and when all reasonable precautions had been taken and applicable SOPs applied; reasonable precautions includes, but are not limited to, the full use of weather forecast information, use of airborne weather radar, requesting updated weather information, timely abort or turnaround, delaying launch, seeking shelter or taking alternative action decisions, as applicable, for vectoring to avoid areas of hazardous weather or bird concentrations.

123. The Environmental cause factor is divided in five categories:

a. Weather;

b. Unusual Phenomena;

c. Surface operating area;

d. Wildlife; and

e. Atmospheric Pressure, Simulator or Centrifuge.

Weather

124. The Weather category relates to normal environmental phenomena such as cloud, hail, lightning, rain, ice, snow, sea state and wind.

Unusual Phenomena

125. The Unusual Phenomena category relates to all other environmental conditions exclusive of weather that cannot be easily predicted, e.g. tidal waves (tsunami), earthquakes, landslides, avalanches etc.

Surface Operating Area

126. The Surface Operating Area category relates to a condition where the landing/take-off area is causal in the occurrence, e.g. earth surface, water surface or landing/take-off manoeuvring area generating FOD, a degraded visual environment, a hidden object (snow covered stump), etc.

Wildlife

127. The Wildlife category relates to a condition where wildlife activity is causal in an occurrence, bird / bat strike, bird avoidance manoeuvring, wildlife strike or presence, etc.

Atmospheric Pressure, Simulator or Centrifuge

128. The Atmospheric Pressure, Simulator or Centrifuge category relates to a condition where involved personnel suffer adverse physiological consequences during or after exposure to a change of atmospheric pressure, a simulator or centrifuge. Consultation with a Flight Surgeon is recommended when considering this cause factor area. Examples of Atmospheric Pressure, Simulator, Centrifuge include:

a. High altitude decompression sickness;

b. Disorientation or after-effects caused by simulator or centrifuge training; and

c. Neck or other body strains from centrifuge.

> NOTE
> The Atmospheric Pressure, Simulator or Centrifuge cause factor could be assigned independently, especially in the case in an hypobaric chamber where there is no intent to fly. For instance, the investigation could reveal that an individual suffered from decompression sickness, a trapped gas disorder, hypoxia, etc, and that no further safety of flight compromise was present. These occurrences are valuable for statistical tracking and possible PMs.

OPERATIONAL CAUSE FACTOR

Definition Operational Cause Factor

129. An Operational cause factor relates to a condition or situation where the CoC has formally accepted higher risk estimated to be above an acceptable level of safety to achieve an operational mission objective and when the risk was present and causal, either in whole or in part, to the FS occurrence.

Assignment of Operational Cause Factor

130. An Operational cause factor can only be assigned by the AIA when the applicable formation Comd or legally authorized individual has lawfully accepted a higher risk in accordance with the provisions of individual CDS (delegation) Orders as part of the Airworthiness Program or as stipulated by the B-GA-100-001/AA-000 National Defence Flying Orders, Volumes 1 and 3.

131. Due to the disposable nature of Class 1 Mini and Micro UA, WFSOs and BFSO may assign operational cause factors.

132. The assignment of an Operational cause factor can be done in isolation or in combination with other cause factors.

FOREIGN OBJECT DEBRIS (FOD) CAUSE FACTOR

Definition of Unidentified FOD Cause Factor

133. An Unidentified FOD cause factor relates to a condition where the presence of a foreign object in or around an aircraft leads to a FS occurrence and where the type of FOD cannot be established.

Assignment of Unidentified FOD Cause Factor

134. Usually, the Unidentified FOD cause factor should not be assigned in conjunction with or in addition to any other cause factor type. On the other hand, when the source of the debris is known, e.g. Materiel, Personnel or Environment, the applicable cause factor Type shall be

selected. Examples of FOD that should not be assessed against Unidentified FOD include any FOD generated by aircraft systems or component failures, loose or lost parts or pieces, personal equipment misplaced in the aircraft and FOD ingestion related to environmental factors like birds, ice, etc.

> NOTE
> If FOD is present in an occurrence, the Event Descriptor FOD shall be selected as well as any other pertinent Event Descriptors applicable to the occurrence. This ensures that FOD-related occurrences are tracked accurately.

UNDETERMINED CAUSE FACTOR

Definition of Undetermined Cause Factor

135. An Undetermined cause factor relates to a condition where the investigation was unable to reasonably determine the probable cause of an occurrence.

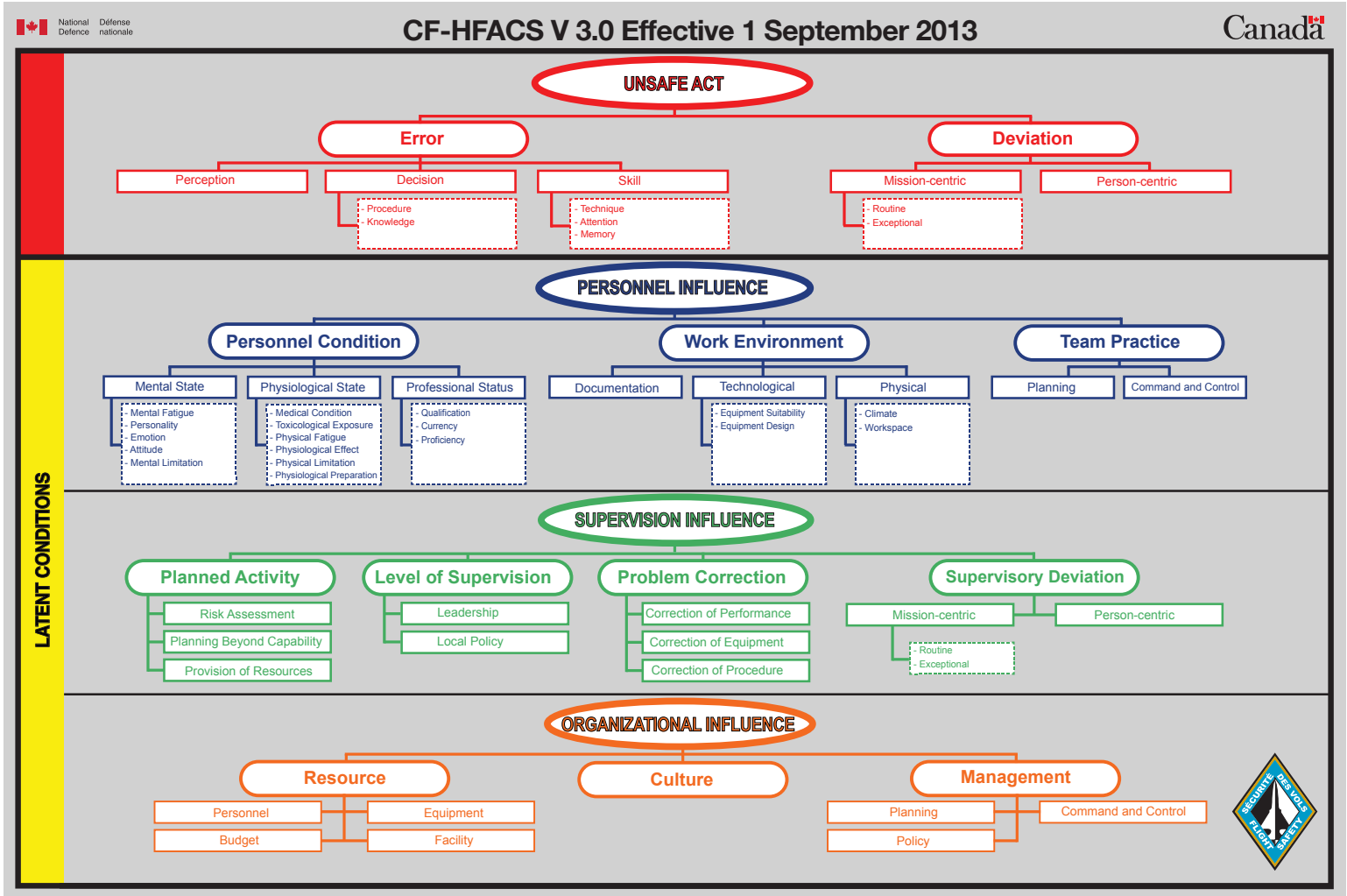
Assignment of Undetermined Cause Factor

136. An Undetermined cause factor should only be assigned as a last resort when all investigative avenues have been exhausted and when the investigation does not provide enough evidence to reasonably determine a specific cause factor. Prior to assigning an Undetermined cause factor, the investigation shall consider assigning cause to one or more of the three main cause factor categories (Personnel, Materiel and or Environmental). If the assessment of the evidence eliminates all other cause factors as causal and there is no reasonable means to determine that one of the three main cause factor categories was causal, then an Undetermined cause factor will be assigned.

> NOTE
> PMs can still be recommended when the occurrence cause is undetermined.

Annex A
Chapter 15
A-GA-135-003/AG-001

ANNEX A – "CF-HFACS V 3.0" CHART



INTENTIONALLY LEFT BLANK

CHAPTER 16 – ANALYSIS AND PREVENTIVE MEASURES

APPLICATION OF TERMINOLOGY

1. Common terminology accepted by the DND/CAF shall, with few exceptions, meet the aims of this manual and maintain consistency. Where terms or words have taken on meanings specific to FS, they are defined below.

ANALYSIS PURPOSE

2. The goal of the FS System is to prevent accidental loss of DND/CAF aviation resources. The analysis and subsequent PM steps are the most important of investigation activities because the successful implementation of PMs is the means to achieve the goals of the FSP and the Airworthiness Investigation activity. This is met through the clear identification of hazards and the effective implementation of practicable PMs. Such measures normally modify some aspect of procedures in the manufacture, support, operation or maintenance of aircraft or components. Further, by investigating occurrences, the FS System obtains valuable feedback and develops PMs so that similar occurrences can be reduced, mitigated and ideally eliminated. Feedback also allows lessons learned by a unit to be used by other units not directly involved and raise the awareness of personnel.

3. FSOs at all levels should make every effort to ensure that PMs / corrective actions are monitored to ensure they are implemented and assessed for effectiveness. Feedback shall be provided to subordinate units and HQ as to the status and effectiveness of these measures.

DEFINITION

Preventive Measure (PM)

4. A PM is any step that can be taken to decrease the likelihood of a FS occurrence.

> NOTE
> When practical, one or more PMs may be applied to each cause factor assigned to an occurrence. While there has to be a correlation between the cause factor(s) and the PMs assigned there is no requirement to assign a PM for each cause factor. Notwithstanding, the combination of the PMs assigned should minimize the risk of a repeat of the contributing cause factors.

ANALYSIS METHODOLOGY

5. Most types of analysis involve statistics. Statistics can be misleading, and methods for avoiding the more common pitfalls are described in the paragraphs that follow. It is suggested the following data be considered:

a. the number of occurrences involving a formation in any given period;

NOTE
The number of occurrences reported can be a valuable FSP indicator but should never be targeted as a measure of performance. This could be counterproductive to a healthy reporting culture.

b. the most common types of occurrences and cause factors (look for trends and their root causes);

c. the most common PMs (have they been implemented and are they effective?);

d. trends in individual aircraft and / or components, equipment, stages of operation, units, sections and personnel and the probable reasons for these trends;

e. environmental and seasonal factors; and

f. the effects of exercises, competitions and deployments.

Occurrence Rate

6. The rate of occurrences is expressed as the number of occurrences per 10,000 flying hours. It is calculated with the formula: (# of accidents) / (incidents) / (occurrences) X 10000 ÷ (# flying hours). E.g. four air accidents in 30,000 flying hours would result in an accident rate of 1.33.

Analysis of Local Occurrences

7. Comds and FSOs at every level must evaluate the effectiveness of their FS Programs. To achieve this, FSOs must maintain records of every FS occurrence involving facilities, equipment and personnel. FSIMS is the primary tool used to aid this process and is useful for identifying trends.

Analysis Available from FSIMS

8. The FSIMS trending tools can provide FS staff with a comprehensive range of data for use in identifying problem areas and implementing PMs. FSOs can contact DFS either directly or through their WFSO for assistance in generating or interpreting an analysis.

Use of Results

9. Regular in-depth analysis can indicate where additional PMs are required. Recommendations should be made to the first level authorized to implement them.

PM MANAGEMENT PROCESS

10. PMs are the final outcome from investigations (for both Occurrences and Hazards) which, when implemented may prevent accidents. Considering this is the ultimate aim of the entire Flight Safety program, there needs to be a formal management process to address PMs from formulation to final closure.

11. Annex A details the process flow for the development and tracking of PMs to completion.

DEVELOPMENT OF EFFECTIVE PM

12. PMs are to be implemented so that they will have lasting effects despite frequent changes in personnel. New accidents are rare; usually it is simply a matter of new people being involved in "old" accidents. Short-term PMs, such as briefing aircrew or maintenance personnel, have little lasting effect and may allow hazards to reoccur when new people arrive.

13. The guidelines for developing effective PM are listed below:

a. the PM should, when applicable, target the lowest level in the chain of command that is able to deal effectively with the PM;

b. the PM must treat the cause of a problem and not its effect;

c. the PM must be realistic and practicable, and their effects on operational capability should be considered. PM must also be judged according to cost-effectiveness, training and manpower requirements and implementation time;

d. the PM need not be limited to the cause of a specific incident, as other hazards may surface during the course of an investigation;

e. the occurrence resulting from personnel cause factors should lead to a search for PMs in management, training and supervision;

f. the PMs resulting from an occurrence should be consistent with and developed logically from the cause;

g. similar occurrences in the past or with other fleets should be reviewed for ideas;

h. the organization responsible for ensuring that PMs are completed should be identified and target dates set for all follow-up action;

i. when a hazard is identified that requires immediate action, the CoC needs to be advised soonest so they can address the particular problem immediately and independently;

j. units shall action PMs contained in SRs from other units if applicable; and

k. lessons learned shall be identified and disseminated when applicable.

14. When preparing the FS Report, the FSO should focus on PMs that can truly mitigate or eliminate the chance of future accidents, like improving a training syllabus, amending SOPs and modifying equipment, to name a few.

15. The Human Factors Intervention Matrix (HFIX®) is a tool that can be used for mapping intervention strategies related to the human errors identified in the HFACS model. HFIX can help a FSO to systematically generate comprehensive PMs that directly target the underlying systemic causes of errors. The HFIX matrix has been posted on the DFS intranet under the *"User Manual / Documentation"* tab.

REVIEWING PM

1 CAD / 2 CAD Review

16. On review of the occurrences and hazards reported, 1 CAD / 2 CAD will:

a. implement the appropriate PMs within their authority;

b. recommend additional PMs and, where applicable, identify the responsible offices and target dates for follow-up action;

c. provide recommendations for PMs that are beyond their capabilities; and

d. consider whether or not specific PMs should also apply to other aircraft types under their Comd.

DFS Review

17. On review of the occurrences and hazards reported, DFS shall:

a. coordinate with other agencies for action as necessary;

b. establish target dates for outstanding items;

c. disseminate PMs and information back to 1 CAD / 2 CAD, wings, bases, and units;

d. consider the application of PMs to other aircraft types; and

e. produce educational material for distribution to units.

RESPONSIBILITY FOR PM IMPLEMENTATION

18. Comds at all levels, with advice from their FS staffs, are responsible for devising and instituting PMs and for advising higher HQ of required PMs that are beyond local capabilities.

PM TRACKING

19. Tracking means monitoring all PMs until they have been fully implemented or rejected by the appropriate authority. Tracking is the responsibility of Comds at all levels, with advice from their FS staffs. Tracking also ensures that the entire user community is kept up to date on the nature, status and effectiveness of PMs. Additionally, it ensures that PMs are not forgotten. Further guidance is provided at Annex A.

Annex A
Chapter 16
A-GA-135-003/AG-001

ANNEX A – OCCURRENCE/HAZARD PM MANAGEMENT PROCESS

Reference: C-05-005-P12/AM-001 *Policy and Procedures Aircraft Weapon Systems Engineering – Aerospace Equipment and Program Management Division Engineering Process Manual*, Part 12 Airworthiness Risk Management

1. This Annex details the steps required to develop and track PMs until completion. Although Hazards and Occurrence have completely different triggering mechanism (Proactive vs Reactive), the method used to resolve any noted deficiencies highlighted in the FS investigation will be through the formulation of PMs.

2. Although the procedures documented in this Annex standardize the PM management process across the DND/CAF, especially for PMs tasked above the wing, it is understood that each wing could use local procedures to deal with PMs within their sphere of responsibility. This is deemed acceptable provided the Chain of Command maintains visibility and responsibility for the implementation of PMs. Further, the intent of the principles described in this Annex are adequately documented in local unit/wing procedures (e.g. FS program, or AF9000 procedures).

3. This Annex should be read in conjunction with the flow chart at Appendix 1. This annex aims to achieve the following:

   a. show how to identify risks to the CoC (usually resulting from hazard reports);

   b. describe the process to be used for validation of PMs;

   c. describe how to transfer PMs addressed outside the unit;

   d. detail the essential steps needed for traceability;

   e. recommend a method to transfer the PMs from the FS network to the Chain of Command (CoC);

   f. recommend a method for the CoC to task organizations under their command; and

   g. describe the process to use when the CoC does not agree with the proposed PM.

4. Record of Airworthiness Risk Management (RARM). In the case of hazards, the reporting form (Chapter 7, Annex A) includes an identification of hazard “Severity” and “Probability”, which can be used to determine a level of risk according to the RARM (reference). The individual filing the hazard form will not necessarily be familiar with the risk management process; therefore the risk should be validated prior to be entered in FSIMS. If after an initial investigation of the hazard (Block H-4), the risk exceeds the acceptable level of safety, the information needs to be passed along to the Division FS office (Block H-6) within 48 hours. Following validation of the risk, the Division FS office will pass-on the information to the OAA (Senior Staff Officer Operational Airworthiness – SSO OA). The SSO OA will initiate a risk evaluation and a RARM will be created if deemed necessary. In cases where a RARM

is completed, a copy will be provided to the WFSO, to include the appropriate reference in FSIMS.

> NOTE
> Once a RARM related to a Hazard is signed by the CoC, the FSIMS risk level assigned should be amended as required to match the risk level assigned in the RARM.

5. PM Validation Process. The validation process detailed in the flow chart (originated at block PM-1), has four steps:

   a. determination of appropriate PM Action Organization (PMAO);

   b. pre-coordination of the PM between the FS network and the PMAO;

   c. assignment of the PM to the proper FS responsibility level (UFSO, WFSO, 1 CAD FSO, or DFS); and

   d. feedback to the investigator accepting and confirming the validity of each PM.

6. FS Responsibility Level. The *"responsibility level"* field in each PM is used to assign the FS staff/level responsible for:

   a. participating in the validation process;

   b. monitoring/tracking the progress of the PM;

   c. reviewing PM refusal or modification;

   d. updating the PM status information in FSIMS; and

   e. PM auditing and PM closure (in coordination with IIC).

7. Determination of PMAO. PMs need to be assigned to an identifiable PMAO for implementation. For all PMs with a PMAO outside the unit, the relevant PMs will be forwarded to the WFSO. Similarly, the WFSO will forward the PMs with PMAO outside the Wing to the Div FS team, who will forward PMs with PMAO outside the Division's responsibility to DFS. The aim of this action is to inform the higher levels of the FS chain regarding the recommended PM and to seek help, if required, in the negotiation process. It is expected that before a PM is passed to the next level (up the FS chain), the FS officer conducting the negotiation will ensure the PM meets the criteria of an effective PM (see Chap 16, para 13). In cases where the IIC/WFSO have a clear understanding of the appropriate PMAO, direct liaison is encouraged and acceptable for the purpose of pre-coordination. However, such coordination shall include informing the FS responsible level (Wing, Div, DFS) of the issues associated with the proposed PM and acceptance of the PM must be properly tracked in the PM tracking field.

8. Third Line Contractor. In situations where PMs have to be implemented by a third line contractor, the following will apply:

   a. For simple & pre-coordinated PMs: the PMAO should be the Wing and the FSIMS tracking field for each PM should reflect that the contractor has agreed to implement the PMs; or

b. For all other PMs: the staffing process detailed in para 6 applies and the PMAO should be the unit managing the contract with the applicable contractor (normally the Weapon System Manager).

9. PM Verification and Pre-coordination Process. Once the proper FS responsibility level is determined (Unit, Wing, Div, DFS), the FSO of that organization will confirm that an appropriate PMAO has been assigned. A pre-coordination shall be performed with the PMAO, ensuring a buy-in from the start, and possibly a quicker implementation of the PMs. This negotiation process may include engaging with upper levels of the FS chain to help with the pre-coordination. It must be noted that often, many PMs are implemented prior to the release of the final report.

10. PM Feedback Recording Process. For each PM staffed up the FS chain, there shall be a record providing feedback to the WFSO, confirming that the PM is valid and has the proper PMAO assigned.

11. PM Assignment to PMAO Above Wing. Once the final report is released (Block PM-2), the PM will be transferred formally (e-mail is acceptable) to the responsible FS organization level (Block PM-3).

12. PM Transfer to Chain Of Command (CoC). Following an investigation, a clear transfer of all PMs from the FS network to the appropriate level of the Chain of Command is required (Blocks PM-4 and PM-12).

13. PM Tasking by CoC. Once the PM has been accepted, a formal tasking to implement the PM should be done by the commanders at all levels. This is a necessary step that not only formally tasks the appropriate PMAO, but confirms acceptance of the PM by the CoC. For Class I investigations, the Comd RCAF will normally issue an Action Directive to direct the implementation of the PM(s) recommended in the FSIR.

14. PM Refusal or Modification. The responsibility to implement PMs rests with the CoC. In some cases, the implementation of a PM may not be possible or practical. In such situation, a PM may be refused, or modified in an attempt to meet the original intent. In such a situation, correspondence with the appropriate FS responsibility level (Block PM-5A or PM-13A) should take place. If the FSO of the appropriate organization agrees with the recommendation or suggested modification, the rationale shall be entered in FSIMS with the pertinent record and the PM closed or amended as required. However, if the FSO does not agree with the recommendation, he can raise his reasoning one level up in the chain of command (Bloc PM-5B and PM-13B), for final vetting. Higher FS level (Wing, Div, DFS) may become involved in the staffing as appropriate.

> NOTE
> PMs for Class I investigations are directed for implementation via an Action Directive issued by the Comd RCAF. Therefore, refusal or modification of these PMs must be agreed to by the Comd RCAF.

15. PM with Associated RARM. Even when the intent of a PM is met by a mitigating action of an approved/signed RARM, the PM will remain open and the tracking field in FSIMS shall include an appropriate comment, e.g. *“RARM Ref #XX includes this PM as mitigating action #YY, with an expected completion date of DD/MM/YY. No updates on this PM will be done as part of the quarterly open PM Report. The assigned DFS desk officer will monitor during the*

yearly fleet review at the ARB." Once the specific mitigating action of the RARM is completed, the PM can be closed.

16. Duplicate PM. When the intent of a PM and its corresponding PMAO are identical to that of a PM already being tracked within another occurrence, the PM may be considered as a "duplicate PM". Duplicate PMs shall be considered as subordinate to the already tracked primary PM. When using duplicate PMs, tracking/update shall be done as follows:

a. Link both occurrences in FSIMS using the "related cases" tab;

b. Insert the following wording in the PM tracking field of the subordinate PM: *"This PM is a duplicate PM to FSIMS xxxxxx, PM # (primary PM). Tracking and updating will be done under the primary PM. This duplicate PM will not be updated and will be closed upon completion and closure of the primary PM"*; and

c. Insert the following wording in the PM tracking field of the primary PM: *"This PM is linked to the following duplicate PM(s) FSIMS yyyyyy, PM #. Once this PM is completed and closed, all duplicate PMs must also be completed and closed."*

17. PM Closure. PM can be closed under the following conditions:

a. when the PM is implemented to the satisfaction of the responsible FS level (WFSO, 1 CAD FSO, or DFS). Once a PM is completed, the PMAO will provide the specific records/documentation to the assigned FS responsibility level. If the responsible FSO concurs, they will close the PM and include the details in FSIMS (Blocks PM-9 and PM-17); or

b. when the PM is not implemented by the CoC and has undergone the review detailed at para 14 above. The appropriate reference(s) showing the CoC refusal of the PM will be included in the FSIMS tracking field before closure of the PM.

NOTE
In the case of Unsatisfactory Condition Report (UCR)/Publication Deficiency Report (PDR)/Statement of Capability Deficiency (SOCD), the PM will remain open until it is fully implemented on the fleet.

NOTE
If the UCR/PDR/SOCD is rejected at higher level, the situation will be reviewed by the FS team as if the PM was rejected. For the purpose of tracking the PM, the FS responsible organization in FSIMS will change as the UCR/PDR/SOCD is staffed up the chain.

18. PM from Reports/Studies. In some cases, reports or studies are mandated as an individual PM. When such a report/study is formally released, that particular PM shall be closed; however, if PMs are resulting from this report/study, they shall be documented as new PMs within the same FS occurrence report that initiated this activity. PM validation and pre-coordination is to be carried-out as described in this Annex. This will ensure that those follow-up actions are adequately tracked and recorded in FSIMS. Similarly, if an independent report/study has identified FS risks, a hazard report shall be generated in FSIMS if one or more PMs have been identified.

19. Occurrence Report/Hazard Report Closure. Once all PMs for a specific Occurrence or Hazard are completed, that specific investigation will be formally closed in FSIMS, by the originating unit.

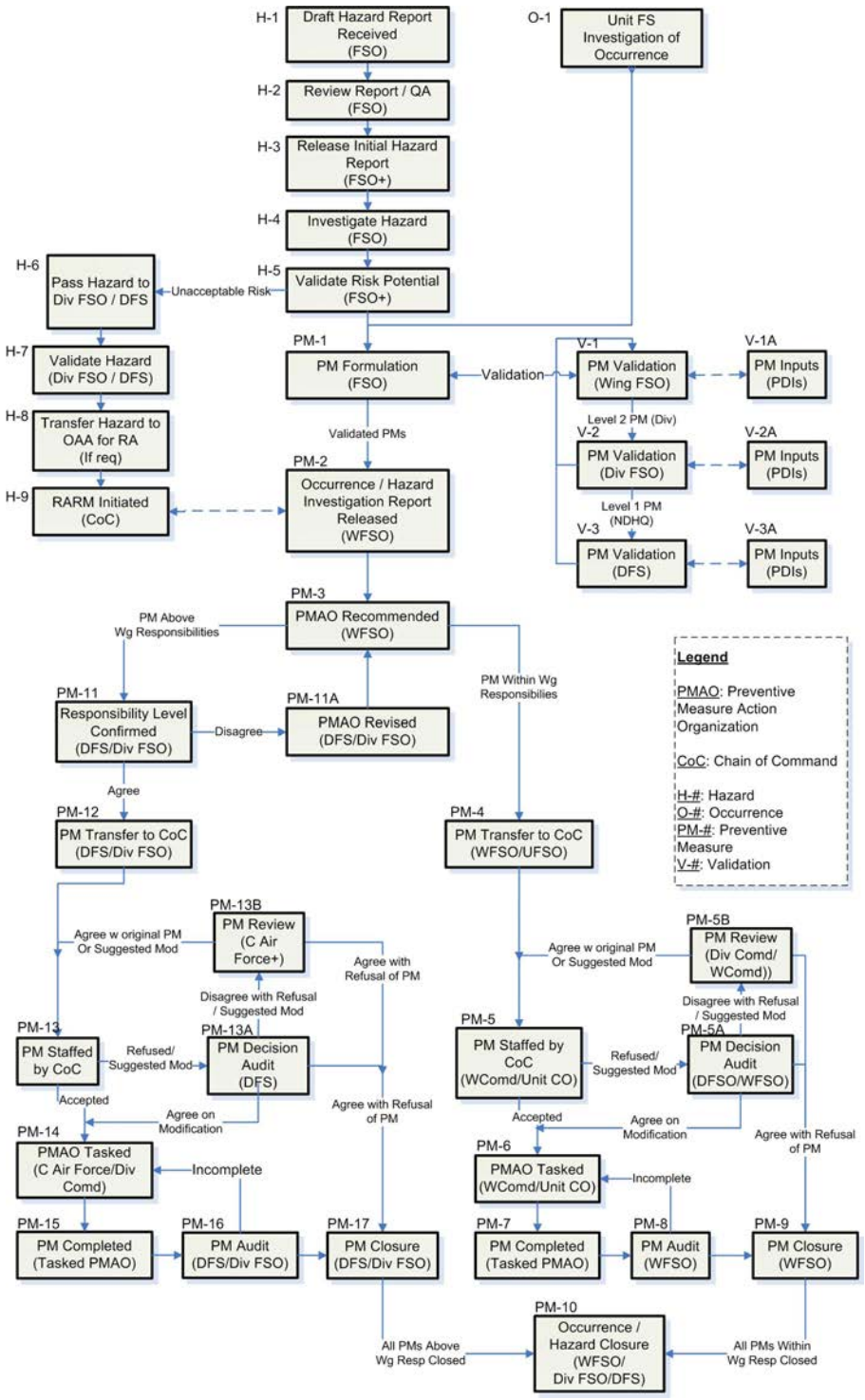
20. PM Tracking. Although the Commanders at all levels are responsible for the tracking of PMs, the FS staff will provide all necessary tools (ex: regular reports) to facilitate this function, and ensure that no PMs are forgotten. Regular updates from the PMAO are to be recorded in the FSIMS *"tracking comment"* field.

21. For tracking purposes, the responsible FS level (Unit, Wing, Div, DFS) will forward a copy of all correspondence/documentation related to the implementation of the PM to the FSO that investigated the occurrence. The investigating FSO shall keep this documentation with the investigation folder. The responsible FSO shall update FSIMS to include reference details and a description of the correspondence/documentation and action taken.

INTENTIONALLY LEFT BLANK

Appendix 1
Annex A
Chapter 16
A-GA-135-003/AG-001

APPENDIX 1 – PM MANAGEMENT PROCESS DIAGRAM



INTENTIONALLY LEFT BLANK

CHAPTER 17 - INVESTIGATIVE AIRWORTHINESS CLEARANCE (IAC)

INTRODUCTION

1. The purpose of this section is to provide the requirements associated with the Investigative Airworthiness Clearance (IAC) process, as part of the Release to Service (RTS) or Temporary Authority to Operate (TAO) processes. The objective of the IAC process is to provide the DND/CAF airworthiness authorities with the assurance that all of the requirements of the Investigative Airworthiness Program have been assessed and deviations/compliance have been documented. An IAC or Provisional IAC (PIAC) is one of the necessary elements needed to grant an Airworthiness Clearance (or Provisional Airworthiness Clearance) for a new aircraft type.

RELEASE TO SERVICE (RTS) AND TEMPORARY AUTHORITY TO OPERATE (TAO)

2. The RTS process is described in the Airworthiness Program Manual (A-GA-005-000/AG-001) as “the backbone of the Airworthiness Program” and is described in detail in ACO 8001-2. It is the formal means by which all operational, investigative and technical issues are reviewed, addressed and documented prior to any operational use of a new or modified aeronautical product.

3. The AIA’s requirements that must be met during the RTS process are that any operator, company or unit under consideration for carrying out duties for the DND/CAF must:

a. understand their FS obligations as listed in the FS Manual (A-GA-135-001/AA-001) and this manual;

b. be able to fulfill those obligations and have the personnel, structure and appropriate culture in their organization to meet these obligations;

c. have access to the DND/CAF FS system so that appropriate reports can be made and they can feed/draw information to support the FS Program; and

d. support investigations such that the AIA may carry out his statutory obligations under the *Aeronautics Act*, *MAIRs* and the Airworthiness Program to independently investigate matters of military aviation safety.

4. When the AIA is satisfied that these requirements are met, an IAC will be signed and become part of the RTS documentation. A similar process will be carried out by FS and AIA personnel for TAO processes. The information that is gathered to support these AIA/DFS requirements do not necessarily have to originate with AIA/DFS audits or FSAVs, but they can be gleaned from the activities of OAA/1 Cdn Air Div and/or TAA/DGAEPM/DTAES and/or other experts involved in the processes.

5. Also, the AIA will monitor RTS and TAO processes with a view to making observations and recommendations based upon safety and airworthiness investigations to ensure appropriate considerations are undertaken during the processes.

INVESTIGATIVE AIRWORTHINESS CLEARANCE

6. An IAC or PIAC must be completed and signed before a new aircraft type is to be employed in DND/CAF operations, including operation under a Flight Permit issued by the OAA/TAA; this will ensure that the AIA is ready to investigate FS occurrences on all aircraft flying under DND/CAF airworthiness authority.

7. The AIA requirements that must be met during the Airworthiness Clearance process are detailed at Annex A and can be grouped in two major elements:

a. FS Investigation and Reporting. This is focused on the ability of the organization to report and investigate occurrences for new DND/CAF-operated aircraft; and

b. Investigation Support. This focuses on the AIA's ability to investigate in an independent, safe and expedient manner. It ensures all the necessary support/ equipment/ contacts have been established/coordinated prior to an aviation safety investigation being conducted on behalf of the AIA.

8. In terms of the certification and introduction to service of a new aircraft type, the issuance of an IAC by the AIA is considered to be the culmination or final step of the Investigative Airworthiness Program as it applies to the Airworthiness Clearance of a new aircraft type. A review of the IAC may also occur when a RTS is deemed required for major upgrade project (especially if it involves changes to the CVR/FDR system or other system equipment or arrangements that may affect the investigation of occurrences).

9. For fleets that are upgrading CVR/FDR or combined CVFDR, a reduced set of IAC requirements are included at Annex A.

CVR/FDR REQUIREMENTS BY FLEET FAMILY

10. The CVR/FDR Requirements by Fleet Family can be found as Annex B to this chapter and the Appendices give details on each aircraft grouping. They may be referenced for information purposes when questions arise regarding CVR/FDR required characteristics.

UAS ARD REQUIREMENTS

11. The ARD Requirements for UAS can be found as Annex C to this chapter. These requirements will be assessed as part of the IAC.

Annex A
Chapter 17
A-GA-135-003/AG-001

ANNEX A- IAC CHECKLIST FOR AERONAUTICAL PRODUCTS

Reference: 1150-21 (DFS), CVR/FDR Policy Implementation Extension, 21 Jun 10

1. As a minimum, the list of requirements in Table 1 shall be assessed before an Investigative Airworthiness Clearance (IAC) is issued. If a specific item is not complete but a suitable substitute is available or the item will be resolved in an acceptable timeframe, a Provisional Investigative Airworthiness Clearance (PIAC) can be issued until the requirement is met. PIAC shall remain valid until such time as it is superseded by IAC, it is revised, or it is revoked. The AIA will review PIAC with the Annual Airworthiness Report – Investigative.

NOTE
For UAS undergoing RTS, the IAC will be tailored as appropriate. The IAC will identify which recordings are considered designated OBR, non-designated OBR or data recorders. Furthermore, the IAC will determine which recorders will be subject to a yearly check, which will also be documented in 1 Cdn Air Div Order 3-304.

Item	Requirements	Description/Details Required
1	Flight Safety Investigation and Reporting	
1a	Letter from CoC (e.g. CO, flight manager, accountable executive) endorsing the FS program (FSP) and the requirement to report and investigate FS occurrences.	Provide reference to the document and procedures that emphasize the CoC obligations and commitment to the FSP.
1b	Trained, and AIA-authorized (IIC 3, IIC 2, or IIC 1) FSOs at both Unit (CAF or contractor) and DFS level	Obtain full name, title, and telephone number of the individual doing this role. The individual shall attend FSC (include course serial), and understand their responsibility to report and investigate occurrences. Also provide reference to the certification letter that indicates the individual's authorization level (i.e. IIC 3, IIC 2, or IIC 1).
1c	Reporting capability in FSIMS;	The FSO shall have access to FSIMS, allowing him to input occurrences/investigations, and to perform searches as needed.

Item	Requirements	Description/Details Required
1d	Emergency Response Plan	Provide reference to ERP (or equivalent document) which triggers a call to DFS (1-888-WARN-DFS; 1-888-927-6337) in the event of an accident/serious occurrence.
1e	3rd line maintenance contractor has FSP in place.	Contract is to include the standard PWGSC contract Clause: B4064C (2008/05/12) Flight Safety.
2	Investigation Support	
2a.	Aircraft hazardous content list to include all on-board hazards and exact on-board location	(1) In order to protect personnel requiring access to the crash site (ex. first responders, recovery and salvage team, investigators), a detailed list of aircraft hazards and their location shall be provided.
		(2) Confirmation that a copy of this document has been provided to first responders at the Main Operating Base (MOB) and secondary Operating locations (e.g. Ships for Maritime Helicopter) and Recovery and Salvage Team shall be included in the IAC report.
2b.	Access to Subject Matter Expert (SME)	To support various investigations, it is often required to have access to various SMEs (e.g. pilot qualified on aircraft type, maintainer qualified on aircraft type, engineering resources, etc) in support of an investigation. The process to reach these additional resources shall be detailed in the final IAC report.
2c.	Flight Data Recorder (FDR)	Document if the new/modified fleet meets the C Air Force CVR/FDR Policy. If a waiver was signed, include the reference. A general description of the recording system is required along with a full list of recorded parameters.
2d.	Cockpit Voice Recorder (CVR)	Document if the new/modified fleet meets the C Air Force CVR/FDR policy. If a waiver was signed, include the reference.

Item	Requirements	Description/Details Required
2e.	National Research Council (NRC) is authorized and capable to read/interpret both the CVR and the FDR	Document/verify the following:
		(1) NRC is authorized to read FDR (No ITAR restrictions);
		(2) NRC has necessary software licences to read CVR/FDR;
		(3) NRC is equipped to read and interpret the CVR/FDR. This implies that NRC has all the necessary software/hardware to perform this as soon as the fleet operates under DND/CAF airworthiness authority;
		(4) NRC is equipped to read severely damaged recorders (CVR, FDR, or a combination CVFDR). This will normally involve the acquisition, by the applicant, of Crash Damaged Recovery Equipment (CDRE), or a surrogate recorder(s) and associated downloading and playback software. Note that such equipment may already be held with NRC (if the recorder is already on DND/CAF aircraft in operation); and
		(5) An initial download CVR/FDR must be sent to NRC, to confirm their ability to read.
2f.	Acceptance of CVR and FDR system	(1) An initial baseline verification ensures that each aircraft entering service records data/audio properly, and it provides a baseline of comparison in case of an accident. Document the initial verification process for each individual aircraft (no later than immediately after the first in-service flight, when an aircraft is delivered to the CAF). If this initial verification is not performed by NRC, the certified agency must be approved by TCCA (or equivalent agency) to perform annual verifications; a copy of this initial download must be sent to NRC (to be kept on record in support of potential accident investigation); and
		(2) A verification will also be required for each aircraft recording system (CVR and/or FDR) after operation of the aircraft for a period equal to the full capacity of the respective recording system.

Item	Requirements	Description/Details Required
2g.	List of all Non-Volatile Memory (NVM) components and cards	A document shall be created to list all on-board equipment that will retain flight information in the event of an accident (for example engine control units may record key engine parameters at time of impact). Exact Weapon Replaceable Assemblies (WRAs), information recorded, time of recorded information, and exact location on the aircraft (drawings or sketches) shall be provided for each item.
2h.	Investigators are cleared to investigate the fleet (i.e. ITAR)	Document any security, ITAR or other restrictions that could be applied to investigators. The FSO and a minimum of two DFS-2 investigators must be cleared to investigate. A plan shall detail how and when all other DFS-2 investigators will be cleared.
2i	Unit has processes (procedures and Out of Sequence Inspections) and tools to implement 1 Cdn Air Div Order 3-304	As per 1 Cdn Air Div Order 3-304, CVR/FDR data shall be sent to NRC annually for validation and correlation verification. Confirm that the operating unit has the necessary tools and process/inspection card to detail how the yearly download will be carried-out. This requirement also needs to be covered by the maintenance program (possibly using an Out of Sequence Inspection). This element must also ensure that 1 Cdn Air Div Order 3-304 has been updated.
2j	CVR/FDR Download capability during deployment	Confirm that operating units have the necessary tools to protect CVR/FDR information following a FS occurrence while deployed. Possible compliance can include: download equipment availability, extra CVR/FDR in deployment kit, or accept grounding the aircraft until a new CVR/FDR is delivered.
2k	The AIA holds relevant publications in support of investigations: AOIs, Flight Manual, SMM, MEL, Tech Publications, SOI, and CONOP	Hard copies or electronic access to relevant fleet information must be provided to AIA investigators.

Table 1 - Requirements to Obtain an IAC

2. For fleets that upgrade their CVR, FDR or combined CVFDR, the IAC requirements listed in Table 2 shall be assessed before a reduced Investigative Airworthiness Clearance (IAC) is issued. If a specific item is not complete but a suitable substitute is available or the item will be resolved in an acceptable timeframe, a Provisional Investigative Airworthiness Clearance (PIAC) can be issued until the requirement is met. PIAC shall remain valid until such time as it is superseded by IAC, it is revised, or it is revoked. The AIA will review PIAC with the Annual Airworthiness Report – Investigative.

Item	Requirements	Description/Details Required
2	Investigation Support	
2c.	Flight Data Recorder (FDR)	Document if the new/modified fleet meets the C Air Force CVR/FDR Policy. If a waiver was signed, include the reference. A general description of the recording system is required along with a full list of recorded parameters.
2d.	Cockpit Voice Recorder (CVR)	Document if the new/modified fleet meets the C Air Force CVR/FDR policy. If a waiver was signed, include the reference.
2e.	National Research Council (NRC) is authorized and capable to read/interpret both the CVR and the FDR	Document/verify the following:
		(1) NRC is authorized to read FDR (No ITAR restrictions);
		(2) NRC has necessary software licences to read CVR/FDR;
		(3) NRC is equipped to read and interpret the CVR/FDR. This implies that NRC has all the necessary software/hardware to perform this as soon as the fleet operates under DND/CAF airworthiness authority;
		(4) NRC is equipped to read severely damaged recorders (CVR, FDR, or a combination CVFDR). This will normally involve the acquisition, by the applicant, of Crash Damaged Recovery Equipment (CDRE), or a surrogate recorder(s) and associated downloading and playback software. Note that such equipment may already be held with NRC (if the recorder is already on DND/CAF aircraft in operation); and
		(5) An initial download CVR/FDR must be sent to NRC, to confirm their ability to read.

Item	Requirements	Description/Details Required
2f.	Acceptance of CVR and FDR system	(1) An initial baseline verification ensures that each aircraft entering service records data/audio properly, and it provides a baseline of comparison in case of an accident. Document the initial verification process for each individual aircraft (no later than immediately after the first in-service flight, when an aircraft is delivered to the CAF). If this initial verification is not performed by NRC, the certified agency must be approved by TCCA (or equivalent agency) to perform annual verifications; a copy of this initial download must be sent to NRC (to be kept on record in support of potential accident investigation); and
		(2) A verification will also be required for each aircraft recording system (CVR and/or FDR) after operation of the aircraft for a period equal to the full capacity of the respective recording system; and
2j	CVR/FDR Download capability during deployment	Confirm that operating units have the necessary tools to protect CVR/FDR information following a FS occurrence while deployed. Possible compliance can include: download equipment availability, extra CVR/FDR in deployment kit, or accept grounding the aircraft until a new CVR/FDR is delivered.

Table 2 - Reduced Requirements to Obtain an IAC following CVR and/or FDR Fleet Upgrade

Annex B
Chapter 17
A-GA-135-003/AG-001

ANNEX B - ADDITIONAL CVR/FDR REQUIREMENTS BY FLEET FAMILY

Reference: EUROCAE document ED-112 Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems

1. Reference does not address military role specific parameters to be recorded. As a result, an additional set of parameters has been developed for each family of aircraft. The various aircraft roles and types of recording equipment were taken into account in determining the requirement for airborne recorder systems on board DND/CAF aircraft. Accordingly, the aircraft required to support DND/CAF operations were divided into several families, some with slightly different recording requirements. Discriminators used in the assignment of aircraft to various families are:

   a. Aircraft type (fixed wing, rotary wing, or UAS):

   b. Aircraft role (trainer, transport, combat, SAR);

   c. Number of engines (single or multi-engine);

   d. Aircraft maximum take-off weight (more or less than 12,500lbs / 5682 Kg);

   e. Maximum aircraft speed (greater or less than 450 knots IAS);

   f. Number of crew; and

   g. Special considerations such as whether the aircraft is ejection seat capable or weapons capable.

2. Based on these discriminators, five generic fixed-wing families and four rotary wing families were identified as follows:

   a. Fixed Wing Aircraft:

      (1) Trainer: No additional parameters required.

      (2) Light Transport: No additional parameters required

      (3) Heavy Transport: Refer to Appendix 1.

      (4) Heavy Combat: Refer to Appendix 2.

      (5) Fast Combat: Refer to Appendix 3

   b. Rotary Wing Aircraft:

      (1) Single Engine Trainer: Refer to Appendix 4.

      (2) Multi Engine Trainer: Refer to Appendix 5.

      (3) Transport / SAR: Refer to Appendix 6.

      (4) Combat: Refer to Appendix 7.

INTENTIONALLY LEFT BLANK

Appendix 1
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 1 – FIXED WING HEAVY TRANSPORT AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks
2 hours minimum	All crew positions + area mike	All radios unless in secure mode.

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Aircraft General					
Altitude warning selections	Discrete, as installed				Radio altimeter warning bug altitude
Emergency shut-off valves activation	Discrete, as installed	1			Activation (manual or auto) of all emergency shut-off valves (engine fuel, hydraulics, pneumatics, etc) + status of valve positions (open, closed, failed)
Fire bottle activation	Discrete, as installed	1			Activation (manual or auto) of all fire-fighting agents + status of activated devices (fail, depleted, etc)
TACAN navigation	As installed	1	As installed	As installed	Frequency selected, status of equipment, bearing + dist readout
Cabin pressure altitude	As installed	1	As installed	As installed	Pressurization readout
Emergency brakes selection	Discrete, as installed	1			Selection of emergency brakes

INTENTIONALLY LEFT BLANK

Appendix 2
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 2 – FIXED WING HEAVY COMBAT AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks
30 minutes minimum (2 hours preferred)	All crew positions + area mike	All radios unless in secure mode.

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Aircraft General					
Stores status	As installed	1			Stores status data (type, location), taken from the mission computer.
Weapons status	Discrete, as installed	1			A discrete signal must be recorded every time a weapon departs the aircraft
Master	Discrete, as installed	1			Activation (manual or auto) of all fire-fighting agents + status of activated devices (fail, depleted, etc)
Arm mode	Discrete, as installed	1			A discrete signal must be recorded every time the master arm function changes status.
Altitude warning selections	Discrete, as installed	1			Radio altimeter warning bug altitude
Data link systems	Discrete, as installed	5			Codes used if applicable, status of equipment. Encryption required

INTENTIONALLY LEFT BLANK

Appendix 3
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 3 – FIXED WING FAST COMBAT AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks
30 minutes minimum (2 hours preferred)	All crew positions + area mike	All radios unless in secure mode.

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Stores Management Systems					
External stores status	Discrete, as installed	1			A discrete signal must be recorded every time an external store departs the aircraft.
Pressing of triggers/ launch buttons	Discrete, as installed	1			A discrete signal must be recorded every time a weapon trigger or launch button/switch is activated.
Master arm mode	Discrete, as installed	1			A discrete signal must be recorded every time a master arm or weapons select override function changes status.
Aircraft General					
Maintenance + system status codes	Discrete, as installed	1			Each systems status or maintenance code triggered shall be recorded (ex: MMP codes)
Display cautions, warnings and advisory messages	Discrete, as installed	1			Each message sent to the cockpit displays, as well as illumination of associated lights.

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Altitude warning selections	Discrete, as installed	1			Selected value, as well as silent/mute/override selection
Arresting gear selection + status	Discrete, as installed	1			Selection of arresting gear deployment/retraction/activation, as well as status
Ejection seat dual cockpit mode	Discrete, as installed	10			Mode selection for dual cockpit ejection system (ex: Norm, Solo, Aft Initiate)
Flight control computers messages	Discrete, as installed	1			Status changes, errors, failures and degradations in normal modes of operation
Data link systems	Discrete, as installed	5			Status of equipment.
Auto throttle (ATC)	Discrete, as installed	1			Engage/disengage + status (fail, degd, etc)
Engine exhaust nozzle position	As installed	0.5	As installed	As installed	Nozzle aperture + thrust vectoring position if applicable
Fuel quantities	As installed	10	As installed	As installed	Recording of all fuel tank quantities, as well as indicated total fuel as displayed in cockpit
Emergency shut-off valves activation	Discrete, as installed	1			Activation (manual or auto) of all emergency shut-off valves (engine fuel, hydraulics, pneumatics, etc) + status of valve positions (open, closed, failed)
Fire bottle activation	Discrete, as installed	1			Activation (manual or auto) of all fire-fighting agents + status of activated devices (fail, depleted, etc)
TACAN navigation	As installed	1	As installed	As installed	Frequency selected, status of equipment, bearing + dist readout

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Crew oxygen system	As installed	10	As installed	As installed	Pressure/quantity in system, system status
Cockpit pressure altitude	As installed	1	As installed	As installed	Pressurization readout
Emergency brakes selection	Discrete, as installed	1			Selection of emergency brakes
G suit pressure, status	As installed	0.5	As installed	As installed	Recording of pressure supplied to G suit and status of equipment.
Radar Warning Receiver status	Discrete, as installed	1			Changes in mode of operation and status of RWR.
Radar mode of operation	As installed	1			Recording of master mode used, and changes of status (Air mode, Ground mode, Nav mode, etc).
Radar status messages	Discrete, as installed	1			Serviceability status + messages (fail, degd, receive only, etc). Also which mode of operation is used.

INTENTIONALLY LEFT BLANK

Appendix 4
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 4 – ROTARY WING SINGLE ENGINE TRAINER AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Aircraft General					
Ground Speed	0 to 300	1	As installed	+/- 1 knot	As installed (equipment capable of producing a groundspeed readout)

INTENTIONALLY LEFT BLANK

Appendix 5
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 5 – ROTARY WING MULTI ENGINE TRAINER AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Aircraft General					
Ground Speed	0 to 300	1	As installed	+/- 1 knot	As installed (equipment capable of producing a groundspeed readout)

INTENTIONALLY LEFT BLANK

Appendix 6
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 6 – ROTARY WING TRANSPORT / SAR AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Aircraft General					
Ground Speed	0 to 300	1	As installed	+/- 1 knot	As installed (equipment capable of producing a groundspeed readout)

INTENTIONALLY LEFT BLANK

Appendix 7
Annex B
Chapter 17
A-GA-135-003/AG-001

APPENDIX 7 – ROTARY WING COMBAT AIRCRAFT CVR/FDR SPECIFICATIONS

CVR Requirements		
Duration and Recording	Application	Remarks
30 minutes minimum (2 hours preferred)	All crew positions + area mike	All radios unless in secure mode.

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Stores Management Systems					
All loaded external racks/pylons/ launchers/ rails	Discrete, as installed	1			A discrete signal must be recorded every time a rack/pylon/launcher or rail departs the aircraft or changes in status (ex: failed, degraded)).
Master arm mode	Discrete, as installed	1			A discrete signal must be recorded every time a master arm or weapons select override function changes status.
Aircraft General					
Aircraft ground speed	As Installed.	1	± 3%	1 kt	
Maintenance + system status codes	Discrete, as installed	1			Each systems status or maintenance code triggered shall be recorded (ex: MMP codes)

FDR Parameters					
Parameter	Minimum Recording Range	Max recording interval in (sec)	Recording Accuracy	Recording Resolution	Remarks
Emergency shut-off valves activation	Discrete, as installed	1			Activation (manual or auto) of all emergency shut-off valves (engine fuel, hydraulics, pneumatics, etc) + status of valve positions (open, closed, failed)
TACAN navigation	As installed	1	As installed	As installed	Frequency selected, status of equipment, bearing + dist readout
Electronic warfare					
Radar Warning Receiver status	Discrete, as installed	1			Changes in mode of operation and status of RWR.
Radar mode of operation	As installed	1			Recording of master mode used, and changes of status (Air mode, Ground mode, Nav mode, etc).
Radar status messages	Discrete, as installed	1			Serviceability status + messages (fail, degraded, receive only, etc). Also which mode of operation is used.

Annex C
Chapter 17
A-GA-135-003/AG-001

ANNEX C- UAS ARD REQUIREMENTS

Reference: EUROCAE document ED-112 Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems

1. As mentioned in Ref: “The combination of audio, data and cockpit image recordings will provide air safety investigators with the necessary information to better define the facts, conditions and circumstances of an occurrence, and to broaden the scope of the vitally important human factor aspects of investigations. Additionally, image recordings can capture other cockpit information that would otherwise be impractical or impossible to record.”

2. Due to design constraints, it is not always possible to have an onboard FDR for Unmanned Aircraft (UA); however, the capability of recording activities in the Ground Control Station (GCS) is not limited by weight constraints. Various types of recording are possible for UAS:

a. GCS Data recorder: This is telemetry data as designed by OEM;

b. GCS Voice recorders: When required (See Table 1 below), the GCS must be equipped with a voice recorder and must be installed so that it will record the following :

(1) Voice communications transmitted from or received in the GCS.

(2) Voice communications in the GCS.

(3) Voice communications of UAV crew using the GCS’s interphone system.

(4) Voice or audio signals introduced into a headset or speaker.

NOTE
The recording requirements of sub-paragraph (2) must be met by installing an area microphone (or multiple microphones with a dedicated recording channel), located in the best position for recording voice communications originating at UAV crew work place and voice communications of other ground staff when directed to those stations. The microphone must be so located and, if necessary, the preamplifiers and filters of the recorder must be so adjusted or supplemented, so that the clarity of the recorded communications is as high as practicable when recorded under GCS noise conditions and played back. Repeated aural or visual play-back of the record may be used in evaluating clarity.

c. GCS image recorder: When required (See Table 1 below), the GCS must be equipped with an image recorder(s) and must be located in the best position for recording the entire UAS crew work area.

d. GCS Workstations and Operators Image recorders: When required (See Table 1 below), the GCS must be equipped with an image recorder(s) so that it will record the following:

(1) Record image of the display provided by each UAS workstation in the GCS; and

(2) Record image of each operator involved in the operation of the UAS. The image of the operator must include hand movement and provide enough quality to monitor facial expression and eye tracking (e.g. monitor for fatigue).

> NOTE
> The recording requirements of sub-paragraph d. (1) and (2) must be recorded such that each work station (Display and operator) can be replayed independently or side-by-side synchronously.

e. UA onboard flight recorders: An on-board recorder must be installed on all Class 3 UAS. The recorder must be certified to the same standard as manned aircraft.

3. Table 1 describes the AIA recording requirements based on the class of UAS.

	GCS Data Recorder[1]	GCS Voice recorders[1]	GCS Image recorders[1]	GCS Work-stations and Oper-ators Image recorders[1]	UA onboard flight recorders
Class 1 UAS with capability to record	See Note 2				
Class 1 - Small UAS (15-150 kg) with an enclosed UAS Control Station	Required	Required	Required		
Class 2 UAS (150-600 kg)	Required	Required	Required	Required	
Class 3 UAS (>600 kg)	Required	Required	Required	Required	Required

Table 1: AIA Recording Requirements to support UAS investigations

Note 1: Although the GCS recorders (Data, voice and image) do not require crash protection capabilities, the quality/recording resolution is defined in ED-112A.

Note 2: The IAC will ensure that a process exists to secure recorded information following a FS occurrence.

4. Each recorders installed in the GCS must be verified by the DND/CAF-recognized flight recorder playback facility for an analysis of recorded material to demonstrates that the quality and intelligibility of the recorded information are satisfactory.

ABBREVIATIONS

AA: Airworthiness Authority

AAR: Annual Airworthiness Report

ADL: Aircraft Damage Level

ADM (Mat): Assistant Deputy Minister (Materiel)

ADREP: Accident/Incident Data Reporting

A&E: Ammunition and Explosives

AETE: Aerospace Engineering Test Establishment

AFSP: Allied Flight Safety Publication

AGL: Above ground level

AIA: Airworthiness Investigative Authority

AIM: Airworthiness Investigator Manual

ALARP: As Low as Reasonably Practical

ALSE: Aviation life support equipment

AMA: Aerospace Medical Authority

AMMIS: Aircraft Maintenance Management Information System

AOC: 1 Canadian Air Division Air Operations Centre

AOI: Aircraft Operating Instructions

ARB: Airworthiness Review Board

ARD: Aircraft Recording Device

ATC: Air Traffic Control

ATESS: Aerospace and Telecommunications Engineering Support Squadron

ATI: Access to Information

AWS: Air Weapons Safety/System

AWSP: Air Weapons Safety Program

BBP: Bloodborne Pathogens

BI: Basic Investigator

C Air Force: Chief of the Air Force

CAD: Canadian Air Division

CANSOFCOM: Canadian Special Operations Forces Command

CAACW: Canadian Advanced Army Warfare Center

CAF: Canadian Armed Forces

CAOC: Combined Air Operations Centre

CDS: Chief of the Defence Staff

CFAO: Canadian Forces Administrative Order

CFEME: Canadian Forces Environmental Medical Establishment

CFICC: Canadian Forces Integrated Command Centre

CFMO: Canadian Forces Medical Order

CFTO: Canadian Forces Technical Order

CJOC: Canadian Joint Operations Command

CMP: Chief of Military Personnel

CO: Commanding Officer

CoC: Chain of Command

Comd: Commander

Comd RCAF: Commander RCAF

CraSH: Crash Scene Hazard

CTAISB: Canadian Transportation Accident Investigation Safety Board

CVR: Cockpit voice recorder

DAEPM: Director Aerospace Equipment Program Management

DAOD: Defence Administrative Orders and Directives

DSCDC: Defence Subject Classification and Disposition System

DFS: Director/Directorate of Flight Safety

DGAEPM: Director General Aerospace Equipment Program Management

Div FSO: Division FSO

DND: Department of National Defence

DQA: Director/Directorate of Quality Assurance

DRDC: Defence Research and Development Canada

DTAES: Director Technical Airworthiness and Engineering Support

DWAN: Defence Wide Area Network

ERP: Emergency Response Plan

ESR: Enhanced Supplementary (flight safety investigation) Report

FDR: Flight Data Recorder

FOD: Foreign Object Debris/Damage

FS: Flight Safety

FSAV: Flight Safety Assurance Visit

FSC: Flight Safety Course

FSCL: Flight Safety Compromise Level

FSI: Flight Safety Investigation

FSIR: Flight Safety Investigation Report

FSO: Flight Safety Officer

FSIMS: Flight Safety Information Management System

FSP: Flight Safety Program

FTA: Flight Test Authority

FTI: From the Investigator

FTPO: For tracking purpose only

GCS: Ground Control Station

GSO: General Safety Officer

HAZMAT: Hazardous Materials

HFACS: Human Factor Analysis Classification System

HQ: Headquarters

IAC: Investigative Airworthiness Clearance

IAW: In accordance with

ICAO: International Civil Aviation Organization

IIC: Investigator-in-charge

IFR: Instrument Flight Rules

IR: Initial (Flight Safety Investigation) Report

MAIRs: Military Airworthiness Investigation Regulations

MND: Minister of National Defence

MOU: Memorandum of understanding

MTOW: Maximum takeoff weight

NATO: North Atlantic Treaty Organization

NCO/NCM: Non Commissioned Officer/Member

NDA: National Defence Act

NDHQ: National Defence Headquarters

NDQAR: National Defence Quality Assurance Region

NMAC: Near mid-air collision

NoK: Next of Kin

NRCC: National Research Council of Canada

OAA: Operational Airworthiness Authority

OAC: Operational Airworthiness Clearance

OBR: On-board Recording

OJTS: On Job Training Syllabus

OPI: Office of Primary Interest

OPSEC: Operational Security

OSCAR: On-scene Commander Accident Response

PAO: Public Affairs Officer

PCL: Personnel Casualty Level

PDI: Parties/Persons with Direct Interest

PIAC: Provisional Investigative Airworthiness Clearance

PM: Preventive measure

PMAO: PM Action Organization

PPE: Personal Protective Equipment

QETE: Quality Engineering Test Establishment

QR&O: Queen's Regulations and Orders

RARM: Record of Airworthiness Risk Management

RASS: Recovery and Salvage Support

RCSU: Regional Cadet Support Unit

RCAF: Royal Canadian Air Force

RO: Repetitive Occurences

RTS: Release to Service

SAMEO: Squadron Aircraft Maintenance Engineering Officer

SAR: Search and Rescue

SKAD: Survival kit air droppable

SLA: Service level agreement

SoF: Safety of Flight

SOP: Standard Operating Procedures

SR: Supplementary (Flight Safety Investigation) Report

STANAG: NATO Standardization Agreement

Sqn: Squadron

TAA: Technical Airworthiness Authority

TAC: Technical Airworthiness Clearance

TAO: Temporary Authority to Operate

TC: Transport Canada

TSB: Transportation Safety Board of Canada

UA: Unmanned aircraft

UAS: Unmanned aircraft system

UCR: Unsatisfactory Condition Report

UFS: Unit Flight Safety

UFSO: Unit Flight Safety Officer

UXO: Unexploded Explosive Ordnance

VFR : Visual Flight Rules

WComd: Wing Commander

WFS: Wing Flight Safety

WFSO: Wing Flight Safety Officer

Wg: Wing