



National
Defence

Défense
nationale

A-GA-135-001/AA-001

D2-189/2007E

978-0-662-45014-6

FLIGHT SAFETY FOR THE CANADIAN FORCES

March 20, 2007

Change #6 – September 4, 2012





ENDORSEMENT BY THE CHIEF OF THE DEFENCE STAFF

The Canadian Forces' mandate is to provide combat capable, operationally effective forces for both the defence of Canada and for missions undertaken in accordance with the policies and priorities of the Canadian government on behalf of all citizens of our country. The preservation of personnel and equipment is critically important in maintaining the operational effectiveness needed to fulfill this demanding mandate.

It is clear that the Flight Safety Program plays a distinct and integral role in supporting the operational mission of the Canadian Forces through its primary tenets of promotion, education, airworthiness investigation and analysis. We must collectively ensure that our personnel and materiel are afforded the protection of the best possible safety program. Hazards that could decrease operational effectiveness through loss of personnel and equipment must be recognized and positive action taken to eliminate them.

The Flight Safety Program and airworthiness investigation activities help ensure that the air missions of the Canadian Forces are accomplished at an acceptable level of risk. I endorse a vigorous Canadian Forces FS Program and expect everyone associated with air operations to do likewise.

A handwritten signature in blue ink, appearing to read 'W.J. Natynczyk', located below the endorsement text.

W.J. Natynczyk, CMM, MSC, CD
General
Chief of the Defence Staff

FOREWORD

1. The A-GA-135-001/AA-001 *Flight Safety for the Canadian Forces* is issued by the Chief of the Air Staff on the authority of the Chief of the Defence Staff.
2. The A-GA-135-002/AA-001 *Occurrence Investigation Techniques* is issued as a separate publication with limited distribution. DFS 2 is the OPI for this publication.
3. The A-GA-135-003/AG-001 *Airworthiness Investigation Manual* delineates the Airworthiness Investigative Authority's policies with details regarding standards, procedures and instructions for investigation interaction within the Department of National Defence and with persons, agencies, companies or authorities outside of the Department. It is issued electronically as a separate publication. DFS 2 is the OPI for this publication.
4. The OPI for the publication A-GA-135-001/AA-001 is DFS 3 Promotion and Information. Any suggestions for amendments are to be forwarded through normal channels to the Director of Flight Safety, attention: DFS 3 or by e-mail to dfs.dsv@forces.gc.ca.

DISTRIBUTION LIST

1 AIR MAINTENANCE SQUADRON
1 CANADIAN AIR DIVISION HEADQUARTERS DETACHMENT - REGIONAL AIR
COMPONENT ELEMENT PACIFIC
1 CANADIAN AIR DIVISION CONTINGENCY CAPABILITY CENTRE
1 CANADIAN AIR DIVISION HEADQUARTERS / COMD
1 CANADIAN AIR DIVISION HEADQUARTERS / FSO 1 DIV
1 CANADIAN AIR DIVISION HEADQUARTERS DETACHMENT - REGIONAL AIR
COMPONENT ELEMENT ATLANTIC
1 CANADIAN AIR DIVISION HEADQUARTERS DETACHMENT LFAA
1 CANADIAN AIR DIVISION HEADQUARTERS DETACHMENT OTTAWA
1 CANADIAN AIR DIVISION HEADQUARTERS FIGHTER STANDARDS EVALUATION TEAM
DETACHMENT COLD LAKE
1 CANADIAN AIR DIVISION HEADQUARTERS MARITIME HELICOPTER STANDARDS
EVALUATION TEAM DETACHMENT SHEARWATER
1 CANADIAN AIR DIVISION HEADQUARTERS MARITIME STANDARDS EVALUATION TEAM
DETACHMENT GREENWOOD
1 CANADIAN AIR DIVISION HEADQUARTERS TACTICAL AVIATION STANDARDS
EVALUATION TEAM DETACHMENT KINGSTON
1 CANADIAN AIR DIVISION HEADQUARTERS TRANSPORT STANDARDS EVALUATION
TEAM DETACHMENT TRENTON
1 CANADIAN FORCES FLYING TRAINING SCHOOL
1 CANADIAN MECHANIZED BRIGADE GROUP HEADQUARTERS AND SIGNAL SQUADRON
1 WING HEADQUARTERS DETACHMENT CMTC WAINWRIGHT
1 WING HEADQUARTERS DETACHMENT EDMONTON
1 WING HEADQUARTERS DETACHMENT GAGETOWN
1 WING HEADQUARTERS DETACHMENT PETAWAWA
1 WING HEADQUARTERS
10 FIELD TECHNICAL TRAINING SQUADRON
103 SEARCH AND RESCUE SQUADRON
12 AIR MAINTENANCE SQUADRON
12 WING HEADQUARTERS
14 AIR MAINTENANCE SQUADRON
14 WING
15 WING

16 WING

17 WING

19 AIR MAINTENANCE SQUADRON

19 WING

2 CANADIAN AIR DIVISION HEADQUARTERS / COMD

2 CANADIAN AIR DIVISION HEADQUARTERS / FSO 2 DIV

2 CANADIAN FORCES FLYING TRAINING SCHOOL

2 CANADIAN MECHANIZED BRIGADE GROUP HEADQUARTERS AND SIGNAL SQUADRON

21 AEROSPACE CONTROL AND WARNING SQUADRON

22 WING

3 AIR MAINTENANCE SQUADRON

3 CANADIAN FORCES FLYING TRAINING SCHOOL

3 WING

4 WING

400 TACTICAL HELICOPTER SQUADRON

402 SQUADRON

403 HELICOPTER OPERATIONAL TRAINING SQUADRON

404 MARITIME PATROL AND TRAINING SQUADRON

405 MARITIME PATROL SQUADRON

406 MARITIME OPERATIONAL TRAINING SQUADRON

407 MARITIME PATROL SQUADRON

408 TACTICAL HELICOPTER SQUADRON

409 TACTICAL FIGHTER SQUADRON

410 TACTICAL FIGHTER OPERATIONAL TRAINING SQUADRON

412 TRANSPORT SQUADRON

413 TRANSPORT AND RESCUE SQUADRON

414 ELECTRONIC WARFARE SUPPORT SQUADRON

417 COMBAT SUPPORT SQUADRON

419 TACTICAL FIGHTER TRAINING SQUADRON

42 RADAR SQUADRON

423 MARITIME HELICOPTER SQUADRON

424 TRANSPORT AND RESCUE SQUADRON

425 TACTICAL FIGHTER SQUADRON

426 TRANSPORT TRAINING SQUADRON
427 SPECIAL OPERATIONS AVIATION SQUADRON
429 TRANSPORT SQUADRON
430 TACTICAL HELICOPTER SQUADRON
431 AIR DEMONSTRATION SQUADRON
435 TRANSPORT AND RESCUE SQUADRON
436 TRANSPORT SQUADRON
437 TRANSPORT SQUADRON
438 TACTICAL HELICOPTER SQUADRON
439 COMBAT SUPPORT SQUADRON
440 TRANSPORT SQUADRON YELLOWKNIFE
442 TRANSPORT AND RESCUE SQUADRON
443 MARITIME HELICOPTER SQUADRON
444 COMBAT SUPPORT SQUADRON
5 CANADIAN MECHANIZED BRIGADE HEADQUARTERS AND SIGNALS SQUADRON
5 WING GOOSE BAY
51 AEROSPACE CONTROL AND WARNING OPERATIONAL TRAINING SQUADRON
8 AIR MAINTENANCE SQUADRON
8 WING
9 WING
ACRO AEROSPACE
AEROSPACE AND TELECOMMUNICATIONS ENGINEERING SUPPORT SQUADRON (ATESS)
AEROSPACE ENGINEERING TEST ESTABLISHMENT
ASSISTANT DEPUTY MINISTER (MATERIEL)
BELL HELICOPTER
BRISTOL AEROSPACE LTD
CANADA COMMAND HEADQUARTERS
CANADIAN COMPONENT 552 AIR CONTROL WING
CANADIAN COMPONENT NATO AIRBORNE EARLY WARNING FORCE
CANADIAN CONTINGENT ALASKAN NORAD REGION HEADQUARTERS
CANADIAN EXPEDITIONARY FORCE COMMAND HEADQUARTERS
CANADIAN FLEET ATLANTIC HEADQUARTERS
CANADIAN FLEET PACIFIC HEADQUARTERS

CANADIAN FORCES AIR NAVIGATION SCHOOL
CANADIAN FORCES COLLEGE
CANADIAN FORCES ENVIRONMENTAL MEDICINE ESTABLISHMENT
CANADIAN FORCES JOINT HEADQUARTERS
CANADIAN FORCES NAVAL OPERATIONS SCHOOL HALIFAX
CANADIAN FORCES SCHOOL OF AEROSPACE CONTROL OPERATIONS
CANADIAN FORCES SCHOOL OF AEROSPACE TECHNOLOGY AND ENGINEERING
CANADIAN FORCES SCHOOL OF SURVIVAL AND AEROMEDICAL TRAINING
CANADIAN LAND FORCE COMMAND AND STAFF COLLEGE
CANADIAN SPECIAL OPERATIONS FORCES COMMAND HEADQUARTERS
CANADIAN SPECIAL OPERATIONS REGIMENT
CASCADE AEROSPACE
CENTRAL FLYING SCHOOL
CF-18 WEAPON SYSTEM MANAGER DETACHMENT MIRABEL
COLD LAKE AIR CADET SUMMER TRAINING CENTRE
COMBAT TRAINING CENTRE HEADQUARTERS
CONTINGENT CANADIEN 1ST AIR FORCE / CONUS NORAD REGION HEADQUARTERS
DEFENCE RESEARCH AND DEVELOPMENT CANADA - TORONTO
DEPUTY COMMANDER NORTH AMERICAN AEROSPACE DEFENCE COMMAND
FIELD AVIATION COMPANY INC.
HER MAJESTY'S CANADIAN SHIP ALGONQUIN
HER MAJESTY'S CANADIAN SHIP ATHABASKAN
HER MAJESTY'S CANADIAN SHIP CALGARY
HER MAJESTY'S CANADIAN SHIP CHARLOTTETOWN
HER MAJESTY'S CANADIAN SHIP FREDERICTON
HER MAJESTY'S CANADIAN SHIP HALIFAX
HER MAJESTY'S CANADIAN SHIP IROQUOIS
HER MAJESTY'S CANADIAN SHIP MONTREAL
HER MAJESTY'S CANADIAN SHIP OTTAWA
HER MAJESTY'S CANADIAN SHIP PRESERVER
HER MAJESTY'S CANADIAN SHIP PROTECTEUR
HER MAJESTY'S CANADIAN SHIP REGINA
HER MAJESTY'S CANADIAN SHIP ST JOHNS

HER MAJESTY'S CANADIAN SHIP TORONTO
HER MAJESTY'S CANADIAN SHIP VANCOUVER
HER MAJESTY'S CANADIAN SHIP VILLE DE QUEBEC
HER MAJESTY'S CANADIAN SHIP WINNIPEG
JOINT RESCUE COORDINATION CENTRE HALIFAX
JOINT RESCUE COORDINATION CENTRE TRENTON
JOINT RESCUE COORDINATION CENTRE VICTORIA
JOINT TASK FORCE (CENTRAL) HEADQUARTERS
JOINT TASK FORCE (NORTH) HEADQUARTERS DETACHMENT NUNAVUT
JOINT TASK FORCE (NORTH) HEADQUARTERS DETACHMENT WHITEHORSE
JOINT TASK FORCE (PACIFIC) HEADQUARTERS
JOINT TASK FORCE (WEST) HEADQUARTERS
JOINT TASK FORCE ATLANTIC HEADQUARTERS
JOINT TASK FORCE NORTH HEADQUARTERS
JOINT TASK FORCE NORTH HEADQUARTERS
KELOWNA FLIGHTCRAFT LIMITED
L-3 COMMUNICATIONS MAS (CANADA) INC.
LIBRARY AND ARCHIVE CANADA
MARITIME FORCE ATLANTIC HEADQUARTERS
MARITIME FORCES PACIFIC HEADQUARTERS
MARITIME PROVING AND EVALUATION UNIT
NATIONAL DEFENCE QUALITY ASSURANCE COASTAL AND NATIONAL CAPITAL REGION
WORKCENTRE ENFIELD
NATIONAL DEFENCE QUALITY ASSURANCE ONTARIO AND PRAIRIES REGION
WORKCENTRE MISSISSAUGA
NATIONAL DEFENCE QUALITY ASSURANCE REGION ONTARIO AND PRAIRIES
WORKCENTRE CALGARY
NATIONAL DEFENCE QUALITY ASSURANCE ONTARIO AND PRAIRIES REGION
WORKCENTRE NIAGARA
NATIONAL QUALITY ASSURANCE WORKCENTRE EDMONTON
NATIONAL QUALITY ASSURANCE WORKCENTRE HALIFAX
NATIONAL QUALITY ASSURANCE WORKCENTRE QUÉBEC
NATIONAL QUALITY ASSURANCE WORKCENTRE TRENTON
NATIONAL QUALITY ASSURANCE WORKCENTRE VANCOUVER
NATIONAL QUALITY ASSURANCE WORKCENTRE WINNIPEG

NDHQ - LIBRARY

NDHQ - CHIEF OF LAND STAFF

NDHQ - CHIEF OF THE AIR STAFF

NDHQ - CHIEF OF THE DEFENCE STAFF

NDHQ - CHIEF OF THE MARITIME STAFF

NDHQ - DIRECTOR CADETS

NDHQ - DIRECTOR FLIGHT SAFETY

NDHQ - DIRECTOR GENERAL AEROSPACE EQUIPMENT PROGRAM MANAGEMENT

NDHQ - DIRECTOR GENERAL MATERIEL SYSTEMS AND SUPPLY CHAIN

NDHQ - DIRECTOR QUALITY ASSURANCE

NDHQ - STRATEGIC JOINT STAFF

NDHQ - VICE CHIEF OF THE DEFENCE STAFF

PROVINCIAL AEROSPACE LIMITED

QUALITY ENGINEERING TEST ESTABLISHMENT

REGIONAL CADET AIR OPERATIONS CENTRE (PACIFIC)

REGIONAL CADET SUPPORT UNIT (ATLANTIC)

REGIONAL CADET SUPPORT UNIT (CENTRAL)

REGIONAL CADET SUPPORT UNIT (EASTERN)

REGIONAL CADET SUPPORT UNIT (PACIFIC)

REGIONAL CADET SUPPORT UNIT (PRAIRIE)

REGIONAL GLIDING SCHOOL (ATLANTIC)

REGIONAL GLIDING SCHOOL (CENTRAL)

REGIONAL GLIDING SCHOOL (EASTERN)

REGIONAL GLIDING SCHOOL (PRAIRIE)

SEA TRAINING ATLANTIC

SEA TRAINING PACIFIC

TRANSLATION BUREAU

LIST OF AMENDMENTS

Refer to the DFS Internet and Intranet websites for the list of amendments. It is the responsibility of the owner of this publication to keep it current. Insert latest changed pages; dispose of superseded pages in accordance with applicable orders.

NOTE

Zero in Change No. column of the list of effective pages indicates an ORIGINAL page.

AMENDMENT	NUMBER	DATE
ORIGINAL	0	March 20, 2007
Change # 1	1	April 10, 2008
Change # 2	2	October 30, 2008
Change # 3	3	March 1, 2010
Change # 4	4	April 1, 2011
Change # 5	5	March 31, 2012
Change # 6	6	September 4, 2012
Change # 7		

This publication supersedes A-GA-135-001/AA-001 dated 2002-12-02. The official and most current version of A-GA-135 is available electronically on the DFS Internet and Intranet websites. An amendment notice will be sent electronically to the distribution list and communicated via a CANFORGEN. The details of all amendments will be listed on the FS Internet and Intranet websites. Key Flight Safety staff and operational commanders or managers will keep an up to date hard copy or electronic copy of this publication as a handy reference manual. The owners of a non-official copy of the publication are responsible for printing and amending the publication as required or to update the electronic copy of the publication.

LIST OF EFFECTIVE PAGES

The number 0 in the amendment number column indicates an original page.

SECTION #	AMENDMENT #	PAGE #	# of PAGES
Cover Page	6	-	1
Endorsement by the CDS	3	-	1
Foreword	5	i	1
Distribution List	6	iii to viii	6
List of Amendments	6	ix	1
List of Effective Pages	6	xi to xii	2
Table of Contents	6	xiii to xxiv	12
Chapter 1	6	1-1 to 1-8	8
Annex A	6	1A-1 to 1A-3	3
Appendix 1	5	1A-1-1	1
Appendix 2	3	1A-2-1	1
Chapter 2	6	2-1 to 2-11	11
Annex A	6	2A-1 to 2A-4	4
Annex B	6	2B-1 to 2B-2	2
Chapter 3	5	3-1 to 3-3	3
Chapter 4	6	4-1 to 4-5	5
Annex A	0	4A-1	1
Annex B	5	4B-1 to 4B-8	8
Annex C	5	4C-1 to 4C-6	6
Annex D	0	4D-1 to 4D-12	12
Annex E	3	4E-1	1
Appendix 1	3	4E-1-1	1
Appendix 2	3	4E-2-1	1
Appendix 3	3	4E-3-1 to 4E-3-3	3
Appendix 4	3	4E-4-1	1
Appendix 5	3	4E-5-1	1
Appendix 6	3	4E-6-1	1
Appendix 7	3	4E-7-1 to 4E-7-2	2
Chapter 5	6	5-1 to 5-6	6
Annex A	4	5A-1 to 5A-2	2

SECTION #	AMENDMENT #	PAGE #	# of PAGES
Chapter 6	0	6-1 to 6-3	3
Annex A	0	6A-1	1
Chapter 7	6	7-1 to 7-12	12
Annex A	4	7A-1 to 7A-2	2
Annex B	5	7B-1 to 7B-2	2
Annex C	3	7C-1 to 7C-2	2
Chapter 8	6	8-1 to 8-16	16
Annex A	6	8A-1 to 8A-2	2
Appendix 1	5	8A-1-1	1
Annex B	6	8B-1 to 8B-10	10
Annex C	4	8C-1 to 8C-3	3
Annex D	0	8D-1 to 8D-4	4
Annex E	6	8E-1 to 8E-4	4
Annex F	0	8F-1	1
Chapter 9	6	9-1 to 9-12	12
Annex A	5	9A-1	1
Annex B	5	9B-1	1
Annex C	0	9C-1	1
Annex D	4	9D-1	1
Annex E	5	9E-1 to 9E-3	3
Annex F	3	9F-1 to 9F-2	2
Annex G	5	9G-1 to 9G-2	2
Chapter 10	3	10-1 to 10-25	25
Annex A	1	10A-1	1
Annex B	1	10B-1	1
Chapter 11	5	11-1 to 11-4	4
Annex A	0	11A-1	1
Appendix 1	3	11A-1-1	1
Annex B	5	11B-1 to 11B-4	4
Appendix 1	6	11B-1-1	1
Abbreviations	6	Abvn-1 to Abvn-4	4
Total			236

TABLE OF CONTENTS

ENDORSEMENT BY THE CHIEF OF THE DEFENCE STAFF

FOREWORD	i
DISTRIBUTION LIST.....	iii
LIST OF AMENDMENTS.....	ix
LIST OF EFFECTIVE PAGES.....	xi
TABLE OF CONTENTS.....	xiii
CHAPTER 1 – PROGRAM DESCRIPTION.....	1-1
General.....	1-1
Governance	1-1
Definitions.....	1-1
Flight Safety (FS)	1-1
FS Program.....	1-1
FS Occurrence	1-1
FS Unit.....	1-2
Safety of Flight (SoF).....	1-2
FS Risk	1-2
FS Hazard	1-2
Military Conveyance Aircraft.....	1-2
Operating Unit	1-2
Air Weapons Capable Wing / Unit	1-2
Air Weapons System.....	1-2
Air Weapons	1-2
Aircraft Store	1-3
Pyrotechnic	1-3
Aim of FS Program.....	1-3
Scope of FS Program.....	1-3
Air Weapons Safety	1-4
Airworthiness Program.....	1-4
Fundamental Principles	1-4
Responsibility for FS Program	1-5
Overall Responsibility	1-5
Individual Responsibilities	1-5
Unit Responsibilities	1-5
Management Responsibilities.....	1-5
FSO Responsibilities	1-6
Airworthiness and FS Policy	1-6

General	1-6
Airworthiness Program Authorities.....	1-6
Airworthiness Authority (AA)	1-6
Technical Airworthiness Authority (TAA)	1-6
Operational Airworthiness Authority (OAA)	1-7
Airworthiness Investigative Authority (AIA)	1-7
Airworthiness Program Principles.....	1-7
Airworthiness Program Roles.....	1-7
Risk Management	1-8
FS Strategic Processes	1-8
Annex A – FS Strategic Business Model	1A-1
Appendix 1 – FS Business Processes.....	1A-1-1
Appendix 2 – FS Information Model.....	1A-2-1
CHAPTER 2 – ORGANIZATION.....	2-1
General.....	2-1
FS Structure	2-1
Interaction with Other Organizations	2-2
Aerospace Engineering Test Establishment (AETE)	2-2
Aerospace and Telecommunications Engineering Support Squadron (ATESS)	2-2
Air Cadet FS Program	2-2
Implementation of FS Program	2-3
Assignment of FSO Responsibilities.....	2-3
FSO Access to CO / Executive Manager.....	2-3
Management Level of the FSO.....	2-3
Limitations on FSO Secondary Duties	2-4
Technical and Administrative Support	2-4
Unit FS Team Members.....	2-4
D/FSO	2-4
Appointment.....	2-4
Role	2-4
Duties	2-4
FS Specialist	2-4
Role	2-4
FSS Weapons (FSS (W))	2-5
Appointment.....	2-5
Role	2-5
Duties	2-5
Formation FSO	2-5
CF, Royal Canadian Air Force (RCAF) and ADM (Mat) FSO	2-5
1 Canadian Air Division FSO.....	2-6

Wing FSO	2-6
FSO for Assigned / Attached Air Assets.....	2-7
Non-Air Force Formation FSO	2-7
FS Committee	2-7
Purpose	2-7
Establishment of FS Committee	2-7
General Membership	2-7
Frequency of Meeting.....	2-8
Conduct of Meeting	2-8
Additional Responsibilities	2-8
Wing FS Committee Composition.....	2-8
Records of Discussion	2-9
Distribution of Minutes	2-9
Foreign Object Damage (FOD) Committee	2-9
Other FS Committees	2-9
Agreements	2-9
International Agreements.....	2-9
ICAO Convention Annex 13	2-9
NATO STANAG 3101	2-9
NATO STANAG 3102	2-9
NATO STANAG 3117.....	2-10
NATO STANAG 3230	2-10
NATO STANAG 3318	2-10
NATO STANAG 3379	2-10
NATO STANAG 3531	2-10
NATO STANAG 3533	2-10
NATO STANAG 3564	2-10
NATO STANAG 3750	2-10
NATO STANAG 3879	2-10
NATO STANAG 7160	2-10
National Agreement.....	2-10
DFS / TSB Working Agreement.....	2-10
Service Level Agreements.....	2-11
Annex A - Air Cadet Flying Program	2A-1
Annex B – Contractor FS Program.....	2B-1
CHAPTER 3 – EDUCATION AND TRAINING.....	3-1
General.....	3-1
Informal Education and Training.....	3-1
FS Qualification	3-1
Investigator Qualification	3-

Air Weapons Safety Awareness Training.....	3-2
Specialized Investigator Training	3-2
Bloodborne Pathogens (BBP) Training	3-2
Other Safety Courses	3-3
FS Professional Development.....	3-3
CHAPTER 4 – PREVENTION ACTIVITIES	4-1
General.....	4-1
Bird Strike Prevention Program.....	4-1
Aim of Program	4-1
Objectives	4-1
Bird Strike Reporting	4-2
Prevention Strategy	4-2
Information on Birds	4-2
Reporting Bird Activity	4-2
Identification of Bird Type.....	4-2
FS Surveys	4-2
Purpose	4-2
Requirement	4-2
Frequency	4-2
Types.....	4-2
Formal Survey	4-3
Informal Survey.....	4-3
Air Weapons Survey.....	4-3
Contractor Survey	4-3
Conduct.....	4-3
Team Composition	4-3
Questionnaires.....	4-4
Formal Survey Report	4-4
Action on Change of Command.....	4-4
Feedback and Follow-up	4-4
Conduct of Formal Survey.....	4-4
Team Members	4-5
Timelines	4-5
Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) Parameter Requirements	4-5
Annex A – Regional Offices of Canadian Wildlife Service	4A-1
Annex B – FS Survey Checklist	4B-1
Annex C – Contractor FS Survey Checklist	4C-1
Annex D – Air Cadet Gliding Program FS Survey Checklist.....	4D-1
Annex E - CVR / FDR Parameter Requirements By Families	4E-1
Appendix 1 – Fixed Wing Heavy	

Transport Aircraft CVR / FDR Specifications	4E-1-1
Appendix 2 – Fixed Wing Heavy	
Combat Aircraft CVR / FDR Specifications	4E-2-1
Appendix 3 – Fixed Wing Fast	
Combat Aircraft CVR / FDR Specifications	4E-3-1
Appendix 4 – Rotary Wing Single	
Engine Trainer Aircraft CVR / FDR Specifications	4E-4-1
Appendix 5 – Rotary Wing Multi	
Engine Trainer Aircraft CVR / FDR Specifications	4E-5-1
Appendix 6 – Rotary Wing Transport and	
SAR Trainer Aircraft CVR / FDR Specifications.....	4E-6-1
Appendix 7 – Rotary Wing Combat	
CVR / FDR Specifications	4E-7-1
CHAPTER 5 – PROMOTION	5-1
General.....	5-1
Promotional Briefings.....	5-1
DFS Annual Briefing	5-1
FSO Briefings	5-1
Briefing Content	5-1
Promotional Material.....	5-1
CF FS Publications	5-1
Flight Comment Magazine.....	5-1
On Target Magazine	5-2
Debriefing Pamphlet.....	5-2
Flash Pamphlet	5-2
Other FS Periodicals.....	5-2
Other Media.....	5-2
Videos.....	5-2
Posters	5-2
Websites.....	5-2
FS Notice Boards	5-3
Awards	5-3
Objective.....	5-3
Timeliness of Awards.....	5-3
Types of Awards	5-3
Good Show Award.....	5-4
For Professionalism Award.....	5-4
Commander’s Commendation.....	5-5
DFS Commendation	5-5
SICOFAA Award	5-5

Award Staffing Procedures	5-5
Annex A – Flight Safety Award Nomination Form.....	5A-1
CHAPTER 6 – FS FEEDBACK TO THE	
CHAIN OF COMMAND.....	6-1
General.....	6-1
Intent of Feedback	6-1
Assessment of FS Indicators.....	6-1
FS Dedicated Resources and Tasks	6-1
Stress Points.....	6-2
Feedback Methodology	6-2
Feedback Consideration	6-3
Annex A – Example FS Feedback Matrix.....	6A-1
CHAPTER 7 – OCCURRENCE REPORTING	7-1
Airworthiness Investigation and the FS Program.....	7-1
Purpose of Reporting	7-1
Definitions.....	7-1
Aircraft	7-1
Collateral Investigation	7-2
FS Airworthiness Investigator	7-2
FS Publications.....	7-2
FS Reports	7-2
FS Occurrence	7-2
Air FS Occurrence.....	7-3
Ground FS Occurrence	7-3
Unmanned Aircraft System (UAS).....	7-3
Unmanned Aircraft Vehicle (UAV)	7-3
FS Accident	7-3
FS Incident.....	7-3
Stage of Operations	7-3
Hazard Conditions	7-4
Unit of Occurrence	7-4
Unit of Ownership	7-4
Requirement for Reporting	7-5
Requirement Information and Security	7-5
Reporting Responsibility	7-5
Hazard Reporting.....	7-5
Initial Incident Report.....	7-6
Initial Accident Report	7-6
Guidelines for Reportable Occurrences.....	7-6
FS Report Classification	7-6

Obligation to Report	7-7
Occurrences Involving Non-CF Aircraft	7-7
Aircraft at Civilian Contractors	7-7
Contracted Aircraft / Facilities	7-7
Occurrences Involving Parachutists / Rappellers	7-8
Occurrences Involving UAS.....	7-8
Categories of UASs.....	7-8
UASs Occurrence Reporting.....	7-8
Occurrences Involving Air Weapons System	7-9
FS Occurrence Management System.....	7-10
Transfer of Ownership.....	7-10
Report Forms and Tags	7-10
FS Forms	7-10
Other Related Report Forms.....	7-11
Aircraft Accident Tags.....	7-12
Annex A – Hazard Report Form DND 2484.....	7A-1
Annex B – Accident Notification Procedures	7B-1
Annex C - Airworthiness Investigator Matrix	7C-1
CHAPTER 8 – POST-OCCURRENCE ACTIVITIES	8-1
Purpose	8-1
Definitions.....	8-1
Aircraft Recording Device (ARD)	8-1
On-board Recording (OBR)	8-1
Designated OBR.....	8-1
Non-designated OBR.....	8-1
Privileged OBR Data.....	8-2
Handling of ARD Data	8-2
OBR Data	8-2
Other ARD Data	8-2
Provisions for Downloading ARD Data	8-2
Occurrence Response Procedures.....	8-3
Efficient Response Elements	8-3
Investigation Planning Requirements.....	8-4
Accident Response Plan Review	8-5
Accident Response Components	8-5
Communications	8-7
Notification of Foreign Countries.....	8-7
Requests Beyond Supporting Wing Capability	8-7
Notification to Coroner.....	8-7
Release of Information	8-7

Briefing to Next of Kin.....	8-8
Information Not to Be Released	8-8
Releasing Information to Contractors	8-9
Releasing Information to Other Nations.....	8-9
Accident Site.....	8-9
Health Protection	8-9
Accident Investigation Kit.....	8-9
Site Security.....	8-9
Security Duties	8-10
Security in Foreign Nations.....	8-10
Impounding Articles	8-11
Items to Be Impounded	8-11
Quarantining	8-12
Quarantining Documentation	8-12
Items to Be Quarantined.....	8-13
Fluid Sampling	8-13
Authority to Access Quarantined / Impounded Items.....	8-14
Lifting of Quarantine / Impoundment.....	8-14
Authority to Lift Quarantine / Impoundment	8-14
Provision for ARD.....	8-14
Recording the Lifting of Quarantine / Impoundment.....	8-14
Disposal of Quarantined / Impounded Evidence.....	8-15
Authority for Civilian Into Plane Servicing Facility	8-15
Processing of Special Equipment	8-15
Escape Systems	8-16
Aviation Life Support Equipment.....	8-16
QETE FS Work Request	8-16
Annex A – Protective Equipment	8A-1
Appendix 1 – Health Protection Kits.....	8A-1-1
Annex B – Aircraft Accident Checklist	8B-1
Annex C – Accident Investigation Kits	8C-1
Annex D – Occurrence Checklist	8D-1
Annex E – Imagery and Video Coverage.....	8E-1
Annex F – Statement of Impounding / Quarantining / Sampling Form	8F-1
CHAPTER 9 – INVESTIGATIONS	9-1
Introduction.....	9-1
Definitions.....	9-1
Aircraft Damage	9-1
Aircraft Major Components	9-1
Investigator In Charge (IIC)	9-2

FS Investigation.....	9-2
FS Investigation Report.....	9-2
Power Plant.....	9-2
Persons with a Direct Interest (PDI).....	9-2
Need to Investigate	9-3
Authority to Investigate	9-3
FSI Convening Authority.....	9-3
Investigation Responsibilities	9-3
Departmental Responsibilities.....	9-3
Command Responsibilities	9-3
Occurrence Category	9-3
Aircraft Damage Level	9-4
Personnel Casualty Level	9-4
Class of Investigation	9-5
Criteria for Assessing FSI Class	9-5
SoF Compromise Level Factor	9-5
Other Aggravating Factors	9-5
Relationship Between Investigation Class and Investigation Type.....	9-5
Tasking for Conduct of Investigations.....	9-6
Repetitive Occurrences (RO).....	9-6
Definition of RO	9-6
RO Conditions	9-6
RO Staffing, Approval and Monitoring.....	9-6
Investigation for Tracking Purpose Only (FTPO)	9-6
FSI Team Selection	9-7
Investigator-In-Charge.....	9-7
Members and Advisors	9-7
Typical FSI Team Complement	9-8
Types of Occurrence Reports.....	9-8
Initial Report (IR)	9-8
Supplementary Report (SR)	9-8
Combined Report (CR).....	9-8
Enhanced SR (ESR)	9-8
FS Investigation Report (FSIR).....	9-9
Actions Leading to Production of FSIR and ESR	9-9
Documentation	9-9
Preliminary FSIR.....	9-9
From The Investigator (FTI)	9-9
Draft FSIR for Comment.....	9-9
Epilogue	9-10
Immediate Action Taken.....	9-10

Report Deadlines	9-10
Follow-up on Proposed PM	9-10
Use and Handling of FS Reports	9-11
Protection of Information in FS Reports	9-11
Reconvening an FSI.....	9-11
Relationship Between FSI and Board of Inquiry.....	9-11
Coordinated Investigations	9-12
Access to Information Requests	9-12
Annex A – Occurrence Category Table.....	9A-1
Annex B – Flight Safety Investigation Class Table	9B-1
Annex C – FSI SITREP Template	9C-1
Annex D – Reference Documentation	9D-1
Annex E – Initial Report Content	9E-1
Annex F – Supplementary Report Requirements	9F-1
Annex G – Preparation of Investigation Report	9G-1
CHAPTER 10 – CAUSE FACTORS IDENTIFICATION	10-1
Purpose of Cause Factors Identification	10-1
Definition of Cause Factor.....	10-1
Assessment and Publication of Cause Factors in FS Report	10-1
Categories of Cause Factors	10-1
Personnel Cause Factors	10-2
Background.....	10-2
CF Human Factors Analysis and Classification System (CF-HFACS)	10-2
Unsafe Acts	10-3
Errors.....	10-4
Perception Errors	10-4
Decision Errors	10-5
Skill-based Errors	10-6
Deviations	10-7
Routine Deviations	10-8
Exceptional Deviations	10-8
Preconditions for Unsafe Acts.....	10-10
Working Conditions	10-10
Technological Environment.....	10-10
Physical Environment.....	10-10
Practices of Personnel	10-11
Resource Management	10-11
Personal Readiness	10-12
Conditions of Personnel	10-13
Mental States.....	10-13

Physiological States	10-15
Physical / Mental Capabilities	10-16
Supervision.....	10-16
Level of Supervision	10-17
Planned Activity	10-18
Problem Correction	10-18
Supervisory Deviations	10-19
Organizational Influences	10-19
Organizational Resource Management	10-20
Organizational Climate	10-21
Organizational Processes	10-21
Materiel Cause Factors	10-22
Materiel – Aircraft or Engine Components	10-23
Materiel – Related Facilities.....	10-23
Environmental Cause Factors	10-23
Environment – Weather	10-23
Environment - Surface Operating Area	10-23
Environment – Bird Strike.....	10-24
Environment – Unusual Phenomena	10-24
Environment - Reduced Atmospheric Pressure and Simulators.....	10-24
Operational Cause Factor	10-24
Unidentified Foreign Object Damage (FOD) Cause Factor	10-24
Undetermined Cause Factor	10-25
Annex A – Pre-HFACS Personnel Cause Factors.....	10A-1
Annex B – HFACS Chart.....	10B-1
CHAPTER 11 – PREVENTIVE MEASURES AND ANALYSIS	11-1
Application of Terminology.....	11-1
Analysis Purpose	11-1
Definition	11-1
Preventive Measure (PM).....	11-1
Analysis Methodology.....	11-1
Occurrence Rate	11-2
Analysis of Local Occurrences.....	11-2
Analysis Available from FSOMS	11-2
Use of Results.....	11-2
PM Management Process	11-2
Development of Effective PM	11-2
Reviewing PM	11-3
1 Cdn Air Div Review.....	11-3
DFS Review.....	11-3

Responsibility for Implementing PM	11-3
Tracking of PM	11-3
Mapping CF Data to ICAO Data	11-4
Annex A – Matrix Mapping CF Occurrences to ICAO Data.....	11A-1
Appendix 1 – List of Serious Occurrences	11A-1-1
Annex B – Occurrence / Hazard PM Management Process	11B-1
Appendix 1 – PM Management Process Diagram.....	11B-1-1
ABBREVIATIONS	Abvn-1

CHAPTER 1 – PROGRAM DESCRIPTION

GENERAL

1. The Flight Safety (FS) Program is a force multiplier for the Canadian Forces (CF). FS contributes to mission accomplishment in the DND / CF through the elimination of the accidental loss of aviation resources.
2. Orders and standards for operational and support personnel are, for the most part, developed out of concern for the safety of people and equipment. These standards represent levels of risk which are considered acceptable and practical for the full spectrum of DND / CF activities from peacetime training to wartime operations. It is understood that Commanders (Comds) in high intensity wartime action are likely to accept higher levels of risk than those considered acceptable in peacetime force generation activities. Risk management in the planning and execution of the DND / CF mission is fundamental to safe operations.

GOVERNANCE

3. The Chief of the Air Force Staff (C Air Force) and the Royal Canadian Air Force (RCAF) has been designated as the Airworthiness Authority (AA) for DND / CF. C Air Force retains as a residual responsibility the oversight of the FS Program across the full spectrum of DND / CF operations, at home or abroad. Therefore, the FS Program is applicable to:
 - a. all DND / CF units conducting flying operations or supporting flying operations;
 - b. any contracted organizations conducting or supporting flying operations, be it for maintenance support, logistics support or any other support role; and
 - c. independent airworthiness investigation activities as detailed in the A-GA-135-003/AG-001 *Airworthiness Investigation Manual* (AIM) and authorized by the AIA.
4. The Director Flight Safety (DFS), as the Airworthiness Investigation Authority (AIA), monitors matters concerning aviation safety of all foreign military aircraft operating in Canada.

DEFINITIONS

FLIGHT SAFETY (FS)

5. FS is a desired condition achieved by individuals and organizations through the systematic process of identifying and forecasting air operations risks and developing a proactive attitude for safe procedures, services, facilities and associated programs to minimize risks to air operations.

FS PROGRAM

6. The FS Program is a program of safe behaviour, education, independent airworthiness investigation, promotion and analysis of matters concerning aviation safety. It is directed at military and civilian personnel involved in CF aviation and its contracted support elements.

FS OCCURRENCE

7. Any event that involved the operation of a CF and / or a military conveyance aircraft or activities in support to flying operations where safety of flight was 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.

FS UNIT

8. A FS Unit is any unit / formation within the CF or contracted by the CF that is conducting flying or aircraft maintenance activities, or is coordinating closely or remotely flying or maintenance activities.

NOTE

A FS Unit includes RCAF HQs, wings, squadrons and units, HMCS Ships equipped with a flight deck, whether or not a HELAIRDET is embarked, land forces garrisons that support flying operations, contracted flying training establishments, National Defence Quality Assurance Regions' (NDQAR) and work centres at all contractor facilities where CF aircraft are manufactured, overhauled, inspected or repaired. For the FS unit, it implies that the Comd / executive manager and its supervisor will ensure proper oversight of flying operations within their area of responsibilities.

SAFETY OF FLIGHT (SoF)

9. 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.

FS HAZARD

10. An existing condition whereby there is possibility of adverse effect on health, property or SoF.

FS RISK

11. A FS risk is the quantification or measurement of a FS hazard according to the quantitative probability and the qualitative severity of the hazard.

MILITARY CONVEYANCE AIRCRAFT

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

OPERATING UNIT

13. This term refers to the unit under whose authority a flight has been authorized in accordance with B-GA-100-001/AA-000, *National Defence Flying Orders*.

AIR WEAPONS CAPABLE WING / UNIT

14. A wing / unit which uses ammunition, explosives and / or pyrotechnics in support of its role.

AIR WEAPONS SYSTEM

15. A system containing armament computers, mechanical, electromechanical and electronic components, that 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.

AIR WEAPONS

16. Air Weapons are any ammunition, explosives and / or pyrotechnics suspended, launched, released or fired from an aircraft; it includes any aircraft store, as described in para 8 below, that interfaces

with the Air Weapons System including bombs, missiles, torpedoes, flares, pyrotechnics, survival kit air droppable (SKAD) (excluding the SKAD dropped as cargo), chaff and flares, releasable external fuel tanks from the time the load starts to the time it is unloaded from the aircraft, sonobuoys, airborne targets and banners, etc. This shall apply to both live and training weapons.

AIRCRAFT STORE

17. 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 follow:

- 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, sonobuoy, signal underwater sound device, survival kit (SKAD) or other similar item; and
- b. Non-expendable store. Non-expendable store is an aircraft store that is not normally separated from the aircraft in flight such as a tank (fuel or spray), pod (refueling, thrust augmentation, gun, electronic countermeasures, target designator, etc), multiple racks, target, cargo drop container, luggage / equipment carrier, drone or other similar item.

NOTE

Aircraft fire detection and extinguishing systems, ejection and escape explosive charges, shielded mild detonating cord (SMDC) lines and aircraft hoisting systems are not considered Air Weapons. Although they all contain explosives, they do not interface with the armament system and are not considered Air Weapons; therefore, no armament implications.

PYROTECHNIC

18. A chemical mixture of oxidizing and reducing agent capable of reacting exothermically. Such mixtures are used to produce light, heat, smoke or gas and may also be used to introduce delays into explosive trains.

AIM OF FS PROGRAM

19. The aim of the FS Program is to prevent accidental loss of aviation resources while accomplishing the mission at an acceptable level of risk.

SCOPE OF FS PROGRAM

20. The CF shall conduct flying operations in accordance with this publication. A FS Program consistent with the roles and missions of the DND / CF shall be established at each level of command where flying operations are supervised or supported. Personnel at every level are required to participate in and support the program. The FS Program is a program of safe behaviour, education, independent airworthiness investigation, promotion and analysis of matters concerning aviation safety. It is directed at military and civilian personnel involved in CF aviation and its contracted support elements. Since understanding why safety occurrences happen is the key to an effective accident prevention program, accidents and incidents representing a risk to aviation, or which could lead to the implementation of preventive measures (PMs), should be investigated.

AIR WEAPONS SAFETY

21. The FS Program encompasses all maintenance and operational air weapons activities, including flying operations, from the moment that air weapons are removed from storage until they are delivered on target or are returned to storage. B-GA-297-001/TS-000 *Safety Orders for CF Air Weapons Systems* remains the primary reference for all other air weapons related issues. All wings and units with an air weapons capability shall ensure that their FS Program encompasses air weapons safety (AWS) requirements.

AIRWORTHINESS PROGRAM

22. The aim of the DND / CF Airworthiness Program is to establish and maintain an acceptable level of aviation safety. This compares favourably with the FS Program stated goal of preventing the accidental loss of aviation resources. While not integral to the FS Program, the Airworthiness Program is intended to provide a framework for the regulation of military aviation. In fact, the two programs collaborate on many fronts and share best practices for enhancing SoF. One of the primary objectives of the Airworthiness Program is to establish and maintain an acceptable level of safety for military aviation. When the roles of DFS and the AIA and the associated investigation aspects of these programs were compared, the close match allowed the overlap of the investigation responsibilities to become a single CF / DND activity.

FUNDAMENTAL PRINCIPLES

23. The FS Program is based on the following five fundamental principles:
- a. the main principle is the prevention of occurrences. Although cause factors are assigned to occurrences, this is only done to assist in the development of effective PMs;
 - b. personnel involved in conducting and supporting flying operations are expected to freely and openly report all FS occurrences and FS concerns;
 - c. in order to determine the cause of occurrences such that appropriate, effective PMs can be developed and implemented, personnel involved in conducting and supporting flying operations are expected to voluntarily acknowledge their own errors and omissions;
 - d. in order to facilitate free and open reporting and voluntary acknowledgement of errors and omissions, the FS Program does not assign blame. Personnel involved in a FS occurrence are de-identified in the final report and the report itself cannot be used for legal, administrative, disciplinary or other proceedings; and
 - e. the whole FS Program is based on the primacy of having a “just culture.” A “just culture” lies between a non-punitive culture and one of sanction and punishment. Free and open sharing of critical safety information between managers and operational personnel, without the threat of punitive action, represents the basis of a reporting culture. Personnel are able to report occurrences, hazards or safety concerns as they become aware of them, without fear of sanction or embarrassment. However, while a non-punitive environment is fundamental for a good reporting culture, the workforce must know and agree on what is acceptable and what is unacceptable behaviour. Negligence or wilful, deliberate deviations must not be tolerated by leadership. A “just culture” recognizes that, in certain circumstances, there may be a need for punitive action and defines the line between acceptable and unacceptable actions or activities.

RESPONSIBILITY FOR FS PROGRAM

OVERALL RESPONSIBILITY

24. A large portion of the FS Program is based on the continuous monitoring of hazards, appropriate and independent investigation of aviation safety occurrences and thorough analysis of investigation findings so that the risk of recurrence can be reduced. The complete program involves pre-occurrence activities like education and promotion for the safe behaviour activity, risk management techniques designed to reduce the chances of an occurrence, post-occurrence activities including occurrence response procedures, investigations, occurrence analysis, formulation of PMs and feedback. Early involvement in capital acquisitions is essential to ensure FS issues are adequately considered.

25. C Air Force is responsible for FS policy in DND / CF. FS policy is implemented by the chain of command at wings, bases and units. This policy also applies to NDQAR contracted facilities where CF aircraft are being manufactured, overhauled, inspected or repaired. Supervisors at all levels are responsible for establishing their own FS Programs.

INDIVIDUAL RESPONSIBILITIES

26. The success of the FS Program is reliant upon a commitment to it by all personnel associated with DND / CF flying operations. This commitment can only materialize if all personnel believe in the value of the program and understand that they have a responsibility to actively participate. In order to facilitate this, the individual shall be able to report any flight activity concerns and occurrences or propose better ways of doing business without fear of retribution.

27. Personnel are responsible for:

- a. immediately ceasing unsafe activities under one's direct control;
- b. notifying their supervisor and the FSO of the unsafe activity; and
- c. formally identifying and reporting hazards.

NOTE

It is the responsibility of each individual to cease unsafe activities, regardless of rank or position in the organization.

UNIT RESPONSIBILITIES

28. The FS Program is designed to ensure that DND / CF flying activities remain safe while remaining operationally focused. The scope of the FS Program shall be such that individuals belonging to an organization conducting or supporting air operations will have a structured FS Program in place. Every unit conducting or supporting air operations shall have a flight safety program.

MANAGEMENT RESPONSIBILITIES

29. Management responsibilities are as follow:

- a. immediately ceasing activities that are deemed unsafe or where an unacceptable risk exists;
- b. notifying higher authorities of unacceptable risks and the actions taken to mitigate them or of the need to seek additional resources to mitigate them;

- c. reviewing and accepting / rejecting the risk as per the authority delegated from the Airworthiness Authority (AA), the Operational Airworthiness Authority (OAA) and the Technical Airworthiness Authority (TAA);
- d. establishing the unit's risk control strategy;
- e. measuring and reporting on the effectiveness of risk management activities within the unit; and
- f. promoting risk management activities at the unit and formation level.

FSO RESPONSIBILITIES

30. The FSO is responsible for:
- a. consulting and being aware of the unit's risk assessment criteria;
 - b. immediately notifying the CO of any unsafe activities and unacceptable risks. In these cases the FSO must seek an order from an appropriate authority to cease the activity until the problem can be assessed and either resolved or mitigated to an acceptable level; and
 - c. carrying out independent airworthiness investigation activities as detailed in the AIM and authorized by the AIA.

AIRWORTHINESS AND FS POLICY

GENERAL

31. Within the Airworthiness Program, DFS is named as the AIA and charged with independently investigating all matters concerning aviation safety. Details of the powers delegated from the MND, using powers within the Aeronautics Act, to the AIA and then onward to all airworthiness investigations are laid out in the AIM. Of note, all activities carried out for flight safety airworthiness investigations are carried out on behalf of the AIA / DFS. The FS Program integrates the investigation portion of the CF/ DND Airworthiness Program within its activities which are detailed in Chapters 7-11 of this manual and with the occurrence investigation techniques outlined in the A-GA-135-002/AA-001 *Occurrence Investigation Techniques for the Canadian Forces*.

32. The Airworthiness Program contributes to aviation safety by influencing areas related to aeronautical products and their operation. The DND / CF Airworthiness Program is mandated by the Minister of National Defence (MND) as detailed in DAOD 2015-0 and DAOD 2015-1 and amplified in A-GA-005-000/AG-001 *DND / CF Airworthiness Program*. The elements of an effective airworthiness program consist of a full range of aviation activities including design, manufacture, maintenance, materiel support, facilities, personnel and operations.

AIRWORTHINESS PROGRAM AUTHORITIES

AIRWORTHINESS AUTHORITY

33. The AA is responsible for the development, promotion, supervision and management of an Airworthiness Program for the DND / CF. This includes the appointment of competent individuals to fill the positions of OAA and AIA as described below, and in consultation with the Assistant Deputy Minister (Materiel) (ADM (Mat)), the appointment of a competent individual as Technical Airworthiness Authority. C Air Force is the AA for DND / CF. Of note, the AA is charged with ensuring the AIA is not impeded in any way in its' investigation of matters concerning aviation safety.

TECHNICAL AIRWORTHINESS AUTHORITY

34. The TAA is responsible for the regulation of the technical airworthiness aspects of the design,

manufacture, maintenance and materiel support of aeronautical products and the determination of the airworthiness acceptability of those products prior to operational service. The Director General of Aerospace Equipment and Program Management (DGAEPM) is the TAA for DND / CF.

OPERATIONAL AIRWORTHINESS AUTHORITY

35. The OAA is responsible for the regulation of all flying operations. This includes responsibility for operational procedures; flight standards; operator training, qualification and licensing; aerospace control operations; and operational airworthiness clearance of aeronautical products prior to operational service. The Comd of 1 Canadian Air Division (Comd 1 Cdn Air Div) is the OAA for DND / CF.

AIRWORTHINESS INVESTIGATIVE AUTHORITY

36. The AIA is responsible for regulating the airworthiness investigation aspects of the FS Program. The AIA is responsible for investigations. The AIA is also responsible for monitoring the Technical and Operational Airworthiness Programs to identify deficiencies. DFS is the AIA for DND / CF. Of note, the AA is charged with ensuring the AIA is not impeded in any way in the investigation of matters concerning aviation safety.

AIRWORTHINESS PROGRAM PRINCIPLES

37. The DND / CF 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. performed using approved procedures.

AIRWORTHINESS PROGRAM ROLES

38. A regulatory approach is the most common method employed to implement the concepts and principles of any airworthiness program. A regulatory approach means to control by rule and involves using regulations, orders, directives and standards to control airworthiness-related activities. A regulatory approach for controlling airworthiness activities has the following three distinct roles:

- a. Regulator. The regulator develops the airworthiness instrument (rules and standards) for the engineering, manufacture, maintenance, materiel support and operation of aeronautical products and ensures compliance (e.g. Transport Canada for civil aviation);
- b. Implementer. The implementer conducts the aviation activities associated with the engineering, manufacture, maintenance, materiel support and operation of aeronautical products (e.g. airlines, manufacturers and maintenance organizations for civil aviation); and
- c. Investigator. The investigator investigates airworthiness-related safety occurrences and aviation safety issues. The investigator is normally independent from the regulator and implementer. The investigator is also empowered to investigate the role that the regulator and implementer may have had in any aviation occurrence (e.g. Transportation Safety Board (TSB) for civil aviation). DFS is the designated AIA for this program and fulfils the investigator role as described.

39. Unlike civil aviation, where the airworthiness regulator, implementer and investigator are totally

independent, the Aeronautics Act has assigned DND a self-regulating and self-investigating responsibility for airworthiness.

RISK MANAGEMENT

40. The Airworthiness Risk Management (ARM) process ensures that conflicts between aviation safety, mission accomplishment and resource expenditures are balanced. As promulgated in A-GA-005-000/AG-001 *DND / CF Airworthiness Program* overall responsibility for managing risks rests with COs, DND / CF managers at all levels, and designated contractor representatives. The identification / recognition of hazards is a responsibility shared by all DND / CF personnel or supporting personnel.

41. Due to the inherent dangers associated with operating military aircraft, a certain acceptance of risk to safety is often required. The decision to accept risk must be controlled, balanced and approved at the appropriate level. The ARM process provides a logical and systematic means of identifying and controlling safety risks in the decision-making process.

42. Aviation safety-related risk is a primary concern of the Airworthiness Program and the FS Program. Other forms of risk, such as operational, financial and legal, may also be factors in any decision-making process and may at times conflict with aviation safety goals. The ARM process provides a means to assess and proactively balance airworthiness risk against both mission accomplishment and available financial resources. All personnel associated with aviation, from the pilot-in-command (PIC) of an aircraft to the technician troubleshooting an unserviceability on the hangar floor, will be required to make a decision, at some point, involving some degree of airworthiness risk assessment. Adoption of a standardized ARM methodology enhances the quality of these decisions.

FS STRATEGIC PROCESSES

43. A strategic level conceptual model of FS-related processes for the FS Program is provided at Annex A. It describes in a comprehensive manner all the FS processes irrespective of the organizations responsible to execute them. Many organizations or activities contribute directly or indirectly to the processes described in the model's three management pillars in the form of Resilience Management, Risk Management and FS Program Management. DFS is the champion of the FS Program for the DND / CF, and maintains close liaison with the organizations carrying out the strategic FS processes. DFS, as the AIA, is responsible to the Minister of National Defence (MND) for FS investigations.

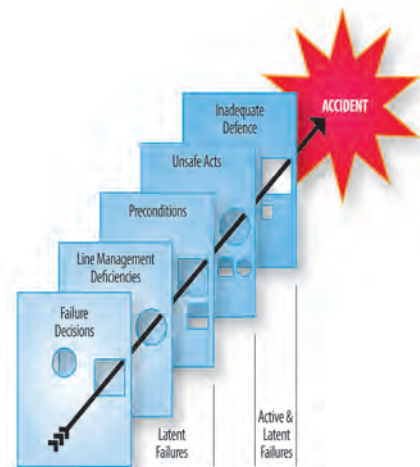
44. Resilience and Risk Management represent the pillars to which most of the critical FS processes and activities gravitate. Resilience Management is considered a proactive form of accident prevention because it reduces the potential or severity of threats to air operations. Risk Management on the other hand is more reactive in that the associated activities are in response to newly identified hazards.

Annex A
Chapter 1
A-GA-135-001/AA-001

ANNEX A – FS STRATEGIC BUSINESS MODEL

INTRODUCTION

1. The strategic FS model provides a high level framework and describes the processes involved in the flight safety program. Accident prevention processes can be derived by inverting Reason's Swiss Cheese model of Accident Causation. Accidents occur because weaknesses or "windows of opportunity" open and align in all levels of the operation, allowing a chain of events to cause an accident. Accidents can be prevented by adding layers of defences through resilience management and patching holes in these defences through risk/hazard management.



FS BUSINESS PROCESSES

2. Appendix 1 to this annex is a graphical depiction of the FS business processes. They are regrouped as follows:

- a. Resilience Management. Resilience management is the process of making the equipment, procedures and personnel resilient to accident-causing conditions, and thus protect operations from unknown hazards.
 - (1) Equipment Resilience Activities. CF airworthiness organizations employ tools and methods to ensure aircraft and related equipment are acceptable for the operations and flying environment. FS data is provided to improve Design, Modification, and Maintenance airworthiness on current and new aircraft so that the flying operations can better withstand unknown hazards.
 - (2) Procedures Resilience Activities. CF flying procedures are monitored to ensure that air operations are being conducted in a safe manner. FS surveys are conducted, rules and regulations are reviewed, and periodic inspections are performed in order to continually improve all associated procedures.
 - (3) Personnel Resilience Activities. Personnel are trained to be capable of dealing with known and unknown threats to flight safety. Occurrences, hazards, trends, and many other forms of flight safety data are disseminated to all personnel involved with the support or conduct of air operations so they can better understand the situations and circumstances that can compromise flight safety. This is supported by a comprehensive awards program to encourage safe behaviour throughout the organization.
- b. Program Management. The FS Program provides the administrative framework for the Resilience and Risk Management processes. Program Management includes development of the FS Program, policies and procedures, relevant training and education, and activities that provide feedback to the chain of command. Program Management does not directly prevent accidents, but supports Resilience and Risk Management in doing so.

- c. Risk Management. Risk management is the systematic process of identifying risks, assessing their implications, deciding on a course of action, and evaluating the results. Known risks are those that have been identified and analyzed. Unknown risks, by their nature, cannot be managed, and thus are addressed through resilience management.
- (1) Identify Hazards. The principle means of identifying hazards is through occurrence investigation, hazard reporting, and trend analysis. A comprehensive reporting system is required to track hazards from initial identification until resolution of any preventive measures.
 - (2) Investigate Hazards. Based on the preliminary information captured when the hazard or occurrence was reported, the nature of the hazard and its severity will be used to determine the level of the investigation and resources that should be employed.
 - (3) Analyze Risk. All available information is systematically reviewed to determine how often specified events may occur and the magnitude of their consequences. Commanders at all levels review investigations within their sphere of responsibility, the associated proposed PM, then make documented decisions on how they will address the hazards.
 - (4) Mitigate Risk. Hazards, whenever possible, are corrected by implementing one or more FS PM. It is critical that the various stages and levels of implementation be tracked and monitored to ensure complete staffing, either full implementation, partial implementation or no implementation (refusal). The latter two options must be endorsed at the proper level in the chain of command and supported by an appropriate record of Airworthiness Risk Management.

FS INFORMATION FLOW

3. Appendix 2 describes the interrelationship between the individuals involved in FS and the FS information flow. It represents the major types of information used for flight safety management (Hazards, Risk, PM, etc.) and the relationships that the entities have with each other as the data / information flows through the FS system.
4. The information model descriptors are:
- a. Persons Involved in Air Operations. These personnel include aircrew, groundcrew, maintainers, air traffic personnel, contractors, as well as any other Air Force, Navy, or Army personnel involved with flying operations. They are responsible for identifying and reporting any hazard to flight safety that they find.
 - b. FS Staff. FS Staff include Unit Flight Safety Officers (UFSOs), Wing Flight Safety Officers (WFSOs), Division Flight Safety Officers (Div FSOs), DFS Flight Safety Officers, and deputies at all levels. They are responsible for validating and investigating reported hazards, for analyzing the hazard risk potential and for proposing possible PM. FSOs and their assistants (FS Non-Commissioned Members, FSO Specialist (Weapons) (FSOS (W), etc.) operate within a FS functional chain of command. As advisors to their respective supervisors, all tiers of FS (deployments, unit, wing, air div, contracted unit and DFS) work in a cooperative and functional Chain of Command IAW direction set in this publication.

- c. Chain of Command. Chain of command include unit commanding officers, wing commanders, division commander, and supervisors at all levels. These persons are responsible for evaluating the hazards within their organizations, and either formally accepting the risk, or mitigating the risk by implementing PM. By extension, the senior management of contracted organizations have an equivalent chain of command.
- d. Action Agencies. Once the Chain of Command has confirmed the risks associated with certain hazards, they will task Action Agencies to complete PM. These Action Agencies will notify FS Staff when their assigned PM have been completed, as well as provide status reports along the way.

FS BUSINESS MODEL AND FSOMS

5. The FS Program achieves the aim of preventing accidental loss of aviation resources while accomplishing the mission at an acceptable level of risk. This is done by managing the risks associated with air operations, and by making the organization resilient to unknown hazards. Some of the FS processes in the FS business model are the direct responsibility of the Airworthiness Investigative Authority while others are the responsibility of organizations and personnel directly and indirectly supporting air operations.

6. The FS Occurrence Management System (FSOMS) supports the FS Program by recording all factual data related to FS occurrences and hazards. It details investigation results including assigned cause factors, recommended PM and disposition of these PM. The collection of data and its systematic analysis helps in the prevention of accidents and the control of risk in a manner that is measurable.

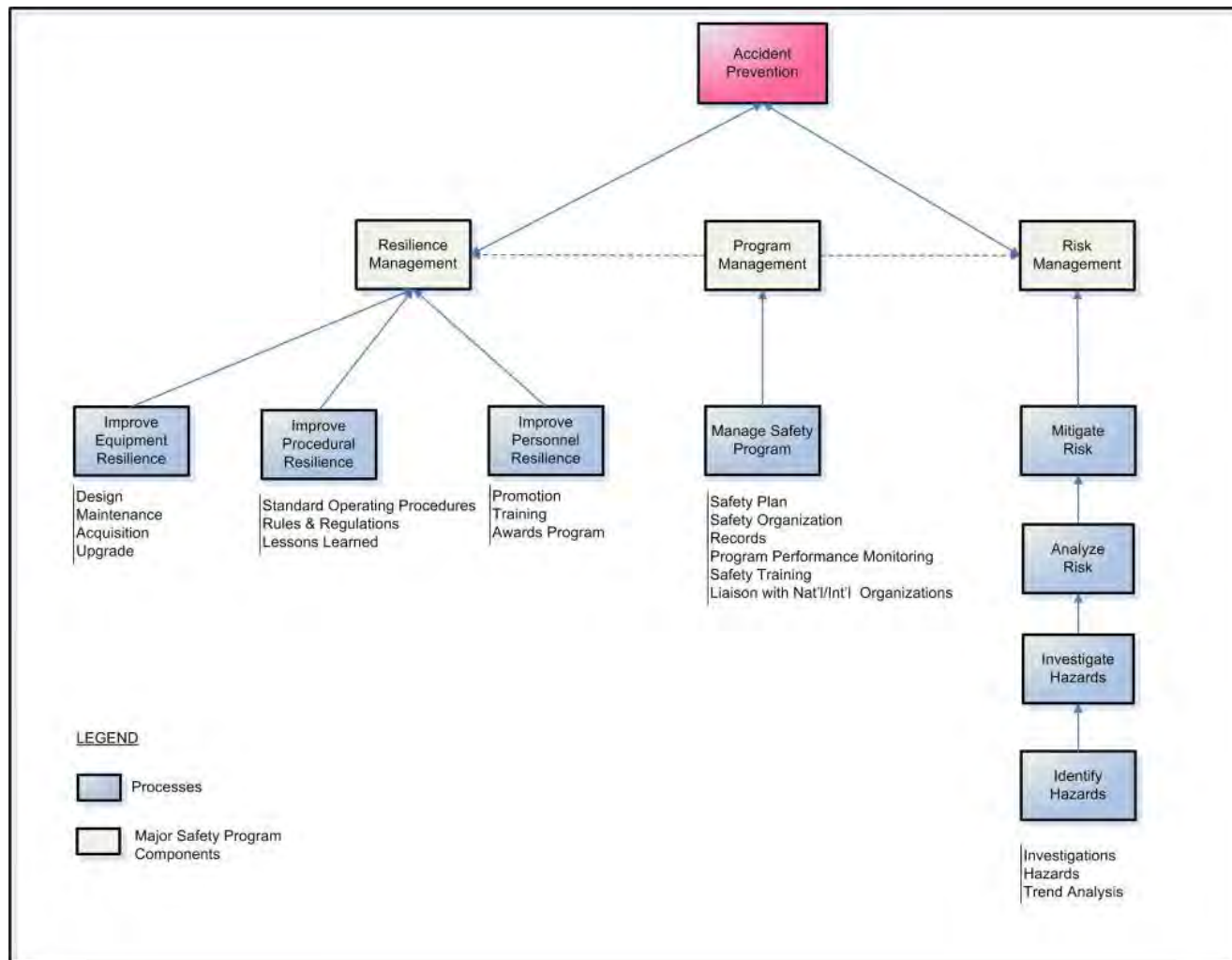
Appendix 1

Annex A

Chapter 1

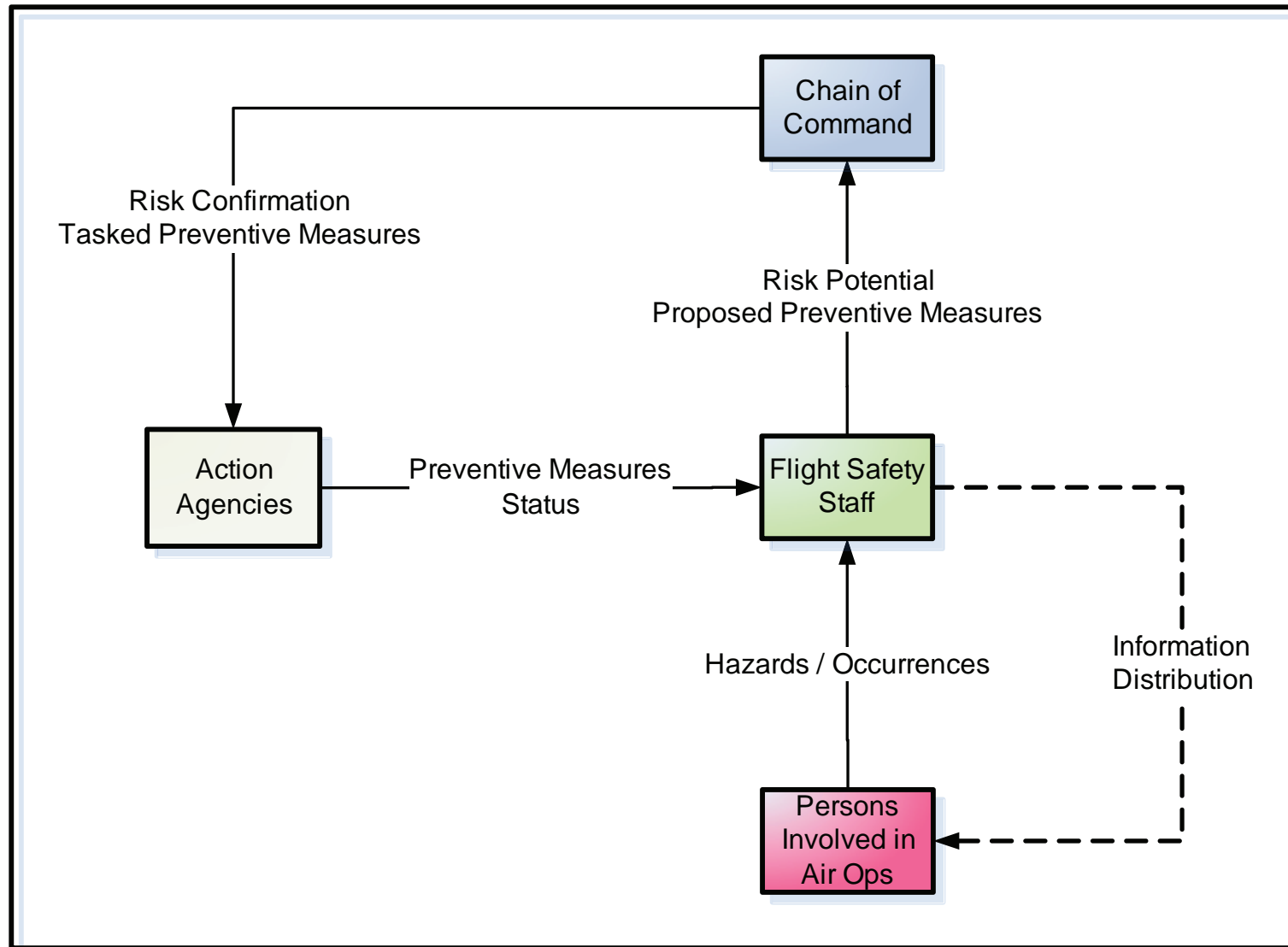
A-GA-135-001/AA-001

APPENDIX 1 – FS BUSINESS PROCESSES



Appendix 2
Annex A
Chapter 1
A-GA-135-001/AA-001

APPENDIX 2 – FS INFORMATION MODEL



CHAPTER 2 – ORGANIZATION

GENERAL

1. The accidental loss of aviation resources can be prevented if hazards are identified and, whenever possible, eliminated. The achievement of this objective requires an effective FS Program that is proactive, adaptable, relevant and highly visible to all members of the organization. This, in turn, requires a dedicated staff of highly motivated, trained FS professionals to develop, revise and administer the FS Program on behalf of the chain of command. In the case of airworthiness investigations, these professionals perform their duties on behalf of the MND through delegated responsibilities to the AIA. Therefore, FS professionals are required at all levels of the organization (tactical, operational and strategic) in order to optimize the effectiveness of the FS Program.

FS STRUCTURE

2. Table 1 below shows the different organizations and the corresponding appointed FSOs. For the designated organizations, it implies that the Commanding Officer (CO) / executive manager will put in place proper oversight of air operations by a designated FSO within their area of responsibility. Reciprocally, the aviation units or sub-units operating under in specific geographic regions or on-board HMCs shall ascertain that proper liaison is maintained and that a suitable emergency response plan is put in place, exercised and updated regularly.

ORGANIZATION	FSO STAFF
STRATEGIC	
NDHQ for MND / CDS / VCDS / C Air Force / ADM (Mat)	DFS
NDHQ National Air Cadet Operations (D Cdts)	DFS
OPERATIONAL	
1 Cdn Air Div / CANR	1 Div FSO
2 Cdn Air Div	2 Div FSO
Canada Com	1 Div FSO
CANSOFCOM	1 Div FSO
CEFCOM	1 Div FSO
CANOSCOM	1 Div FSO
Wing	WFSO
Formation HQ - Land Forces Regions, MARLANT, MARPAC	Designated FSO within HQ For Air Cadet operations: Reg FSO / designated WFSO as per Table 2 of Annex A of Chapter 2

ORGANIZATION	FSO STAFF
TACTICAL	
AETE	UFSO / 4 Wing FSO
ATESS	UFSO / 8 Wing FSO
427 Special Operations Sqn	UFSO / 1 Wing FSO
RCAF Flying Unit	UFSO
RCN Ships equipped with a flight deck	UFSO
Deployed unit / sub-unit (detachment on-board HMCS or attached air assets to land / naval forces)	Assigned FSO as per tasking order
Air Cadet Gliding School / Site	UFSO / Gliding Site FSO
Contracted Organization	Contractor FSO / Assigned WFSO as detailed on DFS websites under FSOMS / FS Occurrence Reporting Relationship

Table 1 – Command levels and Corresponding FSO

3. For Canada Command, Comd 1 Cdn Air Div is the CF Air Component Commander and is responsible for FS. For CEFCON, CANSOFCOM, FS is a residual responsibility that is not relinquished by C Air Force even when detachments are under comd to these commands.

4. For non-Air Force units, the appointment of a dedicated FSO will be based on the unit's level of involvement in flying operations, support and oversight of air operations.

INTERACTION WITH OTHER ORGANIZATIONS

AEROSPACE ENGINEERING TEST ESTABLISHMENT (AETE)

5. AETE, an ADM (Mat) unit, is accountable to C Air Force for their FS Program. Their FS Program is monitored by 1 Cdn Air Div through 4 Wing. The flying and maintenance standards of AETE are the responsibility of 1 Cdn Air Div, which exercises this supervisory role on behalf of C Air Force.

AEROSPACE AND TELECOMMUNICATIONS ENGINEERING SUPPORT SQUADRON (ATESS)

6. ATESS is accountable to C Air Force for their FS Program. Their FS Program is monitored by 1 Cdn Air Div through 8 Wing.

AIR CADET FS PROGRAM

7. The Air Cadet Flying Program, comprising the Air Cadet Gliding Program and the Air Cadet Powered Flight Program, must also comply with this publication. Specific arrangements and associated responsibilities are detailed at Annex A. The Air Cadet Flying Program consist of the following:

- a. The Air Cadet Gliding Program is a national program consisting of familiarization flights and glider pilot flying training; and
- b. The Air Cadet Powered Flight Program is a national program consisting of familiarization flights and pilot ab-initio flight training.

IMPLEMENTATION OF FS PROGRAM

8. Every organization who is assigned or tasked to facilitate the employment of air assets must implement a FS Program overseen by an FSO. The latter shall be a trained FS specialist who advises the unit CO / executive manager on FS and AWS Program issues. Being familiar with the full spectrum of operations in the organization, the FSO provides expert advice on both accident prevention and hazardous conditions.

ASSIGNMENT OF FSO RESPONSIBILITIES

9. A CO / executive manager normally assigns responsibility to the FSO for devising, revising, promoting and administering the FS Program including:

- a. disseminating FS educational material;
- b. administering FS Committee meetings;
- c. researching and staffing airworthiness investigation activities on behalf of the AIA to determine PM;
- d. conducting AWS surveys;
- e. conducting informal FS surveys;
- f. implementing a bird strike prevention program;
- g. correcting hazardous conditions;
- h. advising on FS matters; and
- i. participating as a team member in formal FS surveys.

10. Accident prevention is the responsibility of COs at all levels and involves monitoring the control, conduct and support of air operations. The CO is assisted by an FSO who provides specialist advice on the FS Program.

FSO ACCESS TO CO / EXECUTIVE MANAGER

11. An FSO, whether employed full-time on FS duties or not, must have direct access to the CO / executive manager. Although reporting directly to the CO / executive manager, the FSO normally presents their observations or recommendations to the individual who has the authority to take corrective action. Recommendations prepared by the FSO must be constructive, well thought out and tactfully presented.

MANAGEMENT LEVEL OF THE FSO

12. An FSO should be of at least Captain rank, or in the case of civilian contractors, a mid-level manager. Senior positions at C Air Force, 1 Cdn Air Div and wing level are established at the rank of Captain / Major through Colonel. The FSO and D/FSO must have experience in the related operational roles and should have completed formal FS course (FSC) giving a Basic Investigator (BI) 2 or 3 qualification. In cases where an individual has not received the FSC prior to their appointment, they should complete this training as soon as possible. Aircrew shall maintain flying currency wherever feasible. The DFS / AIA and the 1 Div FSO shall be advised of FSO and D/FSO appointments and qualifications. Candidates nominated for unit positions shall be able to occupy the position for 18–24 months. Candidates nominated for wing positions shall be able to occupy the position for a minimum of 36 months.

NOTE

When a FSO will be absent for an extended period of time, the 1 Cdn Air Div FSO and DFS need to be advised of the period of absence and who the interim FSO will be .

LIMITATIONS ON FSO SECONDARY DUTIES

13. Although units vary in size, composition and role, it is expected that the FSO will have sufficient time to complete their duties during a normal workday. The FSO is expected to maintain professional qualifications and categories commensurate with the unit's role(s). However, the FSO should be actively involved in the stewardship of the unit FS Program, and as such, FSO duties are normally to be considered the individual's only secondary duty. The CO should avoid assigning duties / assignments (i.e. secondary duties) that require full-time attention. If a unit CO considers it necessary to assign additional duties / assignments that may conflict with FSO duties, then the CO shall obtain written approval from the WComd for a UFSO and the WComd shall obtain approval from the Comd 1 Cdn Air Div for a WFSO. The written request shall outline the circumstances, mitigation and / or period required. The request and authorization shall be held on file with the WFSO for UFSOs, and Div FSO for WFSOs for the duration of the approved period.

TECHNICAL AND ADMINISTRATIVE SUPPORT

14. FSOs shall be given the technical and administrative assistance necessary to perform their duties.

UNIT FS TEAM MEMBERS

D/FSO

APPOINTMENT

15. One or more D/FSOs shall be appointed, as required, at all FS units and sub-units. They are employed as assistants to the FSO and may act as the FS representative for a sub-unit. For military units the D/FSO should be an NCM. As a minimum, a D/FSO should have completed the FS Course (BI 3). Candidates nominated for unit positions shall be able to occupy the position for 18–24 months.

ROLE

16. The role of the D/FSO is to assist the FSO in administering an effective FS Program.

DUTIES

17. It is the duty of a D/FSO to:
- a. complete tasks assigned by the FSO; and
 - b. act as FSO during the absence of the latter.

FS SPECIALIST

ROLE

18. The role of the appointed FS Specialist (FSS) is to provide specific FS expertise to the FSO and D/FSO in order to help them administer a more effective FS Program.

FSS WEAPONS (FSS (W))

APPOINTMENT

19. An FSS (W) shall be appointed in any unit utilizing air weapons. The FSS (W) should be an AERE Officer or Senior NCM qualified in aerospace armament, engineering and maintenance (course code SS ADOT).

ROLE

20. The role of the FSS (W) is to assist the FSO on matters affecting air weapons safety (AWS).

DUTIES

21. It is the duty of the FSS (W) to:
- a. develop the unit AWS Program;
 - b. take the necessary actions to correct hazardous conditions;
 - c. advise on AWS matters;
 - d. liaise with the wing / unit Air Weapons Officer (appointed IAW B-GA-297-001/TS-000) on matters affecting AWS;
 - e. assist in the research and staffing of occurrence reports with air weapons implications;
 - f. assist the UFSO in the conduct of internal AWS surveys;
 - g. assist in implementing and conducting AWS awareness training; and
 - h. participate as a member of the wing / unit FS Committee.

FORMATION FSO

CF, ROYAL CANADIAN AIR FORCE (RCAF) AND ADM (MAT) FSO

22. DFS is the FSO assigned to the CDS, RCAF and ADM (Mat). On behalf of C Air Force, DFS shall:
- a. provide advice on all FS and AWS matters;
 - b. devise, implement and monitor the FS and AWS Programs as detailed in this publication;
 - c. independently investigate and analyse matters concerning aviation safety occurrences when required;
 - d. delegate investigation responsibility to qualified personnel as required to conduct airworthiness investigations;
 - e. monitor and facilitate follow-up action to all aviation safety occurrences;
 - f. act as a staff advisor for all FS matters at NDHQ, including acting as FSO to ADM (Mat) in his capacity as comd of a Command;
 - g. advise on the adequacy and suitability of policies, procedures and standards for AWS;
 - h. collect, maintain and analyze FS and AWS statistics for prevention purposes;
 - i. promote AWS awareness;
 - j. monitor and participate in an educational program for the training of FS personnel;
 - k. produce and distribute educational and promotional material;
 - l. monitor the FS Program for air cadet glider and tow plane operations;
 - m. recommend nominations for FS awards and approve, as applicable;
 - n. represent the CF at international FS conferences;

- o. conduct annual FS briefings at wings, units and contractor facilities; and
- p. participate in and / or conduct formal and informal surveys of wings and units and conduct surveys of contractor facilities.

1 CANADIAN AIR DIVISION FSO

23. The Division FSO (1 Div FSO) is the FSO assigned to Comd 1 Cdn Air Div. On behalf of Comd 1 Cdn Air Div, the 1 Div FSO shall:

- a. provide the Air Div chain of command with specialist advice on FS matters;
- b. liaise with DFS on FS and AWS related matters;
- c. liaise with the unit to monitor, advise and promote the FS and AWS Programs;
- d. advise on the adequacy and suitability of policies, procedures and standards for FS and AWS;
- e. promote safety practices within the Air Force by maintaining effective feedback loops amongst the wings, 1 Cdn Air Div and C Air Force;
- f. review FS and AWS occurrences;
- g. review FS award nominations and staff as per Chap 5 directions;
- h. conduct FS surveys and AWS surveys of all Air Force wings and deployed units on a 24 month cycle;
- i. prepare survey reports, including recommendations for improvement, for review by the chain of command;
- j. represent Comd 1 Cdn Air Div at FS conferences and meetings; and
- k. conduct FS education by coordinating the administrative aspects of the FSC, providing instructors for selected course serials, identifying FS training needs of wings / units, and ensuring sufficient numbers of trained FSOs / D/FSOs are available for units and contractors.

WING FSO

24. On behalf of the WComd, the Wing FSO (WFSO) liaises with the flying units and all of the support functions of a base. It is the WFSO's responsibility to:

- a. advise the WComd on all FS and AWS matters;
- b. establish and implement FS and AWS Programs that encompass all aspects of wing operations;
- c. on behalf of the AIA and as laid out in the AIM, ensure that all occurrences are reported, appropriate occurrences are investigated and that proper PM are identified to the chain of command;
- d. liaise with unit COs to conduct FS and AWS surveys;
- e. monitor all safety aspects of flying operations and air weapons operations;
- f. confirm that aircraft publications are up to date;
- g. develop methods for detecting hazardous conditions;
- h. be the focal point for all FS and AWS activities at the wing;
- i. provide advice and assistance to the appropriate 1 Cdn Air Div staff officer;
- j. monitor air cadet flying operations in accordance with this publication and A-CR-CCP-242/PT-001 – Air Cadet Gliding Manual; and

- k. review supplementary reports (SR) from lodger units.

FSO FOR ASSIGNED / ATTACHED AIR ASSETS

- 25. The FS Program shall be promulgated through local flying orders, operations orders, standing orders and equivalent regulatory documents.
- 26. Comds shall appoint a dedicated FSO (e.g. BFSO, ship FSO) and / or utilize FS personnel within attached flying units (e.g. Sqn/Detachment FSO) to provide FS expertise and advice. This is an overarching requirement, separate from wing / unit programs and procedures that are specific to lodger or detached flying units and their chain of command.
- 27. For deployed operations, Comd 1 Cdn Air Div will appoint an Air Force wing to provide administrative support (e.g. FSOMS data entry) and quality control to the deployed unit for its FS Program and occurrence handling. If more than one aircraft type is involved, Comd 1 Cdn Air Div may designate additional wings to provide this technical support and assistance.

NON-AIR FORCE FORMATION FSO

- 28. On behalf of the Formation Comd, the assigned Formation FSO shall:
 - a. provide to the comd and to members of the HQ FS training and advice on FS matters;
 - b. develop, devise, implement and monitor the FS Program as detailed in this publication;
 - c. act as the staff advisor for FS matters in the Formation HQ;
 - d. liaise with 1 Div FSO on FS related matters; and
 - e. liaise with the subordinate units / garrisons to monitor, advise and promote FS Programs.

FS COMMITTEE

PURPOSE

- 29. In order to remain relevant, visible and adaptable to changes, unit / formation FS Programs must be periodically reviewed and reassessed. This is the objective of the unit / formation FS Committee. The committee should focus on the three pillars of the FS Program: promotion, education and analysis. In addition, the committee should use the minutes of their meetings to direct necessary changes to the FS Program.

ESTABLISHMENT OF FS COMMITTEE

- 30. An FS Committee shall be established either independently, or as part of a safety council. FS Committee requirements will be met as follows:
 - a. C Air Force – this function is satisfied by the Airworthiness Advisory Board (AAB);
 - b. 1 Cdn Air Div / CANR Headquarters – this function is satisfied by attendance at the Comd's senior staff meetings; and
 - c. flying units or long-term deployments associated with flying operations - regular formal FS committee meeting to be carried out.

GENERAL MEMBERSHIP

- 31. The FS Committee will be chaired by an individual who has executive authority (CO / executive manager) since it is expected to put in place concrete PMs and get things done in a timely manner. An FS Committee shall include a qualified representative from each major agency involved in the control, conduct or support of air operations. It should normally include:

- a. the comd, CO or manager of the formation responsible for flying operations, who shall be the committee chair;
- b. representatives of flight safety (WFSO, UFSO), operations, technical, support and medical services; and
- c. other representatives as required whenever the agenda for a meeting includes items relating to their specialties.

FREQUENCY OF MEETING

32. Ideally, FS committees should meet several times a year, but not less than twice per year.

CONDUCT OF MEETING

33. The committee should examine and consider:
- a. action items from previous minutes;
 - b. FS and AWS surveys;
 - c. feedback from FS and AWS occurrences;
 - d. necessary corrective action;
 - e. topical items related to present and upcoming operations;
 - f. items for the next FS committee meeting;
 - g. reports of subcommittees;
 - h. emerging trends (i.e. what happened last year over the same period); and
 - i. awareness training on relevant safety issues.

ADDITIONAL RESPONSIBILITIES

34. The FS Committee should also:
- a. monitor implementation of PM within their authority;
 - b. recommend to higher authority measures beyond local capability and monitor the progress of such recommendations; and
 - c. maintain minutes of the committee's proceedings.

WING FS COMMITTEE COMPOSITION

35. The Wing FS Committee should include the following, or their equivalent:
- a. the WComd, who acts as the chairperson;
 - b. the CO of each unit involved in flying operations, including lodger units;
 - c. the Wing Logistics Officer (WLogO) or his equivalent;
 - d. the CO AMS;
 - e. the Wing Surgeon or Flight Surgeon;
 - f. the Wing Air Traffic Control Officer (WATCO);
 - g. the FOD Committee chairperson;
 - h. the WFSO;
 - i. the D/WFSO; and
 - j. staff specialists (i.e. Air Weapons Officer and / or Air Weapons Safety Technical Member) whenever an agenda item requires their presence or additional members as prescribed by the WComd.

36. The WComd will designate who will act as the secretary.

RECORDS OF DISCUSSION

37. Minutes of FS Committee meetings shall be officially recorded. The WFSO is responsible for tracking the progress of action items.

DISTRIBUTION OF MINUTES

38. Distribution of the minutes shall include one copy each for C Air Force / DFS 2, 1 Div FSO and the WFSO if the minutes are from a unit. These copies should be sent simultaneously to the addressees, so that there is minimum delay. The comments of each level may still be sent through normal channels. Distribution of the minutes to common users should also be considered. Minutes shall be transmitted electronically to speed delivery.

FOREIGN OBJECT DAMAGE (FOD) COMMITTEE

39. Each unit associated with flying operations must establish a FOD committee in accordance with C-05-005-P10/AM-001. This committee should be set up as a sub-committee of the FS Committee.

OTHER FS COMMITTEES

40. The FSO shall also serve on committees dealing with issues that impact the safe conduct of flying operations, like hazardous materials (HAZMAT), bird strike prevention and snow and ice removal.

AGREEMENTS

41. Canada / DFS is a signatory of several FS agreements at the national and international level. Their implementation ensures our mandate is accomplished when operating air assets at home or abroad or when foreign military air assets operate in Canada. The following paragraphs summarize the principal flight safety agreements in place. A link to these documents can be found on the DFS Internet and Intranet sites.

INTERNATIONAL AGREEMENTS

42. The DND / CF FS Program is aligned with the policies and aims of the aviation safety programs of the International Civil Aviation Organization (ICAO) and the North Atlantic Treaty Organization (NATO).

ICAO CONVENTION ANNEX 13

43. The ICAO Convention Annex 13 specifies the activities required following an occurrence to an aircraft of a contracting state in the territory of another contracting state.

NATO STANAG 3101

44. This NATO Standardization Agreement establishes procedures for the exchange of safety information peculiar to aircraft types and missiles in current use by NATO nations.

NATO STANAG 3102

45. This NATO Standardization Agreement establishes the requirement for coordination of accident prevention matters when a detachment of one nation operates within or over the sovereign territory of another nation for 8 days or more, or when aircraft of two or more nations participate in combined / joint air operations within the sovereign territory of any NATO nation and / or out-of-area air operations.

NATO STANAG 3117

46. This NATO Standardization Agreement establishes the aircraft marshalling signals and the distinctive garment to be worn by aircraft marshallers.

NATO STANAG 3230

47. This NATO Standardization Agreement establishes the parameters for emergency markings on the outside and the inside of aircraft.

NATO STANAG 3318

48. This NATO Standardization Agreement establishes procedures for the aeromedical investigation of occurrences involving military aircraft or missiles where the equipment, facilities or personnel of two or more NATO nations are involved.

NATO STANAG 3379

49. This NATO Standardization Agreement establishes the in-flight visual signals and the essential procedures for using them.

NATO STANAG 3531

50. This NATO Standardization Agreement establishes procedures for the reporting and safety investigation of occurrences involving military aircraft where the equipment, facilities or personnel of two or more NATO nations are involved.

NATO STANAG 3533

51. This NATO Standardization Agreement establishes basic safety procedures, regulations and responsibilities for flying and static displays that involve aircraft of two or more NATO nations.

NATO STANAG 3564

52. This NATO Standardization Agreement establishes the responsibilities for the planning and conduct of NATO live air weapons demonstrations.

NATO STANAG 3750

53. This NATO Standardization Agreement establishes procedures for the reporting and investigation of air traffic incidents.

NATO STANAG 3879

54. This NATO Standardization Agreement establishes the procedures and formats for the exchange of information on the intensity of bird migration and the reporting of bird strikes.

NATO STANAG 7160

55. This NATO Standardization Agreement is an aviation safety document (AFSP-1 Flight Safety) that sets out aviation safety principles, policies and procedures, in particular those aimed at accident prevention for use as required by NATO participating nations.

NATIONAL AGREEMENT

DFS / TSB WORKING AGREEMENT

56. FS investigations conducted by DFS follow a protocol similar to that of the TSB as prescribed by the *Aeronautics Act*. A working agreement exists between DFS and the TSB that provides direction for the coordinated investigation of transportation occurrences by DND and the TSB.

SERVICE LEVEL AGREEMENTS

57. Different agreements have been signed between DFS or other departmental organizations mandated to support DFS during the conduct of investigations. Such agreements are in place with the Quality Engineering Test Establishment (QETE), Defence Research and Development Canada – Toronto (DRDC Toronto) and the National Research Council of Canada.

Annex A
Chapter 2
A-GA-135-001/AA-001

ANNEX A - AIR CADET FLYING PROGRAM

FS PROGRAM RESPONSIBILITY

1. The CF responsibility for the FS aspect of the Air Cadet Flying Program is derived from Section 43 of the *National Defence Act*. The CDS is tasked with operational command and control of the Air Cadet Flying Program, specifically all air cadet gliding and powered flight operations, including familiarization flying funded by DND / CF and the FS Program.

INVESTIGATION OF CADET OCCURENCES

2. The investigation of air cadet occurrences will be carried out on behalf of the AIA as outlined in the AIM and conducted as follows:

- a. Air Cadet Glider Program (ACGP). The ACGP is a national program consisting of familiarization flights and glider pilot flying training. All air cadet gliding resources are owned by the provincial committees of the Air Cadet League of Canada and are Transport Canada registered, but operational control rests with the CF. All serious occurrences with aircraft involved in the ACGP shall be investigated by DFS / AIA. Thus in accordance with section 18(1) of the *Canadian Transportation Accident Investigation and Safety Board Act* (CTAISB), the aircraft involved here are considered a “military conveyance”. The TSB must be notified by the quickest means possible following any significant occurrence, using the procedures prescribed in the *Canadian Air Regulations* (CARs) and the Working Agreement between DND and TSB; and
- b. Air Cadet Powered Flight Program (ACPP). The ACPP is a national program consisting of familiarization training funded by the local Sponsoring Committee of the applicable air cadet squadron and a summer pilot ab-initio flight training funded by DND. The conduct of a cadet occurrence investigation is governed as follows:
 - (1) Familiarization Flights. The civilian registered aircraft used to conduct the winter familiarization flying program are not considered “military conveyance” aircraft given these flights are contracted by the Local Sponsoring Committee. Therefore, the FS investigations of any occurrence related to this part of the ACPP would be the responsibility of the TSB. DFS would be invited to participate in the investigation as per the Working Agreement between TSB and DND, and
 - (2) Ab-initio Flight Training. The civilian registered aircraft used to conduct ab-initio flight training as part of the Power Pilot Scholarship program are considered “military conveyance” aircraft. Therefore, any FS investigations are the responsibility of the CF as per the *CTAISB Act*. Notwithstanding, TSB would be invited to participate in the FS investigation as per the Working Agreement between TSB and DND.

DESIGNATED SUPPORT WINGS

3. In view of the structure of the Air Force, certain FSOs from designated wings will act as FS advisors to the Region Comds. This working relationship will apply only when these personnel are performing FS duties associated with Air Cadet flying program activities. The Region Comds and associated FSOs are listed in Table 2 below.

REGION	REGION COMD	DESIGNATED FSO
Atlantic	Comd MARLANT	14 Wing Greenwood
Eastern	Comd LFQA	3 Wing Bagotville
Central	Comd LFCA	8 Wing Trenton
Prairie	Comd 1 Cdn Air Div	17 Wing Winnipeg
Pacific	Comd MARPAC	19 Wing Comox

Table 2 – Regions and designated FSOs

4. The FSO from the designated support wing will act as the FS advisor for each respective regional site. The FS support to Air Cadet Glider program gliding sites will be promulgated on an annual basis by 1 Cdn Air Div before the start of the annual Air Cadet Glider program.

DUTIES AND RESPONSIBILITIES

DFS RESPONSIBILITIES

5. The DFS responsibilities for the national cadet program are as follows:
- advise on the implementation and monitor the effectiveness of the regional FS Program in cooperation with D Cdts and the Regional Cadet Air Operations Officer (RCA Ops O);
 - coordinate independent airworthiness investigations for aircraft occurrences and investigate as required;
 - provide annual FS briefings to summer gliding schools;
 - monitor incidents and the follow-up PM; and
 - monitor FS surveys from all gliding sites.

1 CDN AIR DIV FSO RESPONSIBILITIES

6. 1 Cdn Air Div FSO responsibilities for the national Air Cadet Glider program are listed below:
- assign, as required, the Wing and Unit FSO positions to meet designated regional gliding school and gliding familiarization site requirements; and
 - provide advice and assistance to Comd 1 and Comd 2 Cdn Air Div on Air Cadet Glider program FS matters.

SUPPORT WING RESPONSIBILITIES

7. The responsibilities of the WFSO and responsibilities for the national Air Cadet Glider program are to:

- a. provide FS assistance to Air Cadet Glider program activities at a designated site;
- b. advise the school / site comds on FS matters in cooperation with the Air Cadet Glider program FSO;
- c. monitor the safety aspects of flying operations in cooperation with the Air Cadet Glider program FSO;
- d. provide assistance in the preparation and timely submission of initial and supplementary occurrence reports, and recommend PM resulting from occurrences;
- e. conduct biennial FS surveys of all designated gliding sites in conjunction with RCA Ops O;
- f. provide assistance to DFS and RCA Ops O in the event of an accident; and
- g. review Air Cadet Glider program occurrence reports for quality assurance.

FSO RESPONSIBILITIES

8. RCA Ops Os shall designate a Unit Flight Safety Officer (UFSO) for the Regional Gliding School and a Regional Flight Safety Officer (Reg FSO) for all the glider familiarization sites. The UFSO / Reg FSO must be familiar with the unit's/region's operations in order to provide sound advice on accident prevention and hazardous conditions. Also, at each gliding site, an FSO will be designated (Gliding Site FSO). In their proper chain of command, the FS staff responsibilities are as follows:

- a. advise the school / site comd on all aspects of FS;
- b. report all incidents and accidents in accordance with A-GA-135-001/AA-001;
- c. aid school / site comds in the implementation of the unit FS Program; and
- d. monitor all aspects of the operation and advise school / site comds of hazardous conditions.

DETECTION OF UNSAFE PROCEDURES

9. If, during the course of their duties, FS personnel detect any unsafe procedures / practices, they shall immediately notify the site comd, who will immediately rectify the situation and advise of corrective actions taken. The UFSO / Reg FSO will keep the WFSO / BFSO informed of important FS matters.

OCCURRENCE ACTION

10. In the event of an FS occurrence:

- a. the FS personel will file the initial occurrence report;
- b. the UFSO / Reg FSO is responsible through the RCA Ops O for investigating the incident and filing a supplementary report (SR) within 30 days. Distribution of the initial and the SR will be accomplished through the FSOMS as well as any other appropriate addressees;
- c. the support WFSO will maintain files of all the ACGP FS reports and monitor the reporting process;
- d. the support WFSO will assist the UFSO / Reg FSO with any investigations into air occurrences within their region of responsibility; and
- e. the FSO will advise the Region Comd on serious gliding occurrences as required.

ACCIDENT ACTION

11. In the event of an accident:

- a. the Gliding Site FSO and/or the Site Commander shall complete the necessary action requirements and initiate reporting in accordance with a detailed Site specific Emergency Response Check List approved by the RCA Ops O;

NOTE

This requirement will differ from site to site depending upon whether the field is DND or TC, controlled or uncontrolled, etc.

- b. the Gliding Site FSO and/or the Site Commander shall ensure that the UFSO/Reg FSO is contacted immediately;
- c. the UFSO / Reg FSO informs that the RCA Ops O;
- d. the RCA Ops O inform the appropriate WFSO / BFSO; and
- e. Upon notification of an accident notification, the RCA Ops O / WFSO / BFSO will ensure the fol organizations are notified:
 - (1) DFS (via toll free number 1-888-WARN DFS / 927 6337). Personnel requirements for an investigation will be coordinated by DFS and NDHQ / D Cdts 4-6 (National Cadet Air Operations officer). DFS will provide investigative assistance and advice as required,
 - (2) the National Defence Integrated Command Centre (NDICC), and
 - (3) the 1 Cdn Air Div Air Ops Centre (AOC) have been notified and then will assist

REVIEW PROCESS

12. On completion of a FS investigation, a draft report for comment will be sent to persons of direct interest (PDI), CO RCSU (or equivalent), Region Comd and NDHQ VCDS/D Cadets. The action letter for PM implementation will be signed by the C Air Force as the AA.

Annex B
Chapter 2
A-GA-135-001/AA-001

ANNEX B – CONTRACTOR FS PROGRAM

GENERAL

1. Contractors form an important part of the DND aircraft maintenance philosophy and by extension, the preservation of DND assets during this unique activity. It is essential that each contractor develop a comprehensive FS Program that takes into account the depth of maintenance and extends to flight line test and ferry flight activities. In those locations where the civilian contractor falls under the FSO for FS matters, the contractor shall follow the wing FS Program.

APPOINTMENT OF FS SPECIALIST (FSS)

2. The contractor shall appoint a FSS at all contractor facilities where DND owned or controlled aircraft are maintained. The FSS and other FS personnel shall attend the CF FS Course (FSC). FSC course loading is done through the 1 Cdn Air Div / 1 Div FSO.

FSS DUTIES AND RESPONSIBILITIES

3. The FSS must have direct access to the CEO or equivalent or a delegated company representative with sufficient authority to implement corrective action if required. The FSS should be experienced in the relevant aircraft systems and operations and have a good knowledge of all specialties under the contractor's control. DFS and the 1 Div FSO shall be advised of FSS appointments and qualifications.

4. The post-occurrence obligations of a contractor FSS are fairly similar to those of a DND FSO; however, it is recognized that the Airport Authority or other authorities may have areas of responsibility that supersede or overlap those obligations. It is also realized that much of A-GA-135- 001/AA-001 is specific to DND organizations and therefore requires some interpretation for civilian application. Accordingly, the contractor FSS shall ensure that the intent of the requirements of this publication are addressed either by the company or by other authorities, and shall document those areas that are under direct contractor control and those areas that are the responsibility of another authority.

5. The contractor FSS shall ensure that all FS occurrences involving DND aircraft are reported and investigated notwithstanding the fact that NDQAR Offices are identified as the unit of ownership. In that regard, the FSS hold similar status and have the same reporting obligations as a UFSO. The contractor's role with respect to a FS investigation will be determined on a case-by-case basis by DFS. If applicable, questions can be directed to their assigned Wing FSO or DFS. Any investigation activity conducted is done on behalf of the AIA and the provisions outlined in the AIM apply. The AIM stipulates that the airworthiness investigations are based on four principles:

- a. conducted independently from any influence of the Chain of Command;
- b. must not assign blame;
- c. focus in developing effective and practical PM that will preclude or reduce the risk of a reoccurrence; and
- d. make recommendations, through the AIA, to the Chain of Command for action.

6. Contractors that are co-located with units / wings are encouraged to work closely with the local FSO. Offices should be established to promote synergies between the military and civilian programs.

Project offices and PWGSC contracting personnel should stipulate the possibility of joint DND / contractor FS offices during the contracting process.

NOTE

Transfer of aircraft airworthiness investigation ownership to organizations outside of the CF is impractical, for financial and legal reasons. When the NDQAR is identified as the unit of ownership in instances identified in chapter 7, the responsibility to report and investigate occurrence rests with the contractor FSS as detailed above.

CHAPTER 3 – EDUCATION AND TRAINING

GENERAL

1. FS education is one of the fundamental elements of the FS Program. All personnel who are involved in flying operations or the support of flying operations must not only be aware of the FS Program, they must have a solid understanding of the program's objectives, principles and basic processes. This therefore requires a robust formal and informal education program.
2. The teaching of specific skills and knowledge is essential in achieving the aim of preserving aviation assets necessary to conduct the missions of the CF. Thus FS education is the responsibility of all personnel.

INFORMAL EDUCATION AND TRAINING

3. FS education/training is achieved through both formal and informal means. Informally, FS publications, magazines, bulletins, videos, posters, web-based materials, FS briefings, aviation conferences and seminars, including those from other militaries and civilian organizations such as Transport Canada, are all resources that may be used in FS education. This list is not exhaustive, so Air Force personnel are encouraged to actively seek materials and information from numerous sources in order to broaden their FS knowledge. Links to the FS websites and FS Programs and materials can be found on the DFS websites.
4. One of the most effective but often overlooked methods of FS education is the passing of lessons learned from leaders and experienced personnel to those with less experience. The FSO should encourage and afford opportunities to facilitate the exchange of information between unit personnel.

FS QUALIFICATION

5. Personnel selected for FS positions require formal training in order to execute the duties and responsibilities of FS professionals.
6. Formal training is required for FS personnel to obtain an FS accreditation. The formation is conducted by 1 Cdn Air Div FS staff. There were two formal CF flight safety courses designed to fulfill this training requirement. These courses lead to a recognized qualification. The relevant course codes were:
 - a. Basic Flight Safety Course: AEVM (formerly AGNL); and
 - b. Advanced FS Course: AEWD (formerly AGQG).
7. The two courses have been consolidated in one FS course (FSC) starting in November 2012. The FSC course code is TBD.

INVESTIGATOR QUALIFICATION

8. Under the requirements of the CF Airworthiness Program, all occurrence investigators must be accredited in order to conduct FS investigations. The Airworthiness Investigation Manual (AIM) describes a formal system establishing three levels of basic investigators (BI 1, BI 2 and BI 3) and three levels of investigators in charge (IIC 1, IIC 2 and IIC 3). The qualification level (1, 2 or 3) determines the highest Class of investigation in which an IIC or BI can participate as described in Chapter 9. The

AIM specifies the standards and qualifications for these FS investigators.

AIR WEAPONS SAFETY AWARENESS TRAINING

9. Aircrew personnel working directly with air weapons shall receive air weapons systems familiarization training and instruction on the operational and safety requirements for weapons-loaded aircraft in accordance with B-GA-297-001/TS-000.

10. Air weapons awareness training is applicable to personnel who are regularly exposed to the hazards of air weapons such as maintenance officers, aircraft technicians, aircrew, fuel bowser drivers or those personnel who may have to respond to an air weapons occurrence, such as firefighters or security personnel. This training is required to ensure that those working with or around air weapons possess the knowledge required to perform their duties safely and effectively. This training shall be conducted in accordance with BGA-297-001/TS-000 (Safety Orders for CF Air Weapons Systems).

11. The training will be included in wing or unit familiarization briefings and should encompass, but not be limited to the following:

- a. recognition of the air weapons used at the unit and the dangers associated with them, including the precautions to be taken in the vicinity of the weapons;
- b. recognition of air weapons warning signs, placards, flags and banners that indicate danger areas and hazards;
- c. danger areas into which personnel shall not enter unless authorized;
- d. armament operations which could impinge on the daily routine of the unit i.e. conveying air weapons along regular traffic routes or closing some part of the unit when a particular air weapons operation is in progress; and
- e. persons to contact if air weapons safety information is required.

SPECIALIZED INVESTIGATOR TRAINING

12. DFS and 1 Div FSO investigators undergo additional advanced investigator training. FSOs are encouraged to get additional investigative and FS training as their responsibilities, budgets and COs permit. A list of additional courses is available on the DFS website.

BLOODBORNE PATHOGENS (BBP) TRAINING

13. FS personnel are not tasked with handling of those injured or killed in aircraft occurrences; however, the subsequent on-site investigation puts them at potential risk from BBP. Jagged metal covered with tissue or body fluid is an important hazard in the post-crash environment. The actual risk at any given occurrence site varies considerably. The presence of BBP is often unknown and amount of tissue or body fluid present fluctuates so universal precautions are always applied. Therefore, all CF FS personnel will receive initial and annual refresher training on infection prevention with respect to BBP and safe practice in an investigation context.

14. Initial BBP training for flight safety personnel will be presented on the FS course (FSC). Annual refresher training may be by flight surgeon or by BBP video presentation designated by DFS and will consist of: general information about infection prevention and control, information about BBP transmission, preventing exposures, immunization (Hep B vaccine), specific procedures for occurrence investigation sites, including action following an exposure, and, resources for further assistance. FS personnel

will know how to use personal preventive equipment. Records of participation will be maintained by 1 Cdn Air Div FS staff.

OTHER SAFETY COURSES

15. A variety of other safety courses have links to, or application within, the FS education and training program. Courses such as Human Performance in Military Aviation (HPMA) contribute directly to the aims of the FS Program. Courses for other established safety programs also offer opportunities for education/training in FS. These courses include General Safety, Laser Safety, Nuclear Radiation Safety, Electro Magnetic Radiation Safety, Ramp Safety, and On Scene Comd Emergency Response.

FS PROFESSIONAL DEVELOPMENT

16. It is anticipated that comds and managers will provide all FS staff with timely opportunities to enhance their professional knowledge and to interact with local and regional FS organizations like TSB, TC, airport authorities and regional aircraft operators. Participation in relevant FS and aviation conferences / seminars on an annual basis is encouraged. A list of recommended conferences and seminars is available on the DFS website under Training / Flight Safety Professional Development.

CHAPTER 4 – PREVENTION ACTIVITIES

References: A. 1016-18 (DFS) 7 May 2007 - CVR/FDR Policy

B. 1 Cdn Air Div Orders, Vol 3, 3-304: Flight data recorder/Cockpit Voice Recorder/Crash Position Indicator/Other Cockpit Flight Recording Devices

C. EUROCAE document ED-112 Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems

GENERAL

1. FS prevention activities include the Bird Strike Prevention Program and the FS survey. An effective Bird Strike Prevention program and regular FS surveys are key to maintaining a combat-capable and operationally effective force.

BIRD STRIKE PREVENTION PROGRAM

AIM OF PROGRAM

2. The aim of any Bird Strike Prevention Program is to minimize bird hazards to aircraft operating from DND airfields.

OBJECTIVES

3. The Bird Strike Prevention Program must have at least four objectives:

- a. management of the environment;
- b. dispersal of birds;
- c. education of aircrew; and
- d. reporting bird strikes and near misses.

4. Birds constitute a significant hazard to aircraft. The vast majority of bird strikes occur within five miles of an aerodrome. A comprehensive Bird Strike Prevention Program shall be implemented to reduce their impact.

5. The key element of a good Bird Strike Prevention Program is the establishment of an effective unit bird and animal control committee. Although bird and animal control is an ATC responsibility, FSOs must play an active role.

6. The Bird Strike Prevention Program strives to manage the environment around the airport. The objective of the plan is to make the airfield unattractive to birds. Studying the birds that inhabit the environment of the airport will suggest measures that can be taken to make the airport unattractive to them. Some measures are obvious such as draining wet areas and cutting down trees. Others, such as changing ground cover or using chemicals, are more complex. Each airport has its own study and improvement plan, which must conform to environmental constraints.

7. Successful measures to modify an airport habitat require the advice of an ornithologist. Almost every DND airport has been surveyed. Reports are available through the FSO or DFS. If a new survey is required, the wing can request NDHQ / DGRPP (Director General Realty, Policy and Plans) to arrange a bird hazard survey in conjunction with the Canadian Wildlife Service (CWS).

BIRD STRIKE REPORTING

8. A link to detailed information on airfield environment management procedures can be found on the DFS websites. Further guidance is available in CFACM 2-813, *Air Traffic Control Manual of Operations – Aerodrome Bird and Animal Control*, and in *Sharing the Skies – An Aviation Industry Guide to the Management of Wildlife Hazards* (TP13549).

PREVENTION STRATEGY

INFORMATION ON BIRDS

9. Transport Canada operates a website on wildlife control which provides access to bird strike data. The DFS website, under the tabs Resources / Links provides a link to the TC Wildlife Control web page as well as to the Bird Strike Association of Canada web page.

REPORTING BIRD ACTIVITY

10. Pilots shall advise air traffic control and other aircraft of any significant bird activity.

11. Aircrew shall report to their FSO each time they experience a bird strike or near miss. Form CF 215 – FS Occurrence Information Sheet shall be used to assist in providing the required information. The FSO will ensure that the information collected, including category of damage, is entered in the FSOMS database. This will supply the information on bird habits necessary for preventing bird strikes.

IDENTIFICATION OF BIRD TYPE

12. Accurate identification of bird remains provides invaluable information for an effective Bird Strike Prevention Program. Local expertise (bird watcher groups, ornithologists, wildlife specialists) should be used whenever possible to identify bird remains. Annex A contains a list of regional offices of the CWS.

FS SURVEYS

PURPOSE

13. An FS survey measures the effectiveness of an FS program and assists in the identification of recommended PM. Comds have found that FS surveys identify deficiencies that would otherwise have gone undetected until revealed as the causes of occurrences.

REQUIREMENT

14. Surveys are an FS necessity at every level of operational command as well as at contractor facilities that support the maintenance and operation of CF aircraft.

FREQUENCY

15. FS surveys must be conducted on a regular basis if they are to be effective. The type of survey normally dictates how often they should be conducted.

TYPES

16. There are four types of FS surveys:

- a. a formal survey;
- b. an informal survey;

- c. an air weapons survey; and
- d. a contractor survey.

FORMAL SURVEY

17. A formal survey is usually conducted by specialists from a formation other than that which is being surveyed (e.g. 1 Cdn Air Div survey of a wing, base or unit). The comd of the formation to be surveyed is usually notified in advance and is always briefed on the results. The survey team must be cooperative, understanding and helpful. Comds can also request surveys whenever they want to have an outside view of their unit. Formal surveys of ATESS and AETE shall be conducted on behalf of C Air Force by the 1 Cdn Air Div FSO, and the Divisional Staff will be responsible for follow-up action.

INFORMAL SURVEY

18. An FSO informal survey is normally carried out as a minimum once a year by the FSO as part of the FS Program. Inviting an FSO from outside the unit to conduct the survey provides a fresh view and an invaluable exchange of ideas.

19. The FSO shall survey the units in their organization at least once every year; this includes contractor operated units / sections. Unit FS teams should survey their unit on a regular basis as part of their yearly program. Both the UFSO and FS NCM should visit each section regularly throughout the year. Further, whenever someone joins an FS team, be it at the wing or unit level, they should visit all sections within their purview within one month of assuming their duty.

AIR WEAPONS SURVEY

20. An internal air weapons safety survey shall be conducted in any unit involved in air weapons operations. The survey should be a coordinated effort involving both FS and AWS personnel. A combined FS/AWS Formal Survey should be conducted by 1 Cdn Air Div every 24 months.

CONTRACTOR SURVEY

21. DFS will conduct a contractor survey of all contractor facilities where DND owned or controlled aircraft are maintained. Annex C contains a sample contractor FS survey checklist. These surveys will be conducted every 18–24 months.

CONDUCT

22. Survey members may receive conflicting information. The survey team must attempt to balance these inputs and must rationalize these inputs with the “big picture”. There are three basic tenets to conducting an effective FS survey: listen effectively, observe objectively and share all observations in an open and honest manner. The biggest challenge to overcome is the fact that a survey is a snapshot in time and it is difficult to receive feedback and insights from everyone.

TEAM COMPOSITION

23. A survey team comes in many shapes and sizes, all based upon the scope of the survey. An informal unit survey by a WFSO may be comprised of a sister squadron FSOS, the host UFSO / FS NCM and the D/WFSO, whereas a formal survey by 1 Cdn Air Div FSO will have up to 12 members. A unit team that surveys its own operation would likely consist of the UFSO and FS NCM. Another perspective is to do a combined survey, perhaps with the general safety organization, and make up a

joint team.

QUESTIONNAIRES

24. Questionnaires can be used effectively during surveys. One of the difficulties of taking a snapshot of a unit is the number of people one can meet. A simple questionnaire that can be distributed beforehand and collected during the survey provides the survey team a much broader reach. The questionnaire should be short, easy to complete, anonymous, and use questions that are objective in nature. It is important to collate the results quickly and ensure effective feedback is provided to both the chain of command and those who were surveyed.

FORMAL SURVEY REPORT

25. The formal survey report process will consist of three distinct phases:
- the first phase is that the survey team lead will provide a verbal debrief, at the end of the survey, to the host WComd / Sqn CO. The debrief should include all significant findings and observations as well as any analysis from items such as survey questionnaires;
 - the second phase is a written report to the WComd and other applicable comds. The report must identify recommendations and where possible, suggested action levels, e.g. C Air Force, 1 Cdn Air Div, and wing. The written report should be staffed and distributed within one month of the survey completion date; and
 - the third and final phase of the survey process is for the host wing / unit to provide written feedback on the status of final report recommendations. 1 Cdn Air Div FSO will track status / closure of formal FS report recommendations.
26. Surveys consist of two phases: the actual 3-part survey and the resulting implementation of recommendations. Annex B contains a sample FS survey checklist. Annex D contains a sample FS survey checklist for the Air Cadet Gliding Program.

ACTION ON CHANGE OF COMMAND

27. When there is a change of command, a survey of the unit shall be conducted as soon as practical to provide the CO with an updated FS health check of the unit.

FEEDBACK AND FOLLOW-UP

28. The survey process is conducted primarily to provide the chain of command with credible advice on how to better accomplish the mission. There are a variety of formats available to provide such advice, be it the informal verbal debrief or a more formal written report. Regardless of which method is utilized, it is essential to have a clear aim and a set structure that leads to a logical conclusion and recommendations. To ensure closure, it is important that realistic target dates be established for each recommendation; moreover, recommendations must be affordable, achievable and based on common sense. Recommendations without an assigned target date for closure can cause the survey to become merely an event instead of a process, thereby greatly limiting any potential improvements or enhancements that could result from the operation. There are tremendous advantages to capturing the observations and recommendations in a written format. A written report, be it in point form or in full paragraph form, provides a clear delineation of the observations and recommendations.

CONDUCT OF FORMAL SURVEY

29. 1 Div FSO will conduct a formal survey of each wing once every 18–24 months. The FS survey

checklist at Annex B will be used as a guideline for areas to be surveyed. A formal report will be released by the 1 Div FSO to the host WComd / Sqn CO within one month of the survey completion date; subsequently the Comd 1 Cdn Air Div and A-staff will be de-briefed on the survey findings and recommendations. The 1 Div FSO is responsible for tracking the status of all recommendations in the written report .

TEAM MEMBERS

30. The survey team for a formal survey will usually be composed of some 10 to 12 members as follows:

- a. Lead – The formal survey team will normally be led by the appropriate 1 Div FSO desk officer at 1 Cdn Air Div;
- b. appropriate desk officer from DFS;
- c. additional 1 Cdn Air Div FS team members as required;
- d. FSO from sister wing (e.g. survey of 4 Wg will have 3 Wg FSO on team);
- e. ATC rep;
- f. maintenance reps (including augmentation from A4 Maint and DFS); and
- g. other members as required.

TIMELINES

31. The following are the recommended timelines for a formal survey:

- a. initial staff check for timings with wing 4–6 months before survey;
- b. request for team member participation 2–4 months before;
- c. survey directive with questionnaire released by 1 Div FSO to WComd 1 month before;
- d. initial FS team brief by team lead 1–2 weeks before survey;
- e. final written report to Wcomd 1 month after survey completion; and
- f. response from applicable OPIs, based on survey recommendations, to 1 Cdn Air Div.

CVR AND FDR PARAMETER REQUIREMENTS

32. The Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR) Parameter policy (ref A) established the airworthiness requirements for CF 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 C Air Force is set to transition to a DAOD to be published.

33. Ref C represents the minimum standards required for CVR and FDR. It does not address military role specific parameters to be recorded. It is considered the basis for new aircraft procurement; however, in-service fleets are expected to become fully compliant with the CVR/FDR equipment requirements. Given this objective will be achieved over the long-term, it is expected that fleet managers will seek alternate means of compliance and obtain from the AA the appropriate waivers.

34. Annex E to this chapter details a list of additional CVR/FDR parameters for given aircraft families.

Annex A
Chapter 4
A-GA-135-001/AA-001

ANNEX A – REGIONAL OFFICES OF CANADIAN WILDLIFE SERVICE

ATLANTIC REGION

Canadian Wildlife Service and Environment Canada
63 East Main Street
P.O. Box 1590
Sackville, New Brunswick E0A 3C0

QUEBEC REGION

Canadian Wildlife Service and Environment Canada
1141, route de l'église, 9th Floor
C.P. 10 100
Sainte-Foy, Quebec G1V 4H5

ONTARIO REGION

Canadian Wildlife Service and Environment Canada
49 Camelot Drive
Nepean, Ontario K1A 0H3

WESTERN AND NORTHERN REGION

Canadian Wildlife Service and Environment Canada
Room 210, 2nd Floor
4999 - 98th Avenue
Edmonton, Alberta T6B 2X3

PACIFIC AND YUKON REGION

Canadian Wildlife Service and Environment Canada
P.O. Box 340
Delta, British Columbia V4K 3Y3

Annex B
Chapter 4
A-GA-135-001/AA-001

ANNEX B – FS SURVEY CHECKLIST

LEGEND

A: SATISFACTORY

B: SATISFACTORY WITH DEBRIEFING

C: UNSATISFACTORY

SER	ITEM	A	B	C	REMARKS
FSO / D/FSO					
1.	Access to comd: <input type="checkbox"/> Direct <input type="checkbox"/> Indirect				
2.	Access to branch and section heads: <input type="checkbox"/> Direct when necessary				
3.	Relationship with subordinate personnel: <input type="checkbox"/> How well are the FSO / FSNCM known? <input type="checkbox"/> Meetings with FS team				
4.	Adequacy of personal visits to sections: <input type="checkbox"/> Regular and frequent <input type="checkbox"/> Non-flying units				
5.	Feedback process to CO: <input type="checkbox"/> If problems identified on visits <input type="checkbox"/> Areas of concern through trend analysis <input type="checkbox"/> Routine or only as required				
6.	Training: <input type="checkbox"/> Basic, Advanced, FSOMS <input type="checkbox"/> Additional courses (human factors, SCSI, etc.) <input type="checkbox"/> Time in job				

SER	ITEM	A	B	C	REMARKS
7.	Concept of Ops / Business Plan: <input type="checkbox"/> Structured routine or reactive <input type="checkbox"/> Mission, assumptions, risks, initiatives				
8.	Does the FSO have any secondary duties? <input type="checkbox"/> Time dedicated to FS duties <input type="checkbox"/> Time dedicated to other duties (primary or secondary) <input type="checkbox"/> Other major projects				
9.	Does the FS NCM have any secondary duties? <input type="checkbox"/> Time dedicated to FS duties <input type="checkbox"/> Time dedicated to other duties (primary or secondary) <input type="checkbox"/> Other major projects				
10.	MOS ID currency: <input type="checkbox"/> Meets requirements / staying current <input type="checkbox"/> Time away from FS job as a result				
FS OFFICE					
11.	Location: <input type="checkbox"/> Proximity to flight line <input type="checkbox"/> Proximity to comd <input type="checkbox"/> Proximity to clerical staff				
12.	Adequacy of equipment: <input type="checkbox"/> Cellular, pager, voice mail <input type="checkbox"/> FSOMS, Internet, laptop <input type="checkbox"/> Digital camera <input type="checkbox"/> Accident kits (complete)				

SER	ITEM	A	B	C	REMARKS
13.	Supplies: <input type="checkbox"/> Resource material <input type="checkbox"/> Hazard reports <input type="checkbox"/> Posters <input type="checkbox"/> Magazines <input type="checkbox"/> Videos				
14.	Support: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative				
15.	Files: <input type="checkbox"/> Functional <input type="checkbox"/> Adequacy <input type="checkbox"/> Special interest items <input type="checkbox"/> Completeness				
16.	FSOMS: <input type="checkbox"/> Number of terminals <input type="checkbox"/> Location <input type="checkbox"/> Handbook <input type="checkbox"/> Familiarity				
17.	Publications: <input type="checkbox"/> A-GA-I35-001 <input type="checkbox"/> AOIs for all unit aircraft <input type="checkbox"/> Human factors books <input type="checkbox"/> Safety magazines <input type="checkbox"/> ERP				

SER	ITEM	A	B	C	REMARKS
FS PROGRAM					
18.	Written program: <input type="checkbox"/> CO's philosophy <input type="checkbox"/> Focused, fast, flexible, friendly <input type="checkbox"/> Achievable <input type="checkbox"/> Updated and current				
19.	Occurrence reporting: <input type="checkbox"/> Process <input type="checkbox"/> Records / filing system <input type="checkbox"/> Inclusion of flying / ground supervisor <input type="checkbox"/> Process for deployed operations <input type="checkbox"/> Preventive measures follow-up <input type="checkbox"/> Trends analysis technique				
20.	FS meetings: <input type="checkbox"/> Frequency <input type="checkbox"/> Format <input type="checkbox"/> Training <input type="checkbox"/> Attendees (ops, maint, support)				
21.	FS boards: <input type="checkbox"/> Location <input type="checkbox"/> Effectiveness <input type="checkbox"/> Up to date <input type="checkbox"/> Methods of display				
22.	Hazard reports: <input type="checkbox"/> Use promoted <input type="checkbox"/> Availability of blanks <input type="checkbox"/> Processing of completed forms <input type="checkbox"/> Follow-up procedures				

SER	ITEM	A	B	C	REMARKS
23.	Education and promotion: <input type="checkbox"/> Frequency and venue <input type="checkbox"/> Relevance <input type="checkbox"/> Topics (HF, communication, seasonal) <input type="checkbox"/> Aircrew / ground crew <input type="checkbox"/> Pre-deployment <input type="checkbox"/> Originality				
24.	ALSE: <input type="checkbox"/> ALSEO trained <input type="checkbox"/> Process to staff and track issues <input type="checkbox"/> Attendance/inputs to annual PRM				
25.	Awards program: <input type="checkbox"/> Effectiveness <input type="checkbox"/> Visibility				
26.	Local surveys: <input type="checkbox"/> Frequency <input type="checkbox"/> Use of external resources (FSOs, FS NCMs) <input type="checkbox"/> Effectiveness in tracking findings <input type="checkbox"/> Follow-up action				
27.	Use of external resources: <input type="checkbox"/> Use of external subject matter experts for briefings <input type="checkbox"/> Use of lessons from similar fleets <input type="checkbox"/> Linking lessons learned from other fleets				
28.	UCR program: <input type="checkbox"/> FS input				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> FSO comments as required <input type="checkbox"/> FS stamp <input type="checkbox"/> Follow-up procedure				
29.	Emergency Response Plan: <input type="checkbox"/> Completeness <input type="checkbox"/> Updated and current <input type="checkbox"/> Date last tested <input type="checkbox"/> Warning system <input type="checkbox"/> Transport to site <input type="checkbox"/> Photographer				
30.	Accident investigation: <input type="checkbox"/> Control of wreckage <input type="checkbox"/> Guards <input type="checkbox"/> Liaison with supporting DND WFSO				
31.	Incident investigation: <input type="checkbox"/> Reporting <input type="checkbox"/> Thoroughness <input type="checkbox"/> Completeness of report <input type="checkbox"/> Control of report				
AIR WEAPONS SAFETY					
32.	Written program: <input type="checkbox"/> Integrated within FS Program (reporting, prevention, education, promotion) <input type="checkbox"/> Effectiveness <input type="checkbox"/> Encompasses all air weapons activities from ready-use storage to target or return to ready-use storage <input type="checkbox"/> Current <input type="checkbox"/> Air Weapons Safety Committee				

SER	ITEM	A	B	C	REMARKS
33.	Established AWO / WLD / AWSTM: <input type="checkbox"/> Appointed <input type="checkbox"/> Trained and qualified <input type="checkbox"/> Member of unit FS committee <input type="checkbox"/> Member of Air Weapons Safety Committee				
34.	Training: <input type="checkbox"/> Air weapons safety indoctrination and awareness training conducted at unit including all flight line support staff (firefighters, fuel tender drivers, Military Police) <input type="checkbox"/> Annual AWS training <input type="checkbox"/> Annual aircrew familiarization training <input type="checkbox"/> Load crew training <input type="checkbox"/> Weapons load officer training <input type="checkbox"/> Convoy training arm / de-arm training <input type="checkbox"/> Records system exists to document training				
35.	Safety survey: <input type="checkbox"/> Annual informal survey conducted <input type="checkbox"/> Effectiveness (follow-up, corrective actions)				
36.	Operations: <input type="checkbox"/> Absolutely no maintenance carried out on aircraft in the armed state <input type="checkbox"/> Unit SOPs detailing maintenance activities that may be undertaken on loaded aircraft are covered in local orders <input type="checkbox"/> Arming / de-arming areas designated and approved <input type="checkbox"/> Location and number of arming / de-arming areas designated and approved				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Checklist used for acceptance checks on aircraft with air weapons loaded <input type="checkbox"/> Loaded aircraft recovery procedures ensure direct routing to de-arming area <input type="checkbox"/> Aircraft loaded with forward-firing weapons pointed away from populated areas <input type="checkbox"/> Emergency jettison areas identified in flying and air weapons orders <input type="checkbox"/> Pilot's hands visible during arming / de-arming operations				
37.	Administration: <input type="checkbox"/> Unit air weapons SOPs current and available <input type="checkbox"/> Applicable publications available and current to enhance unit AWS Program <input type="checkbox"/> Deployment SOPs include air weapons requirements (manpower, EOD, procedures, equipment) <input type="checkbox"/> AWS representative appointed for unit hosting deployments / exercises <input type="checkbox"/> Emergency Response Plans include AWS considerations including evacuation distances for applicable air weapons				

Annex C
Chapter 4
A-GA-135-001/AA-001

ANNEX C – CONTRACTOR FS SURVEY CHECKLIST

LEGEND

A: SATISFACTORY

B: SATISFACTORY WITH DEBRIEFING

C: UNSATISFACTORY

SER	ITEM	A	B	C	REMARKS
CONTRACTOR FSS					
1.	Access to Director: <input type="checkbox"/> Direct <input type="checkbox"/> Indirect				
2.	Access to branch and section heads: <input type="checkbox"/> Direct when necessary				
3.	Relationship with company personnel: <input type="checkbox"/> How well is the FSS known? <input type="checkbox"/> Meetings with FS team				
4.	Adequacy of personal visits to sections: <input type="checkbox"/> Regular and frequent				
5.	Feedback process to Director on problems and current projects: <input type="checkbox"/> Regular briefings or only as required <input type="checkbox"/> Areas of concern through trend analysis				
6.	Training: <input type="checkbox"/> Basic, Advanced, FSOMS <input type="checkbox"/> Additional courses (human factors, SCSI, etc.) <input type="checkbox"/> Time in job				
7.	Contractor FS instructions: <input type="checkbox"/> Structured routine or reactive <input type="checkbox"/> Mission, assumptions, risks, initiatives				

SER	ITEM	A	B	C	REMARKS
8.	Survey report distribution: <input type="checkbox"/> To Director <input type="checkbox"/> To NDQAR <input type="checkbox"/> To DFS				
9.	General: <input type="checkbox"/> Effectiveness <input type="checkbox"/> Mutual exchange of information <input type="checkbox"/> Occurrence reporting procedures				
FS OFFICE					
10.	Location: <input type="checkbox"/> Proximity to flight line <input type="checkbox"/> Proximity to Director <input type="checkbox"/> Proximity to clerical staff				
11.	Adequacy of equipment: <input type="checkbox"/> Cellular, pager, voice mail <input type="checkbox"/> FSOMS, Internet, laptop <input type="checkbox"/> Digital camera <input type="checkbox"/> Accident kits (complete)				
12.	Supplies: <input type="checkbox"/> Resource material <input type="checkbox"/> Hazard reports <input type="checkbox"/> Posters <input type="checkbox"/> Magazines <input type="checkbox"/> Videos				
13.	Support: <input type="checkbox"/> Technical <input type="checkbox"/> Administrative				

SER	ITEM	A	B	C	REMARKS
14.	Files: <input type="checkbox"/> Functional <input type="checkbox"/> Adequacy <input type="checkbox"/> Special interest items <input type="checkbox"/> Completeness				
15.	FSOMS: <input type="checkbox"/> Number of terminals <input type="checkbox"/> Location <input type="checkbox"/> Handbook <input type="checkbox"/> Familiarity				
16.	Publications: <input type="checkbox"/> A-GA-135-001 <input type="checkbox"/> AOIs for all DND aircraft <input type="checkbox"/> Applicable safety precautions and accident prevention instructions <input type="checkbox"/> Safety magazines <input type="checkbox"/> Company Emergency Response Plan (ERP)				
FS PROGRAM					
17.	Written program: <input type="checkbox"/> Director's philosophy <input type="checkbox"/> Focused, fast, flexible, friendly <input type="checkbox"/> Achievable <input type="checkbox"/> Updated and current				
18.	Occurrence Reporting: <input type="checkbox"/> Process <input type="checkbox"/> Records / filing system <input type="checkbox"/> PM follow-up				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Trends analysis technique				
19.	FS meetings: <input type="checkbox"/> Frequency <input type="checkbox"/> Format <input type="checkbox"/> Training <input type="checkbox"/> Attendees (ops, maint, sp)				
20.	FS boards: <input type="checkbox"/> Location <input type="checkbox"/> Effectiveness <input type="checkbox"/> Up to date <input type="checkbox"/> Methods of display				
21.	Hazard reports: <input type="checkbox"/> Use promoted <input type="checkbox"/> Availability of blanks <input type="checkbox"/> Processing of completed forms <input type="checkbox"/> Follow-up procedures				
22.	Education and promotion: <input type="checkbox"/> Frequency and venue <input type="checkbox"/> Relevance <input type="checkbox"/> Topics (HF, communication, seasonal) <input type="checkbox"/> Aircrew / ground crew <input type="checkbox"/> Pre-deployment <input type="checkbox"/> Originality				
23.	Awards program: <input type="checkbox"/> Effectiveness <input type="checkbox"/> Visibility				

SER	ITEM	A	B	C	REMARKS
24.	FS Committee: <input type="checkbox"/> Frequency <input type="checkbox"/> Attendance <input type="checkbox"/> Feedback				
25.	Award Program: <input type="checkbox"/> Effectiveness <input type="checkbox"/> Visibility				
26.	Local surveys: <input type="checkbox"/> Frequency <input type="checkbox"/> Use of external resources <input type="checkbox"/> Effective tracking of findings <input type="checkbox"/> Follow-up action				
27.	Use of external resources: <input type="checkbox"/> Use of external subject matter experts (SMEs) for briefings <input type="checkbox"/> Use of lessons learned from similar fleets / contractors <input type="checkbox"/> Linking lessons learned from other fleets / contractors				
28.	Emergency Response Plan: <input type="checkbox"/> Completeness <input type="checkbox"/> Updated and current <input type="checkbox"/> Date last tested <input type="checkbox"/> Warning system <input type="checkbox"/> Transport to site <input type="checkbox"/> Photographer				
29.	Accident investigation: <input type="checkbox"/> Control of wreckage <input type="checkbox"/> Guards				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Liaison with supporting DND WFSO				
30.	Incident investigation: <input type="checkbox"/> Reporting <input type="checkbox"/> Thoroughness <input type="checkbox"/> Completeness of report <input type="checkbox"/> Control of report <input type="checkbox"/> Independent from CoC				

Annex D
Chapter 4
A-GA-135-001/AA-001

ANNEX D – AIR CADET GLIDING PROGRAM FLIGHT SAFETY SURVEY CHECKLIST

LEGEND

A: SATISFACTORY

B: SATISFACTORY WITH DEBRIEFING

C: UNSATISFACTORY

SER	ITEM	A	B	C	REMARKS
ACCIDENT PREVENTION PROGRAM					
1.	FS publications <input type="checkbox"/> Incident / accident reports <input type="checkbox"/> Magazines <input type="checkbox"/> Posters <input type="checkbox"/> Flashers <input type="checkbox"/> Memoranda <input type="checkbox"/> Bulletins <input type="checkbox"/> Distribution <input type="checkbox"/> Method of display				
2.	FS films and videos				
3.	FS briefings <input type="checkbox"/> Frequency <input type="checkbox"/> Seasonal <input type="checkbox"/> Effectiveness				
4.	Standard operating procedures (SOPs) <input type="checkbox"/> Display <input type="checkbox"/> Current / adequate <input type="checkbox"/> All read and signed				
5.	Publications <input type="checkbox"/> Amendments <input type="checkbox"/> Availability				
6.	Facilities Display <input type="checkbox"/> Airfield layout				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Location				
7.	Marshalling signals as per SOPs <input type="checkbox"/> Compliance with orders <input type="checkbox"/> Poster display				
8.	<input type="checkbox"/> Radio procedures <input type="checkbox"/> Standardization				
9.	Aircrew <input type="checkbox"/> Qualifications <input type="checkbox"/> Proficiency <input type="checkbox"/> Currency				
10.	Operations <input type="checkbox"/> Launch control <input type="checkbox"/> Scheduling <input type="checkbox"/> Duty time limitations <input type="checkbox"/> Flying time limitations				
11.	Publications for aircraft and equipment <input type="checkbox"/> Checklists <input type="checkbox"/> Availability <input type="checkbox"/> Use of pre-take-off and landing checklist <input type="checkbox"/> Aircraft owner's manual <input type="checkbox"/> Aircraft handover <input type="checkbox"/> Checklist handover <input type="checkbox"/> Location				
GLIDER OPERATIONS – GENERAL					
12.	Checkouts <input type="checkbox"/> Thorough <input type="checkbox"/> Realistic				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Simulated rope breaks <input type="checkbox"/> As per SOPs				
13.	Medical <input type="checkbox"/> Valid <input type="checkbox"/> Restrictions <input type="checkbox"/> Hazards posed by illness <input type="checkbox"/> Procedures to ensure that aircrew cannot fly while medically unfit				
14.	Publications <input type="checkbox"/> On-time dissemination AIP <input type="checkbox"/> VFR Supplement <input type="checkbox"/> Amendments distributed				
15.	Briefings <input type="checkbox"/> Location <input type="checkbox"/> Requirement to attend <input type="checkbox"/> Number per day <input type="checkbox"/> Special requirements <input type="checkbox"/> Current weather <input type="checkbox"/> Ops conditions <input type="checkbox"/> Emergency procedures				
16.	Launch Control Officer (LCO) <input type="checkbox"/> Qualifications <input type="checkbox"/> Responsibilities				
17.	Launch Personnel <input type="checkbox"/> Duties understood <input type="checkbox"/> Adherence to SOPs				
18.	Weather / wind limitations <input type="checkbox"/> Daylight VFR only				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> 90° crosswind limits <input type="checkbox"/> Z-33 8 knots / 10 mph <input type="checkbox"/> Scout 15 knots / 17 mph <input type="checkbox"/> L-19 10 knots / 11 mph <input type="checkbox"/> 15 kts / 17 mph for stds / check pilot conducting training only <input type="checkbox"/> Gusts not greater than 10 knots or 12 mph				
19.	Glider movements <input type="checkbox"/> Supervision <input type="checkbox"/> Sufficient personnel <input type="checkbox"/> By hand when backwards <input type="checkbox"/> By vehicle when forward				
20.	Glider parking as per SOPs <input type="checkbox"/> Distance between gliders <input type="checkbox"/> Alignment and direction <input type="checkbox"/> Parked configuration <input type="checkbox"/> Spoilers extended <input type="checkbox"/> Low wing into wind <input type="checkbox"/> Tie-down as per SOPs				
21.	Vehicular traffic <input type="checkbox"/> Control of movement				
22.	Spectators <input type="checkbox"/> Supervision				
23.	Pilot log books <input type="checkbox"/> Maintained and up to date <input type="checkbox"/> Log book certification for proficiency and qualifications				

SER	ITEM	A	B	C	REMARKS
GLIDER OPERATIONS – EMERGENCY PROCEDURES					
24.	Occurrence Response Plan <input type="checkbox"/> Effectiveness <input type="checkbox"/> Warning system <input type="checkbox"/> Transport to site <input type="checkbox"/> Photographer / camera <input type="checkbox"/> Personnel knowledgeable of plan				
25.	Grid maps <input type="checkbox"/> Available and current <input type="checkbox"/> Understood by drivers				
26.	Accident alarm system				
27.	Vehicles to accident site <input type="checkbox"/> Rules governing vehicle movement <input type="checkbox"/> Control of vehicles by tower <input type="checkbox"/> Markings <input type="checkbox"/> Current weather <input type="checkbox"/> Ops conditions <input type="checkbox"/> Emergency procedures				
28.	Accident responsibilities <input type="checkbox"/> Recovery of wreckage <input type="checkbox"/> Wreckage guards <input type="checkbox"/> Wreckage schematic <input type="checkbox"/> Accident trailer and accident site equipment				
29.	Notification to <input type="checkbox"/> Local firefighters <input type="checkbox"/> Local police / RCMP <input type="checkbox"/> CF FS personnel				

SER	ITEM	A	B	C	REMARKS
30.	Availability of ambulance <input type="checkbox"/> Response time <input type="checkbox"/> Capability				
31.	Fire extinguishers <input type="checkbox"/> Spot checks in hangars, flight line, aircraft and winch <input type="checkbox"/> Up to date <input type="checkbox"/> Knowledge of use				
32.	Emergency procedures <input type="checkbox"/> Knowledge and practice <input type="checkbox"/> Take-off abort <input type="checkbox"/> Emergency release <input type="checkbox"/> Non-release <input type="checkbox"/> Rope / cable break <input type="checkbox"/> Off-field landing				
AIR SERVICES					
33.	Bird strike <input type="checkbox"/> Records, i.e. CF 215				
34.	Airfield condition <input type="checkbox"/> Ramps, taxiways, runways, lighting, approaches, over-run areas, in-field areas <input type="checkbox"/> Method of disseminating previously discussed information to users				
35.	Weather services <input type="checkbox"/> Access to current and forecast conditions <input type="checkbox"/> Information displayed <input type="checkbox"/> Information updated, e.g. use of PIREPs				

SER	ITEM	A	B	C	REMARKS
36.	Control tower <input type="checkbox"/> Communications with all glider operations <input type="checkbox"/> Local gliding procedures <input type="checkbox"/> Visibility of entire glider ops and traffic patterns <input type="checkbox"/> Tower control of gliders and tow aircraft <input type="checkbox"/> Tower control of vehicles on airfield				
MAINTENANCE AND SERVICING					
37.	Relationship with FSO <input type="checkbox"/> Mutual exchanges of information				
38.	FS publications <input type="checkbox"/> Poster displays <input type="checkbox"/> "Safety Comment" forms availability and use <input type="checkbox"/> Aircraft accident summaries				
39.	Use of intake duct plugs <input type="checkbox"/> Tow planes				
40.	FOD Program <input type="checkbox"/> Airfield inspections <input type="checkbox"/> No loose equipment in cockpits				
41.	Flight testing <input type="checkbox"/> Approved personnel <input type="checkbox"/> Checklists used				
42.	Maintenance administration <input type="checkbox"/> Equipment inspections <input type="checkbox"/> Snags recorded <input type="checkbox"/> Aircraft technical logs up to date				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Corrective action on snags <input type="checkbox"/> Storage conditions <input type="checkbox"/> Cleanliness of aircraft and hangar				
SAFETY SYSTEMS					
43.	Life support equipment <input type="checkbox"/> Proper type <input type="checkbox"/> Well maintained <input type="checkbox"/> Storage <input type="checkbox"/> Inspections valid				
44.	Personnel-issue as per scale of issue <input type="checkbox"/> Users fitted and briefed on equipment care and handling procedures for overdue equipment				
45.	Emergency locator transmitter (ELT) <input type="checkbox"/> Availability <input type="checkbox"/> Usage				
46.	Accident response <input type="checkbox"/> Equipment <input type="checkbox"/> Availability <input type="checkbox"/> Usage				
47.	Accident response equipment <input type="checkbox"/> First aid kit <input type="checkbox"/> Disposable camera <input type="checkbox"/> Rescue knife (harness cutter) <input type="checkbox"/> Two fire extinguishers <input type="checkbox"/> Vehicle capable of transporting equipment and personnel close to accident site <input type="checkbox"/> Accident axe				

SER	ITEM	A	B	C	REMARKS
	<input type="checkbox"/> Firefighter's combination tool <input type="checkbox"/> Two wool blankets				
TRAINING					
48.	Supervisor training <input type="checkbox"/> Frequency				
49.	Local surveys <input type="checkbox"/> Regular and systematic <input type="checkbox"/> Adequacy of corrective action <input type="checkbox"/> Use of FSO resources				
50.	Gliding school lectures as per directives <input type="checkbox"/> Lesson plans <input type="checkbox"/> Adequacy <input type="checkbox"/> According to syllabus <input type="checkbox"/> Training aids				
AIR TOW LAUNCH PROCEDURES					
51.	Air tow launch crew <input type="checkbox"/> Number of crew three (3) minimum <input type="checkbox"/> Briefed on operation <input type="checkbox"/> Understand duties				
52.	Position of signallers <input type="checkbox"/> Wingman <input type="checkbox"/> Tow aircraft signaller 45° ahead of aircraft, 50 ft. from take-off path, facing wingman and aircraft				
53.	Tow rope attachment procedure <input type="checkbox"/> Only when glider ready <input type="checkbox"/> Ropes as per SOPs <input type="checkbox"/> Condition of rope checked				

SER	ITEM	A	B	C	REMARKS
54.	Pre-take-off checks <input type="checkbox"/> Back release and forward release checked at start of daily operations <input type="checkbox"/> As per checklist				
55.	Signals <input type="checkbox"/> Verbal and hand signals <input type="checkbox"/> Usage as per SOPs <input type="checkbox"/> Clear and understood				
56.	Tow aircraft handling procedure <input type="checkbox"/> Take-off and climb as per SOPs <input type="checkbox"/> 15° to 20° of bank <input type="checkbox"/> Release descending left turn <input type="checkbox"/> Rope drop in designated area <input type="checkbox"/> Landing clearance of trailing tow rope				
WINCH LAUNCH PROCEDURES					
57.	Winch launch crew <input type="checkbox"/> Number in crew (4 minimum) <input type="checkbox"/> Briefed on operation <input type="checkbox"/> Understand duties <input type="checkbox"/> Certified winch operators				
58.	Winch cable and attachment <input type="checkbox"/> Conditions checked <input type="checkbox"/> Only when glider ready <input type="checkbox"/> Multiple winches: correct cable installed <input type="checkbox"/> Downwind glider launched first				
59.	Winch launch signalling <input type="checkbox"/> Proper signals used <input type="checkbox"/> Easily seen by crews <input type="checkbox"/> Correct usage				

SER	ITEM	A	B	C	REMARKS
60.	Signals <input type="checkbox"/> Mechanical <input type="checkbox"/> Verbal and hand signals <input type="checkbox"/> Clear and understood <input type="checkbox"/> Usage as per SOPs				
61.	Take-off and climb <input type="checkbox"/> Technique <input type="checkbox"/> Initial climb shallow <input type="checkbox"/> Safety altitude: 200 feet AGL <input type="checkbox"/> Safety speed: 50 mph <input type="checkbox"/> Maximum climb speed: 69 mph				
62.	Climb control procedure <input type="checkbox"/> Yaw to reduce power <input type="checkbox"/> Release if too slow				
63.	Cable break procedure <input type="checkbox"/> Glider in flying attitude <input type="checkbox"/> Non-release signals and procedure				
64.	Cable retrieving <input type="checkbox"/> Signals <input type="checkbox"/> Originated by winch op <input type="checkbox"/> Maximum speed of 15 mph to lay or retrieve cable				
AUTO LAUNCH PROCEDURES					
65.	Auto launch crew <input type="checkbox"/> Number in crew (4 minimum) <input type="checkbox"/> Briefed on operation <input type="checkbox"/> Understand duties <input type="checkbox"/> Certified vehicle driver and observer				

SER	ITEM	A	B	C	REMARKS
66.	Auto tow cable and equipment <input type="checkbox"/> As per SOPs				
67.	Cable attachment <input type="checkbox"/> Only when glider ready				
68.	Auto tow launch <input type="checkbox"/> From runway or hard surface				
69.	Position of signallers <input type="checkbox"/> Launch vehicle observer in place				
70.	Signals <input type="checkbox"/> Verbal and hand signals <input type="checkbox"/> Clear and understood <input type="checkbox"/> Usage as per SOPs				
71.	Take-off and climb <input type="checkbox"/> Technique <input type="checkbox"/> Initial climb shallow <input type="checkbox"/> Safety altitude: 200 feet AGL <input type="checkbox"/> Safety speed: 50 mph <input type="checkbox"/> Maximum climb speed: 69 mph				
72.	Climb control procedure <input type="checkbox"/> Yaw to reduce power <input type="checkbox"/> Release if too slow				
73.	Cable break procedure <input type="checkbox"/> Glider in flying attitude <input type="checkbox"/> Non-release signals and procedure				
74.	Cable retrieving <input type="checkbox"/> Parachute not dragged				

Annex E
Chapter 4
A-GA-135-001/AA-001

ANNEX E - CVR / FDR PARAMETER REQUIREMENTS BY FAMILIES

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 CF aircraft. Accordingly, the aircraft required to support the CF 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 UAV);
- 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:
 - (a) Trainer: No additional parameters required.
 - (b) Light Transport: No additional parameters required
 - (c) Heavy Transport: Refer to Appendix 1.
 - (d) Heavy Combat: Refer to Appendix 2.
 - (e) Fast Combat: refer to Appendix 3
- b. Rotary Wing Aircraft
 - (a) Single Engine Trainer: Refer to Appendix 4.
 - (b) Multi Engine Trainer: Refer to Appendix 5.
 - (c) Transport / SAR: Refer to Appendix 6.
 - (d) Combat: Refer to Appendix 7.

Appendix 1
Annex E
Chapter 4
A-GA-135-001/AA-001

APPENDIX 1 – FIXED WING HEAVY

TRANSPORT AIRCRAFT CVR / FDR SPECIFICATIONS

CVR REQUIREMENTS					
DURATION AUDIO RECORDING		APPLICATION			REMARKS
2 hours minimum.		All crew positions + area mike			All radios unless in secure mode.
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	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

Appendix 2
 Annex E
 Chapter 4
 A-GA-135-001/AA-001

APPENDIX 2 – FIXED WING HEAVY

COMBAT AIRCRAFT CVR / FDR SPECIFICATIONS

CVR REQUIREMENTS					
DURATION AUDIO RECORDING			APPLICATION		REMARKS
30 minutes minimum (2 hours recording preferred)			All crew positions + area mike		All radios unless in secure mode.
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	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

Appendix 3
Annex E
Chapter 4
A-GA-135-001/AA-001

APPENDIX 3 – FIXED WING FAST COMBAT AIRCRAFT CVR / FDR SPECIFICATIONS

CVR REQUIREMENTS					
DURATION AUDIO RECORDING			APPLICATION		REMARKS
30 minutes minimum (2 hours recording preferred)			All crew positions + area mike		All radios unless in secure mode.
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	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.
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

Parameter	Minimum Recording Range	Maximum recording interval in seconds	Recording Accuracy	Recording Resolution	Remarks
AIRCRAFT GENERAL (CONT.)					
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
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.

Parameter	Minimum Recording Range	Maximum recording interval in seconds	Recording Accuracy	Recording Resolution	Remarks
AIRCRAFT GENERAL (CONT.)					
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.

Appendix 4
Annex E
Chapter 4
A-GA-135-001/AA-001

**APPENDIX 4 – ROTARY WING SINGLE ENGINE
TRAINER AIRCRAFT CVR / FDR SPECIFICATIONS**

CVR REQUIREMENTS					
DURATION AUDIO RECORDING			APPLICATION		REMARKS
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	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)

Appendix 5
Annex E
Chapter 4
A-GA-135-001/AA-001

**APPENDIX 5 – ROTARY WING MULTI ENGINE
TRAINER AIRCRAFT CVR / FDR SPECIFICATIONS**

CVR REQUIREMENTS					
DURATION AUDIO RECORDING			APPLICATION		REMARKS
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	Recording Accuracy	Recording Resolution	Remarks
STORES MANAGEMENT SYSTEMS					
Ground Speed	0 to 300	1	As installed	+/- 1 knot	As installed (equipment capable of producing a groundspeed readout)

Appendix 6
Annex E
Chapter 4
A-GA-135-001/AA-001

**APPENDIX 6 – ROTARY WING TRANSPORT AND
SAR TRAINER AIRCRAFT CVR / FDR SPECIFICATIONS**

CVR REQUIREMENTS					
DURATION AUDIO RECORDING			APPLICATION		REMARKS
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	Recording Accuracy	Recording Resolution	Remarks
STORES MANAGEMENT SYSTEMS					
Ground Speed	0 to 300	1	As installed	+/- 1 knot	As installed (equipment capable of producing a groundspeed readout)

Appendix 7
Annex E
Chapter 4
A-GA-135-001/AA-001

APPENDIX 7 – ROTARY WING COMBAT AIRCRAFT CVR / FDR SPECIFICATIONS

CVR REQUIREMENTS					
DURATION AUDIO RECORDING		APPLICATION		REMARKS	
30 minutes minimum (2 hours recording preferred)		All crew positions + area mike		All radios unless in secure mode.	
FDR PARAMETERS					
Parameter	Minimum Recording Range	Maximum recording interval in seconds	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)
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.

CHAPTER 5 – PROMOTION

GENERAL

1. The objective of the FS Promotion Program is to facilitate the maintenance of a strong and committed FS culture within all organizations that conduct or support DND / CF flying operations. An active and visible FS Promotion Program designed to engender full participation in the FS Program at the tactical, operational and strategic levels is an excellent way to achieve the objectives of the FS Program with a relatively small investment.
2. The CF FS Program uses a series of briefings, FS documents and awards as the main mechanisms for the Promotion Program.

PROMOTIONAL BRIEFINGS

DFS ANNUAL BRIEFING

3. The DFS annual briefing is one of the main FS promotion activities. The objective of this briefing is to remind all personnel of the requirement for and the importance of the FS Program. In addition, this activity is used to update personnel on new FS concepts as well as to identify key lessons learned through the analysis of occurrences over the previous 12 to 18 months. The intent of the annual DFS presentation is to brief as many civilian and military personnel as possible at the tactical, operational and strategic level. Although the briefing will be focused on CF / DND formations, wings and units, the briefing will also be presented where possible to OUTCAN formations such as NATO AWACS and NORAD detachments.

FSO BRIEFINGS

4. FSOs are encouraged to provide / conduct briefings on subjects pertinent to their units.

BRIEFING CONTENT

5. Briefings must be relevant to the audience, informative, current and interesting.
6. Visual aids should be used to the extent possible. A presentation that contains photos, charts, graphs and statistics relevant to the verbal message can greatly assist in maintaining audience attention and communicating the message.

PROMOTIONAL MATERIAL

CF FS PUBLICATIONS

FLIGHT COMMENT MAGAZINE

7. *Flight Comment* is the FS magazine of the Canadian Forces and is produced three times a year. The objective of *Flight Comment* is to provide relevant, interesting and timely FS information to all personnel involved in air operations. The intent of the magazine is also to provide a forum for anyone to present written articles on any issue related to FS. Accordingly, any individual can submit an article or poster concept for publication in *Flight Comment*. DFS reserves the right to edit these articles for length and content.

ON TARGET MAGAZINE

8. *On Target* is a focus magazine similar to Flight Comment and is produced once per year or as required by the Directorate of Flight Safety. The objective of *On Target* is to educate Air Force operators on a single subject of interest in a user friendly yet thorough fashion. All back issues of *On Target* are archived on the DFS website.

DEBRIEFING PAMPHLET

9. The objective of the “Debriefing” pamphlet is to highlight significant FS concerns in a timely manner. “Debriefing” is a short, one-to-two page electronic pamphlet that is produced by DFS or 1 Div FSO in a bilingual, electronic format on a monthly basis. The content generally covers current trends, threats and occurrence information. All back issues of “Debriefing” are archived on the DFS website.

FLASH PAMPHLET

10. The objective of an FS FLASH is to highlight critical FS information to both the chain of command and the rest of the FS team as quickly as possible. An FS FLASH is released on the authority of DFS and is produced on an as-required basis. Typically, an FS FLASH will be produced as a result of issues identified during the investigation of a serious occurrence.

OTHER FS PERIODICALS

11. FS information is available from a myriad of FS magazines produced by national and foreign government departments as well as companies and safety organizations. These periodicals contain a wealth of relevant and interesting FS information that can be used to raise the level of FS consciousness. All members of the FS team are encouraged to regularly review these publications for items of interest. An updated list of appropriate periodicals can be found on the DFS website.

OTHER MEDIA

VIDEOS

12. FS videos can be obtained from a variety of sources. DFS maintains a library of FS videos that can be acquired through the DFS website.

POSTERS

13. DFS also maintains a library of FS posters that can be obtained through the DFS website. Individuals and units are encouraged to create their own FS posters pertinent to their specific operations and share them with other FS organizations through DFS.

WEBSITES

14. DFS maintains comprehensive Intranet and Internet websites that provide information on a variety of FS topics. Most Air Force units post their FS Program, current issues and links to a myriad of other sites and resources. Links to the recommended FS sites can be found on the DFS website.

15. Publishing SRs on the Defence Wide Area Network (DWAN) is allowed. It promises to significantly improve flight safety processes and the FS reporting culture. Still, care must be taken to ensure that it does not inadvertently compromise the reporting culture. Only completed reports may be posted on the Intranet after a diligent review of the SRs by senior FS staff. Completed SRs may be released to the DWAN as long as:

- a. personnel cannot be identified;
- b. no cockpit voice recorder (CVR) information, medical information or witness statements are included;
- c. reports are reviewed carefully to ensure that blame is not assigned to anyone; and
- d. a disclaimer is included in each report stating: “Flight Safety incident reports are produced under the authority of the Minister of National Defence (MND) pursuant to section 4.2(n) of the Aeronautics Act (AA) and in accordance with A-GA-135-001/AA-001 – Flight Safety for the Canadian Forces. They are prepared solely for the purpose of accident prevention and shall not be used for legal, administrative or disciplinary action.”

FS NOTICE BOARDS

16. Dedicated FS notice boards are an effective and efficient method of transmitting FS information. The purpose of FS notice boards is to remind personnel of the goals and impact of the FS program. To do this, FS notice boards should be erected in high-traffic areas and should be restricted to FS matters such as the “Debriefing” newsletter, the Flash bulletins, awards and AWS incidents. Notice boards should be prominent enough to be easily seen from a distance and bordered by red and white alternating stripes (minimum of 5 cm / 2 inches) to be effective. A pictorial sample of a suitable FS board can be seen on the DFS website.

AWARDS

OBJECTIVE

17. The objective of the FS Awards Program is to recognize the efforts of individuals, teams and organizations that have made a significant contribution to the objectives of the FS Program.

18. In order to qualify for an FS award, the action(s) of the nominee(s) must be outstanding for a “Good Show” and superior for a “For Pro”. Submissions must clearly describe the efforts of the individual or individuals nominated. The submission must describe the explicit actions and related facts demonstrating why the action(s) was / were exceptional and above and beyond the scope of normal duty for the individual.

19. Often a well-written FS nomination does not meet the excellence criteria for winning an FS award. But while the actions are commendable, they may be within the scope of the normal duties of the individual. As an example, a submission for a “For Pro” stated that a qualified technician working as part of a fuel tank load crew discovered hydraulic fluid on the bottom of the aircraft. The technician informed the Servicing Supervisor. Further investigation by the maintenance crew revealed a very serious problem with a hydraulic feed line for the landing gear. This nomination would likely be rejected because the technician performed his duties as expected.

TIMELINESS OF AWARDS

20. As with all promotional activities, the more timely it is, the more effective it is in raising FS awareness as well as the profile of the FS Program. Ideally, the period from the date of occurrence to the date of notification of approval or rejection should not exceed two months.

TYPES OF AWARDS

21. Awards are an excellent way of recognizing performance that is truly exceptional. In FS, individual or group performance that achieves the aims of the program should always be commended

and if significant enough, should be rewarded / heralded. Originators and reviewing authorities must give careful thought to which form of recognition would be most appropriate and timely.

22. The following are the official FS awards available through the CF. Acts that fit the descriptions hereunder should be submitted to the chain of command for recognition.

- a. Good Show;
- b. For Professionalism (For Pro).

23. A nomination for an official FS award may be denied at the 1 Div FSO or DFS level. It would be anticipated then that the unit CO, formation comd or manager would award a Commander's Commendation.

GOOD SHOW AWARD

24. The "Good Show" award is given when an aircraft accident or serious incident is averted or reduced in severity by a professional act that is clearly outstanding or above and beyond the call of duty.

25. A Good Show will be awarded when one or more of the following conditions have been met by an individual, crew or team:

- a. actions directly prevented loss of life or loss of an aviation resource;
- b. actions directly reduced the severity of an accident or serious occurrence;
- c. actions identified and rectified a critical hazard to FS in truly exceptional circumstances;
or
- d. actions demonstrated outstanding skill, knowledge, judgment or situation awareness in exceptional circumstances.

26. Good Show awards must be endorsed by the formation commander or equivalent position, the 1 Div FSO on behalf of Comd 1 or 2 Cdn Air Div and the DFS. Good Show Awards are approved by C Air Force. The award is signed by both the C Air Force and DFS. The proposed Good Show Award citation is to be up to 500 words in length.

FOR PROFESSIONALISM AWARD

27. The For Professionalism award recognizes acts that may not qualify for the Good Show Award yet reflect a superior professional attitude that either reduced the severity of or averted an aircraft accident or serious incident. Acts in the line of duty may qualify if clearly indicative of commendable extra effort.

28. A For Professionalism award will be awarded when one or more of the following conditions have been met by an individual, crew or team:

- a. actions demonstrated superior skill or reaction in identifying and rectifying a significant hazard to FS in very difficult circumstances; or
- b. actions exhibited a superior display of skill, knowledge, situation awareness or judgment in difficult circumstances that resulted in a significant contribution to the DND / CF FS program.

29. The For Professionalism award is recommended by the WComd or equivalent position, endorsed by the 1 Div FSO and approved by the Comd 1 or 2 Cdn Air Div. The For Professionalism scroll is signed by the 1 Div FSO and Comd 1 or 2 Cdn Air Div. When doubt exists as to which FS award

applies, originators are encouraged to make the nomination for the Good Show Award. The proposed For Pro Award citation is to be up to 300 words in length.

COMMANDER'S COMMENDATION

30. The Commander's Commendation is given for an act that does not warrant either a Good Show or For Professionalism Award but does deserve recognition. Given that the award submission has been endorsed by a wcomd before being staffed up the chain, the minimum award a nominee should receive is a Commander's Commendation.

DFS COMMENDATION

31. The DFS Commendation recognizes outstanding professional performance and dedication in the field of aviation safety. The DFS Commendation is awarded to deserving individuals who through their action have contributed significantly to enhance the capability of the Flight Safety Program across the Canadian Forces and who emulate the values and ethos promoted by the Program.

SICOFAA AWARD

32. Canada is a member of the international aviation association called Sistema de Cooperación entre las Fuerzas Aéreas Americanas (SICOFAA). This is a Spanish name meaning system for the cooperation of the air forces in the Americas. Each year SICOFAA provides member countries with an FS Award to recognize a deserving unit within their individual air force. The Canadian award is granted by C Air Force each year. The award is given to a wing or unit that has demonstrated the highest level of dedication to the furtherance of FS in the CF and, by their actions, been an exceptional example to others. It is intended to acknowledge a concerted effort over a period of time.

33. The guidelines for this award are for the unit or formation that has developed, implemented and performed at a high level of FS efficiency or has an FS program that is:

- a. innovative;
- b. proactive;
- c. comprehensive;
- d. effective; and
- e. enthusiastically embraced by all members of the FS team.

34. The SICOFAA FS award is originated by the 1 Cdn Air Div FSO, endorsed by DFS and approved by C Air Force. A call letter for nominations will be issued yearly by the 1 Cdn Air Div FSO.

AWARD STAFFING PROCEDURES

35. The nomination for Good Show and For Professionalism award shall be e-mailed to both DFS and 1 Cdn Air Div FS to reduce the time required for a final decision. Submissions are to follow the format at Annex A and are to include a fully detailed account in Word format that is suitable for use as the citation on the commendation scroll and be supported by a representative photograph of the nominee(s). The quality photograph, related if possible to the occurrence, shall be a high resolution unmodified file of at least 1 megabyte. If approved, the citation will appear outside the individual's community, so early reference should be made to the aircraft type. Formations should develop local staffing procedures to appraise the nomination. The FSOMS occurrence report, UCRs, technical references and other such material should not be shown in the proposed narrative, but must be included as references in the submission to allow proper assessment. Units may be required to provide the 1 Div

FSO or DFS staff with a copy of these references, on demand.

36. The For Pro nomination will be reviewed by 1 Div FSO staff. If approved, 1 Div FSO will produce the award scroll, have it signed by Comd 1 Cdn Air Div and sent to the unit for presentation. DFS will be advised and the award citation will be forwarded for publication in Flight Comment and on the DFS website.

37. The Good Show nomination, once reviewed and endorsed by the 1 Div FSO staff, will be forwarded to DFS. If approved, DFS will produce the award scroll, have it signed by C Air Force and sent to the unit for presentation.

38. If a nomination is not approved, DFS / 1 Div FSO staff, as applicable, will officially inform the submitting unit with a brief explanation as to why the nomination was rejected and if other forms of recognition are recommended.

39. The Good Show or For Professionalism scroll will be forwarded to the appropriate wing, base or unit FS staff, who will coordinate the presentation; local publicity is encouraged. A narrative describing the event will appear in the earliest possible issue of Flight Comment and on the DFS website.

Annex A
Chapter 5
A-GA-135-001/AA-001

ANNEX A – FLIGHT SAFETY AWARD NOMINATION FORM

FS AWARD NOMINATION					
UNIT AT TIME OF OCCURRENCE:					
NOMINEE(S)					
Rank	Surname	First name	Initial(s)	SN	Occupation
Type of award recommended	Good Show <input type="checkbox"/>	For Professionalism <input type="checkbox"/>	Other (specify):		
Reference document(s)	Technical Documents:				
	Occurrence #:				
	UCR #:				
	Other (specify):				
Photograph		The quality photograph, related if possible to the occurrence, shall be a high resolution unmodified file of at least 1 megabyte.			
Citation Language		English			
		French			
RECOMMENDED TEXT FOR AWARD CITATION (up to 500 words for Good Show and up to 300 words for a For Professionalism)					

RANK, NAME, INITIALS, POSITION	DATE
1. PROPOSER: Comments:	
2. SECTION HEAD: Supported : Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:	
3. UFO: Supported : Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:	
4. CO: Supported : Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:	
5. WFSO: Supported : Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:	
6. Wing Comd: Supported : Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:	
7. Nomination sent by WFSO / D/WFS to 1 Cdn Air Div FS by e-mail, info copy to DFS 3-3	

CHAPTER 6 – FS FEEDBACK TO THE CHAIN OF COMMAND

GENERAL

1. It is the responsibility of FS personnel at all levels to advise their comd when they have concerns with respect to FS issues. This advice can take many forms (formal / informal briefings, briefing notes, safety committee meetings, informal discussions), but it is essential that all FS professionals, as advisors, make their concerns known to the chain of command.

INTENT OF FEEDBACK

2. The intent of feedback is to provide an assessment to the applicable comd, in as objective a manner as possible, of the degree of safety of flight-related activities with the aim of making this information useful and relevant to the comd. Ideally, feedback should highlight the areas upon which comds must focus in order to improve the safety of flying operations. Flight safety indicators that highlight to the chain of command the degree of safety of flying activities or the level of risk at which operations are being conducted is what the FSO is trying to measure.

ASSESSMENT OF FS INDICATORS

3. The assessment of the FS indicators in a unit should be done by looking at the following components:

- a. documentation of unit FS Program;
- b. FS implementation or culture within the unit; and
- c. resources dedicated to the unit FS Program and the status of the various FS tasks at the unit.

FS DEDICATED RESOURCES AND TASKS

4. In order to run an effective flight safety program, established FS positions must be filled by appropriate personnel. In establishing the number of FS positions, some key elements that must be considered are:

- a. the existence of a succession plan to ensure continuity in unit FS positions;
- b. whether the incumbents have the proper qualifications, the appropriate background, the opportunity to build and effectively use FS experience, and any additional secondary duties are assigned in accordance with this order;
- c. infrastructure and equipment (offices, equipment storage and, when appropriate, classrooms, IT/IM hardware and software, crash kits);
- d. basic transportation (when required) and communication equipment (including IT resources);
- e. business plan incorporating FS priorities and objectives with a suitable budget to deliver or the commitment of the Comd to support these initiatives; and
- f. budget allocation matching the business plan intent.

5. The number of established FS positions should be revised annually to adjust to the mission and tempo of the organization based on the degree to which FS tasks are being completed, with an assessment of:

- a. the status of occurrence investigations and reports;
- b. regularity of Safety Council meetings and the publishing of meeting minutes;
- c. degree of completion of safety measures recommended from FS investigations, surveys and follow-up actions from FS meetings;
- d. frequency and conduct of informal flight safety surveys and tours of facilities;
- e. frequency of review of unit and fleet FS occurrences;
- f. currency and relevance of promotional material posted on FS bulletin boards and made available to personnel via different media; and
- g. frequency of submission of nominations of suitable candidates for FS awards and suitable public and private recognition of deserving individuals.

STRESS POINTS

6. Another indicator of the relative safety of a flying operation is the presence or absence of stress points. The presence of stress points that, in the opinion of the FSO, have significant impact on the safety of the unit's flying operation, must be quantified as accurately as possible and reported when observed. Care must be taken to ensure that the stress points reported actually do affect FS.

FEEDBACK METHODOLOGY

7. In order to act on FS issues, the chain of command must be made aware of the concerns of their FS professionals. It is the duty of the FSO to question, to warn and to suggest alternatives. As champions of FS, the FSO cannot shrink away from making subjective assessments, but we must recognize the need to more clearly quantify our assessments wherever possible.

8. Reporting to a comd may be done verbally or in writing. The latter is preferred in that it is more formal and provides the comd with documented examples that can be acted upon. This also allows the comd to acknowledge the report and indicate his/her intentions, if any, to address problematic issues.

9. Performance measurement of the flight safety program could be reported through some form of balanced scorecard system or a matrix using a "traffic light" system (RED, YELLOW, GREEN) to indicate performance on the criteria assessed. As a minimum, a brief factual justification for factors rated unsatisfactory or RED must be included in order to fully explain the situation leading to the RED assessment. Such a matrix shows at a glance where the FS staff believes there are concerns and where attention should be focused. The matrix should include objective criteria where possible, but given the nature of some of the issues within the matrix (culture, stress points), a subjective assessment is also required. Wherever possible, subjective assessments should be backed up with facts (statistics, trend analysis, statements from personnel) in order to lend more credence to the assessment. However, it is acknowledged that sometimes the best professional judgement of the FS staff and their "gut feel" will be all that is available. A suggested example of the report matrix format is shown in Annex A. The DFS website contains a quantitative description of the factors listed above which can be used as a guide for the production of the report.

FEEDBACK CONSIDERATION

10. A careful balance must be achieved between the requirement to inform the chain of command and unnecessarily overstating the level of concern. By continually stating that there will be dire consequences if a particular measure is not taken, there is a risk that leadership will become inured to these warnings. Similarly, operations must be periodically reviewed to ensure that more risk has not gradually been assumed over time due to the absence of occurrences. Judicious use of warnings and regular assessment of risk levels are in order to prevent the gradual increase of risk.

11. The FSO will, at times, be in the position of advising non-Air Force COs. In these instances, it must be remembered that the comd may not be aware of the requirements of this manual or of his / her responsibilities under the Aeronautics Act. A tactful explanation of these requirements will be necessary in such situations. By raising the comd's awareness of the basic principles of FS, these situations should be overcome. However, as these are valid, legal, regulatory requirements, the FSO must ensure that the comd is made aware of his / her responsibilities and, if required, must enlist the assistance of other FS personnel to ensure that these requirements are not violated.

Annex A
Chapter 6
A-GA-135-001/AA-001

ANNEX A – EXAMPLE FS FEEDBACK MATRIX

FACTOR¹	DESCRIPTION³	REMARKS
MANNING	All positions fully manned and trained	
PROGRAM	Air Weapons Safety Program not fully documented in FS Program	
FS RESOURCES	FS staff and offices fully re-sourced including funding for PD courses / seminars	
CULTURE	Clear evidence of a fair and flexible reporting and learning culture in the unit	
TASKS	Preventive measures not being tracked until completion	
STRESS POINTS²	Some stress points are present.	
OVERALL	Subjective combined assessment on how safe the unit is operating	

¹ Assessments factors may be added as required by the FSO, but they must include an explanation as to their intent.

² Any individual or overall factors assessed as RED must be accompanied by a suitable explanation and supporting documentation.

³ The DFS website contains a quantitative description of the factors listed above. These can be used as a guide for the production of the FS feedback report.

CHAPTER 7 – OCCURRENCE REPORTING

References: A. *1 Cdn Div Orders*, Vol 2, Glossary
B. DAOD 2008-3, *Issue and Crisis Management*
C. A-GA-135-003/AG-001 *Airworthiness Investigation Manual* (AIM)

AIRWORTHINESS INVESTIGATION AND THE FS PROGRAM

1. Chapters 7 to 11 of this manual deal with the airworthiness investigation of matters concerning safety as delegated to the AIA from the MND and outlined in the AIM (reference C). These investigation activities fulfil both a Flight Safety and an Airworthiness Program objective but are identical in their accomplishment. Because the FS Program 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 FS Program's established structure. Annex C explains the AIA's requirements and conditions for all FS positions with the associated certifications to carry out such investigations.

PURPOSE OF REPORTING

2. 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. FS occurrence reporting and investigation allow appropriate PM to be identified and implemented by comd authorities.

DEFINITIONS

AIRCRAFT

3. A machine capable of deriving support in the atmosphere from reactions with the air.
- a. CF aircraft: Includes aircraft that have been accepted by the CF 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 CF are considered CF 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 *CTAISB Act* gives MND the responsibility for investigating occurrences involving military conveyances. 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 CF 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 at a Wing involving a civilian air asset or civilian personnel, the WFSO should inform DFS so that the appropriate coordination with TSB can occur.

- b. Non-CF aircraft: These are subdivided as follows:
- (1) Non-CF military aircraft. There are two categories of non-CF military aircraft:
 - (a) Allied military aircraft. These are aircraft belonging to an allied military force. When the CF assumes quality-assurance responsibility for these aircraft during production, repair, modification or overhaul, they are considered CF 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.
 - (2) Civilian aircraft. This term is normally self-explanatory, but when a CF aircraft is lent or bailed to a civilian agency on a temporary basis, the CF continues to be involved.

COLLATERAL INVESTIGATION

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

FS AIRWORTHINESS INVESTIGATOR

5. 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 the AIM and is authorized to conduct independent airworthiness investigations.

FS PUBLICATIONS

6. 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

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

FS OCCURRENCE

8. See definition at Chap 1.

NOTE

All FS occurrences exclude events caused by enemy action.

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 paratroops, 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

FS occurrences include lightning and bird strikes, emergency jettison, loss of cargo or slung loads, inadvertent firing or hang-up of airborne armament equipment or munitions, precautionary power plant shut-down, near misses, malfunction of life-support equipment or a crew member experiences an aeromedical problem, damage to civilian or military property, or any other event having accident potential.

AIR FS OCCURRENCE

9. An event involving a CF 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.

GROUND FS OCCURRENCE

10. An event involving a CF 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 ACCIDENT

11. 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, 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 CF aircraft is destroyed, missing or sustains very serious or serious damage.

FS INCIDENT

12. An event in which one or more of the following must 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 CF aircraft sustains minor damage; or
 - c. there is no injury or damage but accident potential did exist;

UNMANNED AIRCRAFT SYSTEM (UAS)

13. An Unmanned Aerial System (UAS) is defined as any aircraft, including support and control elements, being part of a system designed or modified not to carry an on-board human pilot and operated through remote or self-contained automated control (ref A). As an aircraft system, a UAS must meet all applicable standards required of a conventionally crewed aircraft.

UNMANNED AIRCRAFT VEHICLE (UAV)

14. A UAV is defined as a power-driven aircraft that is designed to fly without a human operator on board. The UAV is the aircraft portion of a UAS.

STAGE OF OPERATIONS

15. 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 follows:

- 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 paratroops are also included under this stage of operation.
- 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.

HAZARD CONDITION

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

UNIT OF OCCURRENCE

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

UNIT OF OWNERSHIP

18. 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 CF, 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 CF-supervised contract; and
- d. for other non-CF aircraft, the DFS shall make suitable arrangements.

REQUIREMENT FOR REPORTING

19. A critical requirement of the FS Program is that FS occurrences be reported. If all events that cause a potential or actual SoF compromise are reported, then emerging trends can be identified and analyzed. The analysis then allows appropriate PM to be devised and implemented. Comds must encourage personnel to report all occurrences and hazards.

REPORTING INFORMATION LINKED TO OPERATIONS

20. Reporting FS information is vital to the FS and Airworthiness Investigation Program. However, there will be times when operational security (OPSEC) and operational / time sensitive information could have effect 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 in a timely but secure manner so as to preclude any advantages such knowledge might impart on these non-friendly forces. FS reports containing classified information shall only be transmitted to DFS by secure means in an encrypted message or e-mail as per Annex E of Chapter 9.

REPORTING RESPONSIBILITY

21. Comd 1 Cdn Air Div and 2 Cdn Air Div retain responsibility for the reporting of all FS occurrences involving CF 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.

22. Injuries reported as part of an FS occurrence and under the authority of this manual must also be reported to the General Safety Program and will require investigation in accordance with A-GG-040-001/AG-001.

HAZARD REPORTING

23. 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 Hazard Report Form (Annex A) can be used to alert the FS System to potential problem areas. It is available in electronic format on the DFS website. This form may be submitted anonymously or it may be signed. When the unit FS NCM or Officer receives a Hazard Report it shall be assessed for its validity and possible PM to mitigate it. If the Hazard Report has been signed the person that submitted the report may be contacted for further clarification if desired.

24. 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 if we are aiming to encourage open and honest reporting of hazards.

25. The Hazards Reporting Form at Annex A includes an identification of “Hazard severity” and “Probability”, which will correspond to a level of risk in FSOMS. 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 1 Div FS office, as detailed in Chap 11 Annex B. To ensure adequate and timely visibility of all hazards at higher headquarters, it is critical that UFSO/WFSO input and release (i.e. “sent”) the hazard reports within FSOMS.

INITIAL INCIDENT REPORT

26. The FSOMS is normally used to report a simple occurrence. If unable to access the FSOMS, a telephone call or a CF215 FS message report is to be submitted to the home unit for input to the database.

INITIAL ACCIDENT REPORT

27. Immediately following an accident or serious occurrence, call DFS at 1-888-WARN DFS (927-6337) and the chain of command (NDHQ / CanadaCOM / CEFCON / SOFCOM, and / or 1 Cdn Air Div AOC immediately. An initial report (IR) must follow. See Annex B for Accident Notification Procedures. DFS shall be contacted as soon as possible for any accident (Occurrence category ‘A’ to ‘C’ and / or for any occurrence having a SFCL equal or greater than High).

GUIDELINES FOR REPORTABLE OCCURRENCES

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

- a. Was there an accidental injury or illness to a person or damage to a civilian or military property or to a CF / DND operated aircraft as a result of CF / DND 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 CF / DND aircraft as a result of CF / DND 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.

29. 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.

FS REPORT CLASSIFICATION

30. 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 Transportation Accident Investigation and Safety Board Act*, the *Canadian Human Rights Act* and the *Access to Information Act*. Therefore, FS information will not be released without the express authority of DFS.

NOTE

FSOMS 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 Internet site at <http://www.airforce.forces.gc.ca/dfs> under Publications\Forms. The details of the occurrence will not be entered into FSOMS. 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 FSOMS by DFS. Ownership of the occurrence will then revert to the reporting unit.

OBLIGATION TO REPORT

31. An FS occurrence IR is required for each separate event involving injury to personnel or damage to CF aircraft, air vehicles or support equipment, or when flight safety was affected. If two or more aircraft are involved in a single event, one FS report will normally be required.

OCCURRENCES INVOLVING NON-CF AIRCRAFT

32. Regardless of the report(s) required by non-CF authorities, occurrences involving non-CF aircraft shall be reported as directed in this publication.

AIRCRAFT AT CIVILIAN CONTRACTORS

33. FS occurrence reports are required for each occurrence involving aircraft where there is CF involvement during the periods specified as follows:

- a. new aircraft – except when special arrangements exist, from the time a CF 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 CF-supervised contract – treat as a CF aircraft until it leaves Canada or is accepted by aircrew of the country of ownership.

CONTRACTED AIRCRAFT / FACILITIES

34. Reports are required for each occurrence involving a non-CF aircraft when there is CF 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 CF involvement:

- a. non-CF aircraft and facilities under contract to provide support to CF flying operations at or below the wing / base or unit level shall be included within the existing wing / base or unit FS program 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. CF 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 NavCanada Regional Air Traffic Services Officer, and a normal FS occurrence report is to be filed.

OCCURRENCES INVOLVING PARACHUTISTS / RAPPELLERS

35. SAR Tech Personnel. Occurrences involving SAR Tech personnel jumping from either CF aircraft or CF 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.

36. Other Personnel. Parachute and rappel occurrences involving all other parachutists or rappellers who are jumping from either CF aircraft or CF 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. On the contrary, the occurrence shall be reported through the General Safety Officer.

NOTE

These events are logged according to the tail number of the aircraft involved in the occurrence.

OCCURRENCES INVOLVING UASs

CATEGORIES OF UASs

37. 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 a UAS resides shall be stated in the Canadian Military Aircraft Type Certificate or the Specific Purpose Flight Permit. The UASs are divided into three categories:

- a. Tier 1: UAS with MTOW of 5001 lbs or greater. This classification includes High Altitude, Long Endurance (HALE) and Medium Altitude, Long Endurance (MALE) UAVs with Beyond Line of Sight C3 capabilities;
- b. Tier 2: UAS with MTOW between 185 to 5000 lbs MTOW. This classification comprises Tactical UASs, typically with line of sight only C3 capabilities; and
- c. Tier 3: UAS with MTOW of 0 to 184 lbs MTOW. This classification comprises Small, Mini and Micro UASs, typically with line of sight only C3 capabilities.

UAS OCCURRENCE REPORTING

38. UASs, like any other CF aircraft, are subject to the CF FS Program. UASs FS reporting takes into consideration design, function, complexity and level of skill required for their operation and maintenance. Damage to a UAS component that is designed as consumable will not normally be reported using FSOMS. The following guidelines will apply to the reporting of UAV FS occurrences:

- a. Tier 1: no change from manned systems;
- b. Tier 2: the following items will be reported:
 - (1) complete destruction or loss of UAV or major damage to it,

- (2) engine failure during flight,
 - (3) injury or illness to personnel or potential for injury or illness,
 - (4) uncommanded control input,
 - (5) failure of flight reversionary system,
 - (6) collision with other aircraft or near miss,
 - (7) collision with ground vehicles or infrastructure; and
 - (8) violation of assigned airspace.
- c. Tier 3:
- (1) injuries or potential for injuries, and
 - (2) violation of assigned air space.

OCCURRENCES INVOLVING AIR WEAPONS SYSTEM

39. Occurrences that must be reported and, if necessary, investigated and monitored include:
- a. accidental functioning of an air weapons store;
 - b. inadvertent release or firing of an air weapons store;
 - c. hazardous malfunctioning of an air weapons system or air weapon, e.g. hang-up, runaway gun;
 - d. accident or incident which damages or could have damaged an air weapon or air weapons system; and
 - e. any occurrence associated with air weapons, air weapons system, or explosives / pyrotechnics from the time it is removed from its ready-use storage with the intent to be used in support of an air mission to the time it is returned to a ready-use storage.

NOTE

In addition to the FSOMS occurrence entry, an Ammunition and Explosives Defect and Malfunction Report (CF 410), shall be submitted by the unit armament authority IAW A-GG-040-006/AG-002 for all occurrences where the ammunition / weapon / explosive is faulty, damaged, or the direct cause of the occurrence. The Flight Safety Report number shall be referred to in block 23 of CF 410.

40. In situations where occurrences involve the malfunction of a hand-initiated and manually deployed or released store (i.e. flare, signal smoke and marker) without impacting the safety of flight, equipment or personnel, a CF215 - Flight Safety Occurrence Report should not be recorded. However, the completion of a CF410 - Ammunition and Explosives Defect and Malfunction Report is still mandatory, in order to document the malfunction and assist in identifying trends and deficiencies of the item IAW DAOD 3002-4. A-GG-040-006/AG-002 provides procedures for CF410 completion. In addition, the release and/or impact location of the malfunctioned store shall be recorded on the CF410 to aid Unexploded Ordnance (UXO) tracking and is especially important for stores deployed or released over and impacting non-DND property.

NOTE

In situations where occurrences involving Air Weapons are entered into and investigated within FSOMS, the requirement to file an Ammunition Accident, Incident Report under the Explosives Safety Program is satisfied through the completion of the FSOMS occurrence.

FS OCCURRENCE MANAGEMENT SYSTEM

41. 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. The FS Occurrence Management System (FSOMS) is the primary tool to assist this process and is useful for identifying trends.
42. The FSOMS was developed to meet the automated support needs of the CF FS Program. It provides FSOs at all levels with an ability to input, record and track FS occurrences.
43. FSOMS shall be used to record all FS occurrences. If unable to access the FSOMS 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 CF msg using the CF 215 FS message form. Routine FS occurrences will be submitted to the home unit FSO for input to the FSOMS database. As FSOMS does not automatically inform comds of FS occurrence information, FSOs shall review FSOMS on a regular basis to ensure FS information has been distributed as required.
44. The unit of ownership is responsible for originating the FS report and ensuring it is entered in FSOMS. 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.
45. FSOMS development and policy is a DFS responsibility. The training of FS personnel on the use of FSOMS to input initial investigation data and hazard reports is the responsibility of 1 Cdn Air Div FS and will be delivered through the Basic FS Course.

TRANSFER OF OWNERSHIP

46. 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 (FSOMS 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 FSOMS.

REPORT FORMS AND TAGS

FS FORMS

47. The FS forms can be downloaded from the DFS Website or may be obtained through normal supply action unless stipulated otherwise.
- a. Flight Safety Occurrence Report Initial (CF 215). A CF 215 shall be submitted to a Flight Safety Officer within 12 hours of an occurrence involving the security of a Canadian Forces aircraft. This form can be downloaded from the DFS Website.

- b. Flight Safety Hazard Report (DND 2484). A DND 2484 should be filed when personnel identifies any condition that has the potential to cause injury or damage during Canadian Forces air activities or support to the latter. This form is designed to track and record (through FSOMS) observations on hazardous conditions or deficiencies in the aviation system. A sample form can be found at Annex A. This form can be downloaded from the DFS Website.
- c. 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. This form can be downloaded from the DFS Website; and
- d. Report of Emergency Landing/Ditching on Water (DND 724). A DND 724 can be downloaded from the DFS Website.

OTHER RELATED REPORT FORMS

48. 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 may be obtained through normal supply action.

- a. Report on Injuries or Exposure to Toxic Materials or Substances (CF 98). A CF 98 is used to report serious or very serious injuries and fatalities. In situations where FS occurrences involve injury to personnel, FSOs should ensure the unit General Safety Officer (GSO) is aware of the injury.

NOTE

Entry of the injury into the FSOMS database does not ensure either a CF 98 Report on Injuries or Exposure to Toxic Materials or Substances or CF 663 Accident Prevention Report is completed or medical authorities are aware of the injury and/or exposure.

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

In situations where FS occurrence investigations reveal deficiencies with Aviation Life Support Equipment (ALSE), FSOs should ensure the unit ALSE Officer is aware of the ALSE implications to the FS occurrence. Entry of the occurrence into the FSOMS database does not ensure appropriate ALSE corrective action has been taken.

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

- 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 facilities 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.

AIRCRAFT ACCIDENT TAGS

49. Tag NSN 9905-21-872-3060 is to be used by investigators to identify and quarantine items during the conduct of FS investigations.

Annex A
Chapter 7
A-GA-135-001/AA-001

ANNEX A – HAZARD REPORT FORM DND 2484



National Défense
Défense nationale

Flight Safety Hazard Report Rapport de sécurité des vols - Situation dangereuse

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.		Référence : A-GA-135-001/AA-001 Vous pouvez prévenir les accidents d'aéronef en signalant les situations dangereuses. Une situation dangereuse en sécurité des vols (SV) est toute situation risquant de causer des blessures ou des dommages. Veuillez prendre quelques instants pour remplir le formulaire. Remettez-le dès que possible au personnel de la SV pour que cette situation dangereuse puisse être traitée AVANT que ne se produise un accident. Le rapport peut être soumis de façon anonyme à n'importe quel bureau de la SV ou posté directement à la DSV. Les rapports sont traités en toute confidentialité. La mention volontaire des coordonnées du soumissionnaire permet au personnel de la SV d'assurer un suivi après enquête.	
Contact info: Director Flight Safety National Defence Headquarters Major-général 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		Information pour communiquer : Directeur - Sécurité des vols Quartier général de la Défense nationale Édifice Major-général George R. Pearkes 101, promenade Colonel By Ottawa (Ontario) K1A 0K2 Courriel : dfs.dsv@forces.gc.ca Téléphone : 1-888-WARN DFS / 1-888-927-6337	
Date reported (yyyy-mm-dd) - Date du signalement (aaaa-mm-jj)			
Name - Nom	Rank - Grade	Unit - Unité	Telephone - Téléphone
Hazard description (The hazard I observed is ...) Description de la situation dangereuse (La situation dangereuse que j'ai observée est ...)			
(Use additional sheet if needed – Utilisez une page additionnelle au besoin)			
Hazard severity (provide your personal evaluation of the potential consequences if this hazard materializes) (see reverse for definitions) Gravité de la situation dangereuse (fournissez votre propre évaluation des conséquences possibles si cette situation se produisait) (voir au verso pour les définitions)			
<input type="checkbox"/> Catastrophic Catastrophique	<input type="checkbox"/> Hazardous Dangereuse	<input type="checkbox"/> Major Importante	<input type="checkbox"/> Minor Légère
<input type="checkbox"/> Negligible Négligeable			
Hazard probability (provide your personal estimate of the likelihood of this hazard occurring) (see reverse for definitions) Probabilité de la situation dangereuse (fournissez votre propre estimation de la probabilité que cette situation se produise) (voir au verso pour les définitions)			
<input type="checkbox"/> Frequent Fréquent	<input type="checkbox"/> Probable	<input type="checkbox"/> Remote Faible	<input type="checkbox"/> Extremely remote Très faible
Suggestion solution – Solution suggérée			

DND 2484 (02-2011)

Design: Forms Management 613-993-4050
Conception : Gestion des formulaires 613-993-4062

Hazard definitions	Définition de situations dangereuses
Severity	Gravité
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.	Catastrophique : Conditions dangereuses qui pourraient nuire à la sécurité des vols et des atterrissages. Pourraient être une cause de mortalité de l'équipage de bord *accompagnée de la perte de l'aéronef, en général.
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.	Dangereuse : Conditions dangereuses qui risquent d'entraîner une diminution importante des marges de sécurité ou des capacités fonctionnelles, incluant d'accroître le charge de travail de l'équipage ou d'entraîner des souffrances qui pourraient empêcher l'équipage d'accomplir adéquatement ou entièrement ses tâches. Pourraient être une cause de mortalité ou de blessures graves aux occupants de l'aéronef ou de dommages graves à un système de bord. Pourraient être une cause de mortalité ou de blessures graves au personnel au sol ou au public en général.
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.	Important : Conditions dangereuses qui risquent d'entraîner une diminution modérée des marges de sécurité ou des capacités fonctionnelles, incluant d'accroître modérément la charge de travail de l'équipage ou des souffrances nuisant à son efficacité. Ces souffrances ou dommages pourraient consister en des blessures aux occupants ou des dommages mineurs à un système de bord.
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.	Légère : Conditions dangereuses qui ne réduiraient pas grandement la sécurité des vols, mais qui pourraient réduire légèrement les marges de sécurité ou la charge de travail de l'équipage de bord.
Negligible: No effect on safety. Negligible effect on safety margins.	Négligeable : Aucun effet sur la sécurité. Effet négligeable sur les marges de sécurité.
Probability	Probabilité
Frequent: Occurs continuously for the entire fleet or aircrew population.	Fréquente : Se produit continuellement dans toute la flotte ou pour tout le personnel navigant.
Probable: Occurs or likely to occur several times per year for the entire fleet or aircrew population.	Probable : Se produit ou susceptible de se produire plusieurs fois par année dans toute la flotte ou pour tout le personnel navigant.
Remote: Occurs or likely to occur one or more times per year for the entire fleet or aircrew population.	Faible : Se produit ou susceptible de se produire une fois ou plus par année dans toute la flotte ou pour tout le personnel navigant.
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.	Très faible : Ne devrait pas se produire ou susceptible de se produire une fois ou plus pendant la durée de vie de toute la flotte ou pour le personnel navigant.

DND 2484 (02-2011)

Annex B
Chapter 7
A-GA-135-001/AA-001

ANNEX B – ACCIDENT AND SERIOUS OCCURRENCES NOTIFICATION PROCEDURES

TYPE OF OCCURRENCE	UNIT OF OCCURRENCE	WING *	DFS
Accidents “A” to “C” or any occurrence with a SFCL of High or Extreme	Notify Wing of ownership by fastest possible means. If not practicable, call 1-888-WARN DFS (927-6337).	<p>Immediately telephone DFS at 1-888-WARN DFS (927-6337)</p> <p>For “A” and “B” Accidents only, immediately contact as applicable:</p> <ul style="list-style-type: none"> • The Canadian Forces Integrated Command Centre Strategic Watch Officer: 613-945-2643 • If accident in Canada, the Canada COM Operations Desk: 613-945-2639/2417 • If accident outside Canada, the Canadian Expeditionary Forces Command (CEFCOM) Operations Desk: 613-995-0454 • The Canadian Special Operations Forces Command (CANSOFCOM) Desk: 613-998-4390 during working hours or after hours via Email CANSOFCOMOPS@cansofcom.gc.ca • 1 Cdn Air Div Combined Air Operations Centre (CAOC) Duty Watch Officer: 204-833-2650. 	If civilian involvement, notify TSB for a coordinated investigation.

TYPE OF OCCURRENCE	UNIT OF OCCURRENCE	WING *	DFS
	<p>If outside North America or Europe, notify the nearest Canadian diplomatic or foreign liaison staff.</p> <p>Within 12 hours send an FS Initial Report using format at Annex E, Chapter 9.</p> <p>Follow CFAO 24-1 directions for casualty reporting and administration.</p>	<p>Ensure DFS and 1 Cdn Air Div FS are advised as soon as possible. Brief Duty Officers and confirm details as known.</p> <p>If a fatality is involved, notify the local provincial coroner in accordance with CFAO 24-6.</p>	<p>If foreign military involvement, contact appropriate FS organization.</p> <p>Task a FS investigation.</p>

NOTE

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 C
Chapter 7
A-GA-135-001/AA-001

ANNEX C - AIRWORTHINESS INVESTIGATOR MATRIX

AI POSITION	CONDITIONS REQUIRED TO CARRY OUT AIRWORTHINESS INVESTIGATION ACTIVITY		
	QUALIFICATIONS (NORMAL UNLESS WAIVER ISSUED)	AIA AUTHORIZATION	OTHER REQUIREMENTS
Unit FSO / FS NCM	BI 3 (Issued by 1 Div FSO)	As per AIM regulations and policy	When in designated positions or tasked (for FSI activity by AIA)
Wing FS Support Personnel	BI 3 (Issued by 1 Div FSO)	As per AIM regulations and policy	When in designated positions or tasked (for FSI activity by AIA)
Company FS Personnel	BI 3 (Issued by 1 Div FSO)	As per AIM regulations and policy	When in designated positions or tasked (for FSI activity by AIA)
Wing FSO/NCM	BI 3 & BI 2 (Issued by 1 Div FSO)	IIC 3 (Issued by 1 Div FSO)	When in designated positions or tasked (for FSI activity by AIA)
Division FS Personnel	BI 3 & BI 2 (Issued by 1 Div FSO)	IIC 3 (Issued by 1 Div FSO)	When in designated positions
Division FSO	BI 3 & BI 2 (Issued by AIA)	IIC 3 (Issued by AIA) BI 2, BI 3 & IIC 3 (AIA delegation)	AIA delegation of au- thorization
FSI (Semi Permanent) Team Members	BI3 & BI2 (Issued by 1 Div FSO) BI1 (Issued by AIA)	AIA / Support agency Service Level Agree- ments and upon indi- vidual certification by supervision level of appropriate authority	Individuals identified in FSI tasking message (for FSI activity) and CoC from SLAs
DFS Investigator	BI 3 & BI 2 (Issued by 1 Div FSO) BI 1 (Issued by AIA)	IIC 3 (Issued by 1 Div FSO) IIC 1 & IIC 2 (Issued by AIA)	Individuals identified in FSI tasking message (for FSI activity)

AI POSITION	CONDITIONS REQUIRED TO CARRY OUT AIRWORTHINESS INVESTIGATION ACTIVITY		
	QUALIFICATIONS (NORMAL UNLESS WAIVER ISSUED)	AIA AUTHORIZATION	OTHER REQUIREMENTS
DFS Review Staff (Senior Investigator and Chief Investigator)	BI 3 & BI 2 (Issued by 1 Div FSO) BI 1 (Issued by AIA)	IIC 3 (Issued by 1 Div FSO) IIC 1 & IIC 2 (Issued by AIA)	When in designated positions or tasked (for FSI activity by AIA)
AIA / DFS		AIA (Order by CDS)	When in designated DFS Position

CHAPTER 8 – POST-OCCURRENCE ACTIVITIES

PURPOSE

1. As indicated in Chap 1, the objective of the FS Program 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.

DEFINITIONS

AIRCRAFT RECORDING DEVICE (ARD)

2. An ARD is any device installed on an aircraft that records and stores data in any shape or form.

NOTE

ARDs include cockpit voice recorder (CVR), heads-up display (HUD) with or without voice, aircraft crash position indicator (CPI), flight data recorder (FDR), maintenance signal data recording set (MSDRS), health usage maintenance monitoring system (HUMMS), operational loads monitoring (OLM) devices, air combat manoeuvring instrumentation (ACMI), non-volatile memory chips, cockpit mounted cameras.

ON-BOARD RECORDING (OBR)

3. An OBR is defined in the CTAISB *Act* as a recording of voice communication originating from or received on or in the flight deck of an aircraft and / or a video recording of the activities of the operating personnel of an aircraft.

DESIGNATED OBR

4. A designated OBR is any recording device as defined by the CTAISB *Act*.

NOTE

A transcript or substantial summary of designated OBR data is considered a designated OBR.

NON-DESIGNATED OBR

5. A non-designated OBR is an OBR not designed solely for FS purposes and used for other purposes such as crew training, mission debriefing and maintenance.

NOTE

The Instrument Panel Video Monitoring System (IPVMS) installed on the CH124 Sea King or similar systems are to be treated as a non-designated OBR.

PRIVILEGED OBR DATA

6. Privileged OBR data is data derived from designated OBRs and, in the case that a FS occurrence has taken place, all data from the non-designated OBRs.

HANDLING OF ARD DATA

PRIVILEGED OBR DATA

7. The requirements for handling the data of ARDs are either statutory (based on laws) or regulatory (based on orders).

- a. Designated OBR. The Statutes of the CTAISB Act and the Aeronautics Act require that “On Board Recordings” or designated OBR data be treated with privilege. The details associated for use and access to a designated ORB are contained within the statutes. Therefore, the authority to download data from a designated OBR must be obtained from DFS / 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 DFS / AIA approved training and promotion activities; and
- b. Non-designated OBR. The use of data from a non-designated OBR for maintenance or typical post-mission purposes such as training and debrief is authorized by the DFS / AIA unless the recording is associated with an occurrence. Once a FS occurrence has taken place, the data from these OBR is privileged; therefore, only the specifically delegated WFSO (typically the WFSO responsible for the occurrence aircraft) and those authorized by contact with the DFS /AIA or the designate may view, download or utilize these recordings. Personnel given access to non-designated OBR data under this circumstance must be cautioned regarding the statutory privilege associated with this data.

PROTECTION PRIVILEGED OBR DATA

8. 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.

OTHER ARD DATA

9. 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 Cdn Air Div Orders for the personnel conducting such activities. Notwithstanding, after a FS occurrence, these recording devices and data sets shall be quarantined as per para 44 to 55 below pending a decision on the requirement to retrieve the recorded data. This decision will be taken following consultation with Unit FS Personnel and DFS / AIA if / as necessary. The quarantine will remain in effect until the data has been successfully downloaded and is proven usable for evidence purposes.

PROVISIONS FOR DOWNLOADING ARD DATA

10. Designated OBR. Designated OBR unit may be removed from the aircraft or the data download-

ed to assist with valid AIA approved activity only when conducted in strict accordance to the following provisions:

- a. No person, including any person to whom access is provided to the privileged representation shall knowingly communicate it or permit it to be communicated to any person;
- b. Information shall not be used for any administrative, disciplinary proceedings or punitive actions,
- c. Information will not be accessible through the *Access to Information Act* (ATI),
- d. Crew identities shall not be released without their explicit consent;
- e. The data shall solely be used for the purposes of maintenance activities related to aircraft systems or other valid AIA approved activity;
- f. Instructions for periodic maintenance, data download, and calibration must be established for each fleet. Frequencies for these maintenance activities are to be detailed in the maintenance schedule applicable for each fleet;
- g. Data retrieved shall be copied integrally and steps be taken to ensure that no information is lost, altered, or destroyed as a result of the downloading;
- h. Once every 12 months, the downloaded data as well as the correlation data are to be sent to the National Research Council (NRC) Flight Data Recorder Playback Center for verification of the recorded parameters and accuracy. The frequency of the data download may be increased, if so requested by the AIA, to verify the accuracy or the reliability of the system.

NOTE

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

11. **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.

OCCURRENCE RESPONSE PROCEDURES

EFFICIENT RESPONSE ELEMENTS

12. The CO, through the FSO, must ensure the unit is prepared to respond to any occurrence, regardless of location. The occurrence response plan shall include provisions for:

- a. saving lives and preventing injury or further damage;
 - b. protecting the response team from hazards at accident sites as per Annex A; and
 - c. thorough investigation of every occurrence.
13. 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.
14. Operation orders for CF activities involving air assets or support for air assets like exercises, operations and deployments on airshows shall include contingencies for FS occurrences. The 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.

INVESTIGATION PLANNING REQUIREMENTS

15. Planning is required to ensure that evidence is protected and to conduct a safe and expeditious investigation. Time is most important in post-occurrence activities; evidence may change or be lost, or there may be another accident before PM can be implemented.
16. In preparing a response to an FS occurrence, DFS will:
- a. maintain a suitable cadre of trained, authorized and accredited aircraft accident investigators as delineated in the AIM;
 - b. authorize the Div FSO to train and accredit airworthiness investigators as delineated in the AIM;
 - 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, DRDC Toronto 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.
17. 1 Div 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 Cdn Air Div.
18. In many instances, action items are not the responsibility of the FSO. However, the FSO shall ensure that the appropriate actions are taken as required.

ACCIDENT RESPONSE PLAN REVIEW

19. Each unit shall develop an accident response plan 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 unit chain of command and UFSO;
 - b. the Duty Officer;
 - c. the Control Tower;
 - d. the Operations Section;
 - e. the Military Police; and
 - f. the local civilian police, fire halls, hospitals, ambulance services, telephone operators and information services.

ACCIDENT RESPONSE COMPONENTS

20. The response plan shall include, in order of precedence, those individuals to be advised. The Aircraft Accident Checklist at Annex B lists the actions anticipated from the organizations concerned in case of a serious accident.
21. The accident response plan should include:
- a. provisions for the immediate involvement of aeromedical personnel;
 - b. training of firefighting personnel in aircraft rescue techniques;
 - c. availability of rescue personnel whenever flying is in progress, including personnel to disarm, remove or safety explosive devices and pressurized systems;
 - d. provision of technical and operational advice to the pilot in an emergency;
 - e. a checklist to be used during emergencies by personnel in key positions like CO, DCO, SAMEO, tower, operations, OSCER and FSO;
 - f. procedures for recovery or diversion of aircraft;
 - g. briefings to the local authorities on how to report an occurrence and what to do at the scene until CF authorities arrive, like liaising with coroner or police;
 - h. alert the agencies that must respond to an off-unit site occurrence;
 - i. communications for all rescue vehicles and agencies, e.g. Padre, Environmental Officer and PAO;
 - j. the accident-rescue grid map of the airfield and surrounding area. Copies should be kept in the control tower, dispatch centres, OSCER vehicle, helicopters, ambulances, fire trucks, maintenance, and other vehicles that must respond to an accident or emergency;
 - k. 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;

- l. the search-and-rescue (SAR) plan (water, land or air parties), arrangements for a search centre and for SAR support;
- m. considerations for runway clearance and diversion procedures to allow, if possible, the recording of evidence before wreckage is moved;
- n. procedures for runway clearance, including instructions for the selection, maintenance and use of heavy equipment, cranes, jacks, portable floodlights, spare wheels and slings;
- o. media response guidelines;
- p. measures for the security of the aircraft;

NOTE

Whenever sabotage is apparent or suspected, Security Orders for the CF apply.

- q. 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;
- r. 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 comd, who shall be responsible for:
 - (a) if crash site is outside a defence establishment, coordinating with local police authority to identify CF security needs and ask for their support;
 - (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 comd and crew;
- s. 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;
- t. selecting, maintaining and using equipment for the protection and collection of evidence;
- u. using the services of the Recovery and Salvage Squadron (RASS) of ATESS for heavy

- equipment and diving or dragging equipment to recover wreckage, using both civilian and CF resources (see C-05-010-002/AG-000 – Aircraft Salvage Procedures); and
- v. preparing for the commencement of the investigation by ensuring that perishable evidence is recorded, personnel involved and witnesses are isolated and requested to provide a written statement as soon as possible after the accident, personnel are instructed to take and ship samples, measurements are taken, accident site diagrams are prepared, appropriate medical exams are conducted, appropriate items are quarantined and impounded as required, witnesses (including start crews) are identified, and weather observations at the time of the occurrence are taken.

NOTE

Annex E amplifies details of the photographic requirements. Custody of photographs must be carefully controlled to ensure maintenance of the chain of evidence custody.

NOTE

A Report of Emergency Escape From Aircraft and / or Report of Emergency Landing on Water may also be required.

COMMUNICATIONS

NOTIFICATION OF FOREIGN NATIONS

22. When occurrences involve non-CF 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

23. Normally, the nearest practicable 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 Cdn Air Div / CANR Headquarters.

NOTIFICATION TO CORONER

24. 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

25. 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 the AIM. 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.

26. 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 FS Program is to investigate to prevent future occurrences and the aim of the investigation is not to assign blame.

27. 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.

28. 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

29. 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 FSIR 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.

INFORMATION NOT TO BE RELEASED

30. 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

31. 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 the AIM.

RELEASE OF INFORMATION TO OTHER NATIONS

32. 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.

PROCEDURES ON ACCIDENT SITE

HEALTH PROTECTION

33. At an accident site, there will be dust, chemicals and / or fumes that can be toxic or very hazardous to health. Therefore it is essential to protect all personnel working at the accident site. Equipment must protect the lungs and skin from contact with and ingestion of particles and fumes. The CF 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. Accident Response Plans must ensure that any information regarding dangerous substances is passed to these support agencies. Refer to Annex A and the AIM for further details.

34. 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

35. 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 re-supply 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 C 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

36. 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 CF / DND personnel. On defence establishments it is the responsibility of the MPs. If the site is outside CF military facilities or what is considered a defence

establishment, the local police has jurisdiction. The aircraft commander, the CO or the senior capable survivor may obtain local police or other civilian personnel to perform the initial security.

37. 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.

38. 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 DFS. In the case of FSIs, access to the accident site and the extent of investigative participation is left to the discretion of the DFS. Representatives of the news media should be asked to stay clear to protect the evidence on the crash site and for their own safety. They 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 no force will be used by CF personnel to prevent them from gathering imagery. The PAO should be advised of any news media in breach of restricted access areas. Similar procedures are to be followed with owners of the property involved, remembering that a full and effective investigation may depend upon a property owner's cooperation.

39. However, when it is impractical or of doubtful value, the CO, having considered the security classification of the components, may decide not to secure the area. COMSEC authorities should be consulted when COMSEC material is present.

40. 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 CF security is not provided, DFS shall be informed.

SECURITY DUTIES

41. 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 serious 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. The security comd 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 DFS, 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 DFS 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

42. Outside Canada, the local authorities or locally provided security have jurisdiction for physical security. CF requirements should be made known and CF methods should be tactfully suggested. For details concerning the security of evidence within NATO countries, refer to STANAG 3531, available on

the DFS website.

IMPOUNDING ARTICLES

43. 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 F. 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

44. 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 34 2) 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. In the case of civilian ATC facilities, contact DFS or DFS IIC, who will make the official impoundment request;

NOTE

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

- 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

45. 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 above in para 9 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

46. 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 F.

47. Aircraft equipment / parts shall be prominently tagged with both a CF-706 (Quarantine tag), and a CF942 (Material condition tag).

48. A register is to be kept in the secure storage to identify items held in quarantine and provide a link to the FSOMS 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

49. 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.

50. 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

51. 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 F. 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.

52. 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.

53. 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.

54. 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. CO or designate; or
- d. a CF-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.

55. 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 QUARANTINED / IMPOUNDED ITEMS

56. Apart from the exceptional requirements noted in paras 7, 8 and 9 above, the DFS IIC, WFSO, UFSO, AFSO (Aircraft Fluid Services Officer) or authorised individuals, are the only people to have access to quarantined / impounded items.

LIFTING OF QUARANTINE / IMPOUNDMENT

AUTHORITY TO LIFT QUARANTINE / IMPOUNDMENT

57. DFS is the authority to lift quarantine / impoundment. This authority is delegated, with the exception of photographic / imagery evidence, in order of precedence as follows:

- a. for Class I and II investigations, as directed by DFS: the IIC; and
- b. for Class III and IV investigations:
 - (1) the WFSO or FS qualified personnel tasked with conducting the investigation, and
 - (2) the CO or a CO's delegated person of authority having the required knowledge to ascertain that the lifting of the quarantine / impoundment of item(s) will not affect the conduct of the investigation.

NOTE

Due to Privacy Act considerations, the DFS / AIA retains the authority for the release of all photographic / imagery evidence.

PROVISION FOR ARD DATA

58. 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 QUARANTINE / IMPOUNDMENT

59. 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

NOTE

For aircraft maintenance record sets, see C-05-005-P04/AM-001.

DISPOSAL OF QUARANTINED / IMPOUNDED EVIDENCE

60. 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.

61. 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

62. 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

63. 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

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

65. Escape system components involved in ejections or damaged in accidents are to be photographed using close up, high quality colour 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.

66. 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

67. In all ejections and in accidents involving injuries, all aviation life support equipment (ALSE) and all items of apparel must be suitably packed, annotated, and shipped to DRDC Toronto. DRDC Toronto 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 DRDC Toronto. These items are to be struck off the appropriate inventory before shipping, as they will not be returned by DRDC Toronto. Personally purchased survival items, crests and badges are not to be removed. They will be returned to the owner when the DRDC Toronto investigation is completed.

QETE FS WORK REQUEST

68. 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 website under Resources / Investigator Toolbox.

Annex A
Chapter 8
A-GA-135-001/AA-001

ANNEX A – PERSONAL PROTECTIVE EQUIPMENT

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 overboots 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.
 - 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 HEALTH PROTECTION KITS

2. Health protection kits are issued for aircraft accident sites as per the Appendix 1. These kits will normally be distributed as follows:
 - a. 15-person Kits. 5 Wg Goose Bay, 9 Wg Gander, 16 Wg Borden, CFB Edmonton, CFB Gagetown, CFB Petawawa, CFB Valcartier, 438 Sqn St. Hubert, 440(T) Sqn Yellowknife, 22 Wing North Bay. These kits are the responsibility of the FSO.
 - b. 30-person Kits. 3 Wg Bagotville, 4 Wg Cold Lake, 8 Wg Trenton, 12 Wg Shearwater, 14 Wg Greenwood, 15 Wg Moose Jaw, 19 Wg Comox, HS 443 Esquimalt. These kits are the responsibility of the FSO.
 - c. 50-person Kits. Two deployable 50-person kits exist for DFS use. They are held by FSO 17 Wg Winnipeg.
3. DFS will dispatch a 50-person kit to an accident site to augment the responding wing's issue if required.
4. Additional kits can be coordinated through DFS as required

Appendix 1
 Annex A
 Chapter 8
 A-GA-135-001/AA-001

APPENDIX 1 – HEALTH PROTECTION KITS

HEALTH PROTECTION KITS			
KIT	KIT SIZE		
	15-PERSON	30-PERSON	50-PERSON
Extra protection – hooded coveralls (size a/a) NSN 8415-21-907-9476	30	60	100
Gloves, work, leather (size a/a) NSN 8415-21-510-5230	15	30	50
Mitten, chemical and oil protective NSN 8415-21-866-6927 (must be purchased locally)	15	30	50
Nitril/latex gloves (must be purchased locally)(6 pairs per person)	90	180	300
Disposable respirator, air filtering NSN 4240-00-629-8199 (6 per person)	90	180	300
Reusable half face piece respirators	5	10	10
P100 filters for half face piece respirators (pairs)	5	10	10
Half face piece respirator cleaning wipes (1 box = 100 wipes)	1	1	2
Antiseptic hand-wipe (115 ml bottle)	5	10	30
Goggles, industrial NSN 4240-21-843-3685 (must be purchased locally)	15	30	50
Masking tape (2-inch / 1-inch)	5 / 5	10 / 10	30 / 30

Annex B
Chapter 8
A-GA-135-001/AA-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 Responsibility 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

The checklist should include the need for phoning the informant back to check authenticity.

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

NOTE

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 or tampering with evidence. Suggest that this could well jeopardize the investigation and warn of hazards such as fuel fumes, fire, explosives, dust from composite materials, ejection seats, armaments, jettisonable tanks and pressurized systems.

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
 - 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).
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. Only firefighters 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 OSCER 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. Death or serious injury can also be caused by a tire exploding due to a damaged wheel.

NOTE

All personnel 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.
 - 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 shellac. 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 investigator will determine the protective clothing and PPE that personnel must use.

RESPONSE PROCEDURE FOR FIRST UNIT ADVISED

9. On the declaration of any air emergency in the area of a flying unit, the occurrence response plan 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.

- d. If there is a possibility that a “D” Category 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 para 16 Recovery and Salvage section 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 occurrence response plan 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);
 - (2) 1 Cdn Air Div AOC or through CanadaCOM; CEFCOM 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 Cdn Air Div;
- 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 Cdn Air Div, 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 letter of understanding between DFS and DRDC Toronto, DRDC Toronto will provide a human factors specialist for all A, B and C Category accident investigations. In addition, a DRDC 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 MOU between AETE and DFS).

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 comd, 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 comd's representative;
- (2) Duties IAW A-GA-135-001/AA-001 shall be carried out by the FSO or his/her representative(s);
- (3) The unit comd 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 comd's representative during the pre- and post-investigation process;
- (4) The DFS IIC shall assume the responsibilities outlined in A-GA-135-001/AA-001 and, in cooperation with the unit RASO, 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 comd 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 A-GA-135-001/AA-001 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, 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.

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 A-GA-135-001/AA-001 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-Air Force assets are required, an NDCC Ops tasking will be issued;
- (4) In cooperation with the supporting RASO, 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. If non-air force 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, 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 and laying out the report during assembly.

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 Cdn Air Div 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 FS Investigation Report, Ditching Report, and Emergency Escape from Aircraft Report (held by DFS);
- b. a personal computer with Microsoft Word application; and
- c. hard covers, fasteners and labels.

20. The supporting unit, in cooperation with the unit of ownership, is responsible for coordinating the activities that affect recovery and salvage operations and the clean-up of the site. Such activities shall normally be coordinated through local authorities and 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.

Annex C
Chapter 8
A-GA-135-001/AA-001

ANNEX C – 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-135-001/AA-001 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 sampling 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. Still cameras (traditional 35 mm with colour film, or digital) 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. health protection 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).

Annex D
Chapter 8
A-GA-135-001/AA-001

ANNEX D – OCCURRENCE CHECKLIST

This checklist is 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 an occurrence response plan.	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: <ul style="list-style-type: none"> • 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 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: <ul style="list-style-type: none"> • transportation • accommodation • rations • finances • communications • special equipment
If the runway is blocked, are plans being made for the recovery of airborne aircraft?	

REQUIREMENTS	REMARKS
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 Occurrence Response Plan should have provisions for: a. notifying the next of kin; b. notifying a coroner or nearest civil authority IAW CFAO 24-6; and c. 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 to III 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.
<p style="text-align: center;">NOTE</p> <p>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.</p>	

REQUIREMENTS	REMARKS
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: <ul style="list-style-type: none"> • 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.	
<p style="text-align: center;">NOTE</p> <p>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.</p>	
Complete the IR occurrence report (FSOMS 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.	

REQUIREMENTS	REMARKS
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 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: <ul style="list-style-type: none"> • administration • finance • photographic support • accommodation • rations • protective clothing • communications • transportation • special equipment 	
Check kit contents and issue an investigation kit.	
<p style="text-align: center;">NOTE</p> <p style="text-align: center;">Casualties must be reported in accordance with CFAOs.</p>	
<p style="text-align: center;">NOTE</p> <p>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.</p>	
<p style="text-align: center;">NOTE</p> <p>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.</p>	
<p style="text-align: center;">NOTE</p> <p>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.</p>	

Annex E
Chapter 8
A-GA-135-001/AA-001

ANNEX E – 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 an 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 CF315 (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 CF315 is completed by a member of the accident / fire 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 / OSCER 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 (OSCER, 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 CF 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 unit 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 chain of evidence 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 / OSCER 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 F
Chapter 8
A-GA-135-001/AA-001

ANNEX F – 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)

CHAPTER 9 – INVESTIGATIONS

References: A. CFAO 24-1

B. CFACM 2-350, Emergency Response Planning

C. A-GA-135-003/AG-001, Airworthiness Investigator Manual

INTRODUCTION

1. FS occurrences result in or have the potential to cause the loss of aviation resources. It is therefore important to investigate appropriate occurrences with the objective of quickly identifying effective PM that will either prevent or reduce the risk of a similar occurrence. The AIA has been delegated the responsibility to independently investigate matters of aviation safety concern and has delineated the policy by which this activity is conducted in the AIM. All FS investigation activities are also airworthiness investigations and they are carried out on behalf of the AIA. This chapter outlines the authorities for investigations, the occurrence classification system, the investigation classification system and the types of FS investigations done by DND / CF.

DEFINITIONS

AIRCRAFT DAMAGE

2. 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 unserviceabilities 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 MAJOR COMPONENTS

3. 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 wing-tips, non-integral nacelles, spoilers, flaps, ailerons or other control-of-lift devices, and
- (3) the empennage and major structural sections thereof (vertical stabilizer, horizontal stabilizer, and stabilator), but not including the rudder or elevator;

- 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, non-integral 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 cross-tubes or skids, non-integral removable axles, brakes, tires, gear doors or actuating rods; and
- c. UAV major components. UAV major components will be defined on a case-by-case basis as determined by individual UAV type and consultation with DFS.

NOTE

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

INVESTIGATOR IN CHARGE (IIC)

4. The IIC will be a qualified, trained and certified accident investigator appointed by the AIA or through authorized delegation by the 1 Div 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

FS INVESTIGATION

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

FS INVESTIGATION REPORT

6. 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 PDIs is titled a FSI Report (FSIR).

POWER PLANT

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

PERSONS WITH A DIRECT INTEREST (PDI)

8. 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 DFS is directly affected by the findings, cause factors and/or preventive measures recommended within the report.

NEED TO INVESTIGATE

9. FS occurrences result in or have the potential to cause an accidental loss of resources. Therefore, any occurrence that could lead to the identification of causes and determine effective PM will be investigated. This chapter describes the tasking authorities and necessary protocols for the conduct of FSIs.

AUTHORITY TO INVESTIGATE

10. The *Aeronautics Act*, the A-GA-135-001/AA-001, *Flight Safety for the CF*, and the delegations and authorizations as outlined in the A-GA-135-003/AG-001 *Airworthiness Investigation Manual* (AIM) provide the authority to investigate FS occurrences. These documents define terminology, responsibilities and procedures for investigation. The A-GA-135-002/AA-001 *Investigations Techniques for the CF* also provides guidance for terminology and prescribes procedures specific to investigative techniques.

FSI CONVENING AUTHORITY

11. DFS / AIA is the convening authority for Class I and Class II investigations. The convening authority for a Class III and IV investigations is delegated by the AIA to the WFSO.

INVESTIGATION RESPONSIBILITIES

DEPARTMENTAL RESPONSIBILITIES

12. The MND has designated DFS as the Airworthiness Investigative Authority for the CF / DND. The AIA is responsible to independently investigate all matters of aviation safety concern, an MND requirement based in the *Aeronautics Act* and a coincidental requirement of both the Airworthiness Program and the FS Program. Consequently, DFS / AIA shall ensure that occurrences as defined in this document are documented and investigated as required. In principle, the completion of a Combined Report or a Supplementary Report constitutes in itself an investigation, although it may consist of the simple gathering of facts as done for occurrences labelled as Repetitive Occurrences (ROs).

COMMAND RESPONSIBILITIES

13. The unit CO shall ensure that all FSIs affecting aircraft under unit control are investigated; however, all investigation activities are undertaken on behalf of the AIA as delineated in the AIM. If an investigation is impractical for the unit of ownership to investigate, the WComd / Comd 1 Cdn Air Div and DFS shall be advised.

OCCURRENCE CATEGORY

14. FS occurrences are categorized according to the overall seriousness of the occurrence. The occurrence category is an alphabetical designation assigning an overall seriousness classification to an occurrence based upon:

- a. aircraft damage level (ADL); or
- b. personnel casualty level (PCL).

15. Occurrence categories range from A to E for both air and ground occurrences, with A being the most serious and E identifying situations where, although no damage occurred, the potential for damage or injury existed. Annex A details the Occurrence Category to be assigned to an occurrence based on the ADL and PCL.

AIRCRAFT DAMAGE LEVEL

16. 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 FSOMS 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 CF personnel from performing repairs that are considered within second-line maintenance, the case will be referred to DFS, who will assign the ADL.

PERSONNEL CASUALTY LEVEL

17. 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 circulated on the FS net or entered in FSOMS.

CLASS OF INVESTIGATION

CRITERIA FOR ASSESSING FSI CLASS

18. In order to assign investigations to the appropriate authority, an occurrence investigation classification system is used. The purpose of classifying FSIs is to determine the amount of time and resources that will be devoted to the investigation. The type of investigation into an occurrence and the level of effort will be determined by an assessment of the following two criteria:

- a. the safety of flight compromise level; and
- b. other factors which could impact on the reputation of the FS Program, the Airworthiness Program, the CF and the Department.

19. FSIs will be classified I to IV based on the above criteria. Annex B shows the Class of investigation assigned based on these criteria.

SoF COMPROMISE LEVEL FACTOR (SFCL)

20. The SFCL is categorized with a qualifier that describes the level to which safety margins were compromised during an occurrence. By extension, it provides an indication of how much the crew and / or aircraft were put at risk.

- a. Extreme: an occurrence where the outcome has been or could have been catastrophic and might have resulted in the loss of life or the aircraft;
- b. High: an occurrence where the outcome has resulted or could have resulted in very serious injury or very serious damage to the aircraft;
- c. Medium: an occurrence where the outcome has resulted or could have resulted in serious injury or serious damage to the aircraft; and
- d. Low: an occurrence where the outcome has resulted or could have resulted in minor injury or minor damage to the aircraft.

OTHER AGGRAVATING FACTORS

21. 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 maintaining the trust of CF personnel and the general public in the FS Program and the CF by having occurrences investigated at the appropriate level.

RELATIONSHIP BETWEEN INVESTIGATION CLASS AND INVESTIGATION TYPE

22. Each FSI Class requires the production of a report as follows:

- a. Class I: Flight Safety Investigation Report (FSIR);

- b. Class II: Enhanced Supplementary Report (ESR);
- c. Class III: Supplementary Report (SR); and
- d. Class IV: Combined Report (CR) or SR.

TASKING FOR CONDUCT OF INVESTIGATIONS

23. DFS / AIA conducts all Class I and Class II investigations and depending upon circumstances, tasks the appropriate investigation team to do so. All other investigations are conducted by unit FSO on behalf of DFS / AIA and are released by the supporting wing FSO (IIC). Some occurrences are repetitive in nature and limited benefit would be gained by carrying out a full-scale investigation.

REPETITIVE OCCURRENCES (RO)

DEFINITION OF RO

24. A 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 SR or a CR.

25. Example 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. Given the repetitive nature of these incidents and the limited potential to find new causes and original PM, a rudimentary investigation is still required to ascertain the facts and confirm the occurrence is similar in all aspects.

RO CONDITIONS

26. To qualify as an RO, an occurrence must meet the following conditions:
- a. the personnel involved has 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

27. Any occurrence which will be treated as an RO must refer to an original FSOMS 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.

28. The 1 Div FSO 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 Div FSO for approval and inclusion on the RO master list. The suitability of the RO designation will be evaluated by the 1 Div FSO 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 Div FSO staff and posted on the FS Intranet site.

29. 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 FSOMS WG.

INVESTIGATIONS FOR TRACKING PURPOSE ONLY

30. 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

FSOMS so it can be tracked for future analysis and tracking purpose (FTPO) and make recommendation to the WFSO as follows:

- a. Cause factor: Nil (FTPO); and
- b. PM: Nil (FTPO).

FSI TEAM SELECTION

31. FSI team personnel are assigned by the appropriate FS tasking authority. For Class I and Class II FSI, the AIA appoints the IIC and approves the team composition. For Class III and IV FSIs the team is typically assigned and authorized through the established FS structure positions within aviation units or with units that conduct aviation activities for the CF/DND.

32. DFS / AIA may, in coordination with the CoC, task a non-DFS IIC to conduct a Class II investigation.

INVESTIGATOR-IN-CHARGE

33. All FS investigations will have an IIC. This is normally the WFSO (typically holding an IIC 3 qualification) for Class III or IV investigations. The IIC for Class I or II investigations should be a DFS accident investigator currently employed at DFS (typically holding IIC 2 or IIC 1 qualifications). In unusual circumstances, DFS may appoint another trained investigator who is not currently employed at DFS. Anyone tasked to conduct an FSI shall be excused from all other duties until released from the investigation by DFS. The IIC reports to DFS / AIA for the conduct of the investigation.

34. The IIC has the authority to quarantine and impound evidence, interview witnesses and examine documents and equipment related in the occurrence. The IIC also has certain delegated authorizations from the AIA for activities associated with investigations as outlined in the AIM. Detailed process guidance for the investigation is promulgated in A-GA135-002/AA-001.

35. The mandate of the IIC is to conduct a thorough and impartial investigation into the occurrence and submit a report in the mandated format detailing the facts, analysis of those facts, causes and PMs relevant to the occurrence as defined and detailed in the AIM.

MEMBERS AND ADVISORS

36. Personnel assigned to an FSI team are tasked by DFS / AIA and will report to the IIC until released from duty by DFS / AIA. Unless there is no reasonable alternative, a team member should not be selected from the unit of occurrence. The circumstances of the occurrence will dictate the team complement best suited to investigate considerations such as human factors, technical issues, recovery and salvage support and medical issues. In addition, advisors such as meteorologists, other aircrew, air traffic controllers and paradrop officers should be appointed when the need arises. Specialist advisors not specifically assigned to the FSI team in the tasking order may be required to assist in the investigation. These individuals will be appointed with an observer status and will normally have limited access to information not related to their field of expertise. At the discretion of the IIC and provided an undertaking is signed to treat the information related to the investigation as privileged, they could be integrated fully into the investigation team.

NOTE

Draft copy of undertaking is available in AIM, Chapter 1, Annex A, section 1(c).

TYPICAL FSI TEAM COMPLEMENT

37. The FSI team tasked by DFS / AIA will ideally comprise:
- a. IIC. This person is a qualified and certified investigator who is authorized by the AIA to conduct the investigation and is familiar with the aircraft type and role;
 - b. Aircrew member. This person is a subject matter expert who is qualified and current on the aircraft type involved in the occurrence;
 - c. Technical member. This person is the DFS AERE Officer or an AERE officer familiar with the aircraft type;
 - d. Medical member. This person is the DFS Flight Surgeon or a military physician, ideally a flight surgeon;
 - e. Specialist advisors. Advisors will be appointed as required; and
 - f. Observers. Observers will be appointed as required.

TYPES OF OCCURRENCE REPORTS

38. There are several types of FS occurrence reports that may need to be completed depending on the Class of investigation carried out:
- a. Initial Report (IR);
 - b. Supplementary Report (SR);
 - c. Combined Report (CR);
 - d. Enhanced SR (ESR); and
 - e. FSIR.

INITIAL REPORT (IR)

39. The IR describes the immediately available particulars of the occurrence and should be sent within 12 hours of the event. It is generally reported through FSOMS. If the user is unable to access the application, occurrence details shall be sent to the designated wing for input into the database. Annex E lists the information that must be submitted in the IR. An IR form can be downloaded from the DFS websites.

NOTE

The IR should include whether quarantining has taken place (e.g. quarantining of aircraft and aircraft oxygen system, aircrew ALSE, LOX trailer, LOX storage tank), so that those reviewing the FSOMS entry know right away that this important airworthiness investigation step was not omitted or overlooked.

SUPPLEMENTARY REPORT (SR)

40. The SR is the report normally produced by the wing or unit for Class III and IV investigations. It shall be submitted within 30 calendar days of the occurrence. The report requirements are shown in Annex F.

COMBINED REPORT (CR)

41. The CR is the combination of the IR and SR in a single report submitted for minor occurrences requiring limited or cursory investigation, provided it can be released within 48 hrs of the occurrence. The report format is the same as the SR.

ENHANCED SR (ESR)

42. The ESR is the report type used for Class II investigations which summarize occurrences that

are sufficiently complex to warrant a more thorough investigation than a normal SR, but do not require the same degree of detail as a FS Investigation Report (FSIR). The format of the ESR is similar to an SR, with expanded detail within paragraph 22 (analysis). The intent of an ESR is to expedite reporting for less complex occurrences; as such the report is much shorter than an FSIR and a preliminary report is not required. A Class II occurrence requires the publication of an FTI, distribution of a Draft ESR for Comment, input of the final report into FSOMS and the publication of the *Epilogue* on the DFS Website. The AIA is the tasking and releasing authority for all ESRs.

FSIR

43. The final report is titled FSIR. It is a comprehensive report on an FS occurrence and all related aspects to provide reviewing authorities with detailed information on which to base recommended PM. The report follows the ICAO accident report format. DFS will be the tasking and releasing authority for the report. The report requirements are available on the DFS website. The FSIR will include valid PDI input from the Draft for Comment process. The report will be produced in both official languages.

44. The FSIR shall normally be unclassified and be released to the public via the DFS Internet site and internally on the DND Intranet site.

ACTIONS LEADING TO PRODUCTION OF FSIR AND ESR

DOCUMENTATION

45. In the process of staffing a FSIR, the IIC will produce different documents as follows:

- a. FSIR:
 - 1. Preliminary FSIR,
 - 2. *From the Investigator*,
 - 3. Draft FSIR for Comments,
 - 4. FSIR,
 - 5. *Epilogue*; and
- b. ESR:
 - 1. *From the Investigator*,
 - 2. Draft ESR for Comments,
 - 3. ESR (inputs in FSOMS), and
 - 4. *Epilogue*.

PRELIMINARY FSIR

46. The purpose of the Preliminary FSIR is to provide senior management with factual information pertinent to the occurrence and provide immediate PM recommendations where appropriate. The Preliminary FSIR shall include Part 1, Factual Information, and Part 4, Preventive Measures of the FSIR. One blank page for each of Part 2 and Part 3 shall be included for completeness. In the interest of expediency, the report may be produced in one language only (normally English unless the addressee is a French language unit (FLU)).

FROM THE INVESTIGATOR (FTI)

47. The FTI summarizes factual information from the initial portion of a Class I or Class II Investigation. It shall describe factual information, immediate safety actions taken and the focus of the ongoing investigation. The FTI will be published in bilingual format on the DFS website and in *Flight Comment*. The complete document will not normally be longer than two pages.

DRAFT FSIR FOR COMMENT

48. Class I and Class II investigations shall be forwarded to PDIs as a Draft FSIR for Comment. In-

dividual PDIs such as involved aircrew or witnesses shall receive individual copies, and their responses shall be privileged. PDI's wishing to share their responses with the appropriate CoC, may do so at their discretion on the understanding that the information remains privileged and should only be shared on a need-to-know basis. Draft FSIR for Comment to the CoC and organizations may be distributed only to the staff required to effect an appropriate response. Individual and collated staff responses should be addressed directly to the DFS OPI without further redistribution. The AIA deems that Draft FSIR for Comment responses are by definition, extensions of witness statements and as such, the direct response ensures privileged information is protected as required by the CTAISB Act.

EPILOGUE

49. The *Epilogue* summarizes the information contained in the FSIR. The *Epilogue* will be published in bilingual format on the DFS website and in Flight Comment.

IMMEDIATE ACTION TAKEN

50. In the course of investigating an FS occurrence, the IIC shall be responsible for staffing reports in accordance with Para 46 above. Notwithstanding report timelines, PM recommendations shall be promulgated by the IIC whenever the investigation discovers a deficiency that requires immediate notification, assessment or action within the CoC.

REPORT DEADLINES

51. Report deadlines shall represent the desired output. Extenuating circumstances such as workload, investigation complexity and manning may result in significant delays. Nevertheless, the intent is to complete all reports in a timely fashion such that preventive measures can be implemented as soon as possible, without sacrificing the quality of the report. Table 3 provides the desired timelines for each report type.

REPORT TYPE	TIMELINE
Preliminary FSIR	4 weeks
FTI	5 weeks
Draft FSIR for Comments	7 months
FSIR	12 months
<i>Epilogue</i>	12 months

Table 3 – Report timelines

FOLLOW-UP ON PROPOSED PM

52. The FSIR and the ESR are distributed in a similar fashion. The FSIR is forwarded from the AIA to C Air Force, who subsequently distributes it to the OAA and TAA, as applicable, to allow them the opportunity to review and provide formal input from the CoC on the proposed PMs. Should the OAA or TAA determine that a recommendation in an FSIR is not feasible, they shall advise the Airworthiness Authority in writing of their decision and the rationale for it. It is highly desirable that the decision not to implement a recommendation be accompanied by a formal risk assessment. An ESR is distributed to the CoC directly from the AIA with a request for support of all PMs. In the event that the CoC does not support a PM from an ESR, alternative PMs and/or risk assessments are requested.

53. OAA and TAA shall submit any comment and input into the proposed PM (including risk assessments) to C Air Force within 21 days following receipt of the FSIR. The AA will consider the input from

the OAA and TAA during the formulation of the final action directive.

54. Chapter 11 of this publication describes the generic handling and follow-up of PM. Chapter 2 of the AIM details the principles of airworthiness investigations and articulate the processes for the follow-up of PM stemming from airworthiness investigations.

USE AND HANDLING OF FS REPORTS

55. Reports prepared under the authority of this publication are considered by the CF to be sensitive documents and, unless specifically authorized, these reports and their attachments shall not be used for any purpose other than FS. 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. Authorization for other uses shall only be granted with the express concurrence of DFS / AIA. 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
- b. an individual is conducting a coordinated investigation under the provisions of one or more signed agreements (a STANAG or an MOU with TSB).

PROTECTION OF INFORMATION IN FS REPORTS

56. 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 *CTAISB Act*, *Access to Information Act* and *Privacy Act*.

57. 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 DFS / AIA pursuant to the powers delegated to him / her by the MND as the Airworthiness Investigative Authority of the CF, with the understanding that the reports will be used for no other purposes than accident prevention.

RECONVENING AN FSI

58. An investigation shall be re-opened by DFS 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.

RELATIONSHIP BETWEEN FSI AND BOARD OF INQUIRY

59. The effectiveness of the FS Program is reliant on open, honest and timely reporting of occurrences by individuals without fear of retribution. When required, the CF may be required to convene a collateral investigation concurrent with or in addition to a FS investigation for the purposes of determining administrative or disciplinary disposition. In order to preserve the fundamental principles of the FS Program, 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 DFS.

60. When an aircraft accident occurs, a separate Board of inquiry may be convened in accordance with QR&Os. The requirement to conduct a Board of inquiry might be for a variety of reasons such as Investigation of Claim By or Against the Crown; QR&O 21.46, Investigation of Injury or Death; or to

support COMSEC, administrative or disciplinary actions. This collateral investigation shall be independent of the FS investigation into the same occurrence. Privileged information (as defined in sections 28–30 of the *CTAISB Act*) which is gathered during the course of the FSI shall not be made available to the Board of inquiry President. However, all the factual information and a statement of cause, if available, will be made available upon request.

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.

COORDINATED INVESTIGATIONS

61. Within Canada, TSB is responsible for investigating all aviation occurrences involving aircraft other than military conveyance aircraft or facilities. DND has the responsibility for investigating all occurrences involving military conveyance aircraft or facilities. The *CTAISB Act* defines a military conveyance aircraft as one being operated by or on behalf of DND, CF or a visiting force.

62. When the occurrence involves both civilian and military aircraft and / or facilities, the work of civilian and military investigators will be coordinated and will be governed by a DND / TSB Working Agreement developed for that purpose. The DND investigation will be conducted under the authority of section 4.2 of the *Aeronautics Act*, the *CTAISB Act*, the DND / TSB Working Agreement and in accordance with this publication. The TSB investigation will be conducted under the authority of the *CTAISB Act* and in accordance with the DND / TSB Working Agreement. Coordinated investigations with other military forces will normally be conducted within the procedures contained in ICAO Annex 13 for investigations involving non-NATO foreign military aircraft, and in STANAG 3531 for investigations involving NATO nations.

ACCESS TO INFORMATION REQUESTS

63. The *Access to Information Act* (ATIA) provides broad and effective legal access to information generated by government employees and information about government employees. With respect to FS investigations in general, and more specifically aviation accident / incident investigations, the ATIA, the *Privacy Act*, the *Aeronautics Act* and the *CTAISB Act* provide some protection for information obtained through investigations. Provisions for protection of privileged information is fully protected from release through the *ATI Act*. WFSOs are not expected to be current with the provisions of the various statutes mentioned above nor are they expected to handle FS ATI requests. All requests for FS information should be immediately routed through the designated ATI officer for the wing and handled according to the provisions stipulated in Chapter 6 of the AIM and applicable annexes. If that officer is not aware of the protections afforded by the various laws, they should be cautioned and advised to contact DFS for advice.

Annex A
Chapter 9
A-GA-135-001/AA-001

ANNEX A – OCCURRENCE CATEGORY TABLE

1. The Occurrence Category is based on the combination of the ADL and PCL as per the Occurrence Category table below and is based on whichever is the highest of the two values. The Occurrence Category table is to be used in conjunction with the Flight Safety Investigation Class table at Annex B. The reporting unit shall use the Category table to define occurrences that require immediate reporting to DFS via 1-888-WARN-DFS (927-6337) and toxicological screening for those military personnel involved.

NOTE

DFS shall be contacted as soon as possible and toxicology testing initiated for any occurrence that is C category or higher, or if the occurrence category is unknown for any occurrence with the potential to be a C category or higher.

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

Annex B
Chapter 9
A-GA-135-001/AA-001

ANNEX B – FS INVESTIGATION CLASS TABLE

1. The investigation Class is based on the highest level between the SFCL and other aggravating factors as per the Investigation Class table below. This table serves as a guide only and DFS / AIA reserves the right to determine the Class of investigation to be done. DFS / AIA is the tasking authority for all Class I and II investigations.

FACTORS		INVESTIGATION		
SFCL	OTHER AGGRAVATING FACTORS	INV CLASS	AGENCY	RECOMMENDED REPORT TYPE
Extreme	Extreme	I	DFS	FSIR
High	High	II	DFS	ESR
Medium	Medium	III	WFSO or UFSO	SR
Low	Low	IV	UFSO	SR or CR

SFCL: The SFCL indicates the actual level of risk experienced by the personnel and / or aircraft during an occurrence.

Other 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 maintaining the trust of CF personnel, the trust of the general public in the FS Program and in the CF by having occurrences investigated at the appropriate level (e.g. a Medium SFCL occurrence involving a WFSO could be investigated by DFS or a WFSO from another wing).

NOTE

DFS shall be contacted as soon as possible if it is felt that a Class I or II investigation would be appropriate.

Annex C
Chapter 9
A-GA-135-001/AA-001

ANNEX C – FSI SITREP TEMPLATE

This report contains information related to an on-going Flight Safety 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.

FS INVESTIGATION SITREP #____

Date/time: Use local times

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.

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:

Annex D
Chapter 9
A-GA-135-001/AA-001

ANNEX D – REFERENCE DOCUMENTATION

- *Aeronautics Act*
- *Canadian Transportation Accident Investigation and Safety Board Act*
- QR&O 21.47, Findings of Injury or Death
- QR&O 21.56-57, Aircraft Accidents
- QR&O 24.20, Post-mortem Examination
- 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
- CFMO 42-03-04, Medical Investigation and Reporting of Aircraft Accidents/Aeromedical Incidents
- B-MD-007-000/AF-003, CF Flight Surgeons' Guidelines for FS Investigation
- B-GA-015-001/FP-001, Human Factors Guide for the Conduct of Aircraft Accident Investigation
- CFTO C-05-010-002/AG-000, Aircraft Salvage Procedures
- CFTO C-02-015-001/AG-000, Unsatisfactory Condition Report – CF 777
- STANAG 3318, Medical Aspects of Aircraft Accident /Incident Investigation
- STANAG 3531, Investigation of Aircraft/Missile Accidents/Incidents

NOTE

Users of this publication who have a requirement to be familiar with STANAG 3531 should obtain a copy of the most recent edition.

- STANAG 3101, Exchange of Accident/Incident Information Concerning Aircraft and Missiles
- Applicable 1 Cdn Air Div Orders, wing / base, unit orders
- B-GA-015-003/FP-001, Notes for the Conduct of Investigations into Aircraft Accidents
- B-GA-015-002/FP-001, Aircraft Accident Handbook – Technical Member
- B-GA-015-004/FP-001, Aircraft Accident – Handbook for Aircrew Member
- Aircraft Accident Investigation, Annex 13 to the Convention on International Civil Aviation
- NATO Airborne Early Warning & C Force Command (NAEW&C), Aircraft Occurrence Response Manual, Number 81-100-12, Dated 19 Sep 00
- ASCC Air Standard 85/2A
- CFACM 2-350, Emergency Response Planning
- DAOD 3002-4, Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting

Annex E
Chapter 9
A-GA-135-001/AA-001

ANNEX E – INITIAL REPORT CONTENT

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 FSOMS 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
 - PCL

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

PERSONNEL INFORMATION

For each person injured, the following is required:

- Role
- MOS ID
- On board aircraft
- Injury classification (most serious injury assessed IAW B-MD-007-000/AF-003) FS reports shall only provide PCL information. No other medical information or details shall be circulated on the FS net or entered in FSOMS)

CONDITIONS

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

BIRD STRIKE REPORT REQUIREMENTS

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 FSOMS within 12 hours of the occurrence.

BIRD STRIKE REPORT

- 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 F
Chapter 9
A-GA-135-001/AA-001

ANNEX F – SUPPLEMENTARY REPORT REQUIREMENTS

The following information should be reported as part of the Supplementary Report (SR) and will form the content of the information entered into FSOMS. 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, this 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

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

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 G
Chapter 9
A-GA-135-001/AA-001

ANNEX G – PREPARATION OF INVESTIGATION REPORT

1. The intention of this annex is 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

- c. a current hypothesis or use only the evidence that supports the opinion of the investigator.
- 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 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 10 – CAUSE FACTORS IDENTIFICATION

PURPOSE OF CAUSE FACTORS IDENTIFICATION

1. The purpose of FS investigations is to prevent future accidents through the careful determination of causes and the formulation of recommended PM. FS does not assign blame. Determining cause factors is thus not an end in itself but a means of identifying problems and assisting in trend analysis. Specifying cause factors in FS occurrences results in a more exhaustive analysis of the occurrence, which in turn leads to the formulation of measures that will prevent a recurrence of the problem. Since the purpose of assessing cause factors is accident prevention, they need not be, in the legal sense, established beyond reasonable doubt.

2. Identification of cause factors assists in understanding the reasons why an accident or incident occurred. Since the purpose of identifying cause factors is not to assign blame, investigators should not avoid identifying those that seem to implicate individuals, such as “Deviations”.

DEFINITION OF CAUSE FACTOR

3. A cause factor is defined as any event, condition or circumstance, the presence or absence of which within reason, increases the likelihood of an FS occurrence. Cause factors are assigned for prevention purposes only, and need not be substantiated in the strict legal sense, nor need they comply with QR&O 21.47 concerning causes of injuries or death for Pension Board purposes.

ASSESSMENT AND PUBLICATION OF CAUSE FACTORS IN FS REPORT

4. Cause factors will be assessed for all FS reports. For FS reports published in CR, SR or ESR format, they will be identified and stated in the report using terminology found in this chapter including CF-HFACS. However, for FS reports published in FSIR format the cause of the occurrence and contributing factors will be identified and stated in the report using normal narrative form (i.e. plain language). Although not published in FSIR using terminology found in this chapter including CF-HFACS, cause factors shall nonetheless be identified by DFS investigators and recorded in FSOMS for statistical purposes. The final authority for cause factor assessment and publication is DFS.

5. Cause factors shall be addressed through the assignment of PM(s).

CATEGORIES OF CAUSE FACTORS

6. For purposes of record keeping and trend analysis, it is necessary to use standard terminology for cause factors. Care must be taken to identify and systematically list cause factors as described in this chapter. Listed below are the definitions for the six cause factors that are applied to aviation occurrences in the CF.

7. Cause factors will be explained in details in this chapter and are divided as follows:

- a. Personnel: Includes acts of omission or commission, by those responsible in any way for aircraft operation or maintenance or support to operations, and contributing circumstances that lead to a FS occurrence.
- b. Materiel: Includes failures of all aircraft components, support equipment and facilities used in the conduct and support of air operations that lead to a FS occurrence.
- c. Environmental: Includes environmental conditions that, if all reasonable precautions have

been taken and applied, are beyond human control within the present state of the art that lead to a FS occurrence.

- d. Operational: Includes operational situations that lead to a FS occurrence in which no other controllable circumstances contributed to that event. This cause factor shall only be approved by the C Air Force.
- e. Unidentified Foreign Object Damage (FOD): Includes occurrences caused by the presence of a foreign object not able to be identified that causes or is assessed as having the potential to cause aircraft damage or personal injury.
- f. Undetermined: Includes occurrences in which there is not enough evidence to either reasonably determine an exact cause or eliminate two of the three main cause factor categories (personnel, materiel and environment). Probable causes are normally assigned so that PM can be implemented.

PERSONNEL CAUSE FACTORS

BACKGROUND

8. On Jan 1, 2004, the CF adopted the Human Factors Analysis and Classification System (HFACS) to assess and document personnel cause factors (PCF). Prior to that date, the FS Program used a different nomenclature for the assignment of PCF, which can be found on the DFS website if required for data mining or statistical comparisons.

CF HUMAN FACTORS ANALYSIS AND CLASSIFICATION SYSTEM (CF-HFACS)

9. When a FS occurrence involves personnel, the study of human factors has shown that there are two general categories for the causes associated with the situation. These categories are referred to as active failures and latent conditions. FS investigations need to identify the active failures and latent conditions for all occurrences so that effective PM can be implemented to reduce the likelihood of recurrence.

10. Using the concept of active failures and latent conditions, the CF-HFACS causal model has four levels for classifying failures or conditions associated with personnel.

- a. Unsafe acts or conditions (active failures);
- b. Preconditions for unsafe acts (latent conditions – direct);
- c. Supervision (latent conditions – remote); and
- d. Organizational influences (latent conditions – remote).

NOTE

The CF-HFACS model utilizes a step-approach broken down in tiers (e.g. Unsafe Acts), categories (e.g. Errors) and sub-categories (e.g. Skill-based). In addition, the concept of streams (e.g. Inadequate Technique) within categories or sub-categories is introduced, as well as nanocodes (e.g. Delayed Response) under the majority of the streams. This step-approach will facilitate the use of the model. Further, it allows the coding to be more reproducible, which in turn will impact positively on reliability and standardization. Consequently, FS data mining and trending will benefit. This step-approach is reflected in the FSOMS application in the form of dropdown menus where selections down to streams and nanocodes are required to be made.

NOTE

This chapter incorporates several examples pertinent to aviation to illustrate the model. Those examples, though not all-inclusive, will help the reader greatly. Refer to the diagram at Annex B for the CF-HFACS causal model.

11. Active failures are either the error(s) or the conscious deviation(s) from an authorized procedure that are directly causal to a FS occurrence.
12. Latent conditions are situations or circumstances associated with the individual(s) or the system of management of the individual(s) involved in the occurrence. Latent conditions contribute to the final sequence of events in the occurrence or hazard by predisposing it to happen. Such conditions can be found within the individual(s) directly involved in the occurrence, any level of the individual(s) immediate supervisory chain, and / or within larger broad based organizational components within which the individual(s) operates. Though these are not found to be the direct cause of the occurrence, they are directly connected to the direct cause / active failure to which they are associated and their impact can be as great. Latent conditions may lie dormant or undetected until one day an active failure(s) occurs.

UNSAFE ACTS

13. Active failures, when applied to FS occurrences, are the Unsafe Acts most closely tied to the occurrence. Unsafe Acts occur when personnel take inappropriate action(s) or when required action(s) are absent in advance of, or during, a task / mission. Occurrences may contain one or more Unsafe Act(s) as multiple or compounding errors or deviations can be causal to the occurrence. Unsafe Act(s) can occur at various points in advance of, or during, an occurrence and are a sequence of errors or deviations that form one or more crucial flaws that are directly causal to the occurrence. Regardless of the number of Unsafe Act(s) identified as causal to the occurrence, it is important to ensure, as a minimum, that the last Unsafe Act (last action or inaction immediately prior to the occurrence) and the seminal or first Unsafe Act (the first action or inaction resulting in a departure from safe operations) are captured and investigated. The last error or deviation prior to the occurrence is the last Unsafe Act after which there is no longer a possibility of avoiding the occurrence.

NOTE

For clarification, it could be possible that the “last” and the “seminal or first” Unsafe Act be the same. In such a case, only one Unsafe Act will be identified.

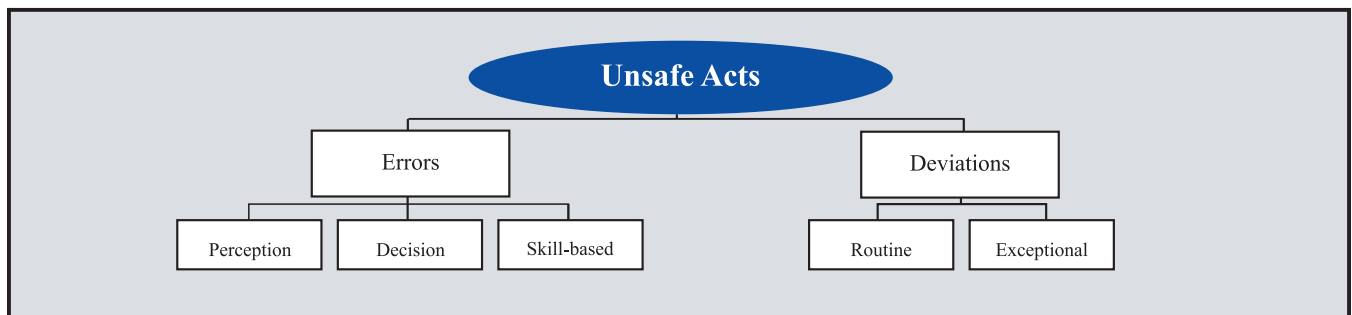


Figure 1 – Active Failures – Unsafe Acts

Errors

14. Errors are unintentional and occur because they are an inherent element of human nature. Consequently, errors in human performance are found in most occurrences. Not all errors are the same, and thus further classification is necessary. The three basic types of Errors are Perception, Decision and Skill-based.

Perception Errors

15. Perception can be seen as the result of a three steps process: detection, awareness and understanding of the situation. A Perception Error can occur when the individual involved has detected elements (object, threat or situation) of the environment inaccurately (detection failure), whether the misperception is visual, auditory, olfactory, proprioceptive (seat-of-the-pants) or vestibular in nature. However, a Perception Error can still occur even if accurate detection takes place if the individual fails to attend to the information (awareness failure). Even if accurate detection and awareness of the elements are achieved, a Perceptual Error can still occur if absence of, or inaccurate, understanding of their significance takes place (understanding failure). Indeed, experience plays a role at this level, in that the information about the environment is processed by comparing it with what the individual already knows.

- a. Detection Errors. Occur when the individual involved has detected elements of the environment inaccurately. For example if an annunciator warning light illuminates in the cockpit and the individual does not visually detect it, a Detection Error has occurred.
 - (1) Inaccurate detection of visual cues (e.g. of a warning light, of incoming traffic, of visual illusions such as *false horizon illusion* or *height-depth perception illusion* when flying over an area devoid of visual references – desert, snow, water).
 - (2) Inaccurate detection of auditory cues (e.g. of unusual rumbling of an engine).
 - (3) Inaccurate detection of olfactory cues (sense of smell) (e.g. of acrid smell of an electrical fire).
 - (4) Inaccurate detection of proprioceptive cues (seat-of-the-pants) (e.g. of distinct movements of the aircraft by the pressures of the seat against the body).
 - (5) Inaccurate detection of vestibular cues (e.g. of spinning sensation / vertigo, of vestibular illusions such as somatogyral illusion – e.g. *the Leans* – during angular acceleration or somatogravic illusion – e.g. *oculogravic illusion* – during linear acceleration).
- b. Awareness Errors. Occur, even if accurate detection takes place, when the individual fails to attend to the information. Referring to the annunciator warning light example above, if the individual visually detected the warning light but was busy with something else and therefore did not pay attention to it, an Awareness Error has occurred. Preconditions such as channelized attention or work overload can lead to this type of error.
 - (1) Failure to attend to the visual cues detected.
 - (2) Failure to attend to the auditory cues detected.
 - (3) Failure to attend to the olfactory cues detected (sense of smell).
 - (4) Failure to attend to the proprioceptive cues detected (seat-of-the-pants).
 - (5) Failure to attend to the vestibular cues detected.
- c. Understanding Errors. Occurs, even if accurate detection and awareness of the elements of the environment are achieved, when absence of, or inaccurate, understanding of their

significance takes place (e.g. misjudgement or misinterpretation of the information detected or attended to, such as visual cues / illusions, auditory cues, olfactory cues, proprioceptive cues / kinesthetic illusions (seat-of-the-pants), vestibular cues / illusions or spatial disorientation). Continuing with the illuminated annunciator light example above, if the individual visually detected the warning light and paid attention to it but did not understand what it meant, an Understanding Error has occurred.

- (1) Failure to understand the visual cues.
- (2) Failure to understand the auditory cues.
- (3) Failure to understand the olfactory cues (sense of smell).
- (4) Failure to understand the proprioceptive cues (seat-of-the-pants).
- (5) Failure to understand the vestibular cues.

NOTE

It is important to note that it is not, for example, the illusion or disorientation that is classified as a Perceptual Error; rather, it is the individual's erroneous response to the illusion or disorientation based on its misunderstanding or misjudgement.

NOTE

Spatial disorientation cannot be totally eliminated from the aviation environment. However, aircrew need to remember that misleading sensations from sensory systems are predictable. These sensations can happen to anyone because they are due to the normal functions and limitations of the senses. Training, instrument proficiency, good health, and proper aircraft design can minimize spatial disorientation.

Decision Errors

16. Decisions are made to achieve a goal or an intention where the perceived elements are used to initiate the process. Success in achieving this is a function of relevant training and knowledge of the task at hand, the system, operations, tactics, previous exposure, experience and proficiency. Decision Errors represent deliberate and conscious acts and occur when behaviour proceeds as intended, yet the plan proves inadequate or inappropriate for the situation. A decision to achieve the desired end-state is not made appropriately, which results in an unsafe situation. Often referred to as “honest mistakes”, they typically represent poor conscious choices, improper procedural selection and application, or the misinterpretation or misuse of relevant information. Insufficient time, inexperience or lack of proficiency, or outside pressures such as overload and task saturation may preclude safe decisions.

- a. Knowledge-based or Information Errors. Occur when knowledge or the information available to achieve the desired end-state is incorrect, partial or absent. Poorly written tactics manual or technical orders, or deficiencies in baseline training are examples of preconditions that could lead to this kind of error.
 - (1) Inadequate knowledge available (e.g. knowledge of the task / mission / tactics, systems, orders / directives / procedures / checklists required to make a proper decision and achieve the desired end-state is incorrect, partial or absent).
 - (2) Inadequate information available (e.g. information required to make a proper decision and achieve the desired end-state is incorrect / ambiguous, partial / impractical, absent).

- b. Problem-solving or Risk Management Errors. Occur when facing a situation or problem for which formal procedures and response options are not available. The elaboration of a solution / way ahead is required, however reasoning and risk management processes are not applied properly. Task saturation, misplaced motivation, lack of time or reduced attention are examples of preconditions that could lead to this kind of error.
 - (1) Inadequate reasoning / problem-solving (e.g. the reasoning / problem-solving process required to elaborate a solution or way-ahead is inadequate to make a proper decision and achieve the desired end-state).
 - (2) Inadequate risk management (e.g. inadequate decision making where the individual(s) neglected to assess risk, adopt appropriate risk mitigation or monitor effectiveness of risk mitigation to achieve the desired end-state).
- c. Procedural or Rule-based Errors. Occur during highly structured tasks (e.g. if X, then do Y) where an improper or inappropriate procedure is selected and applied following a misdiagnosed or unrecognized situation. Insufficient time (time compression) or inexperience are examples of preconditions that could lead to this kind of error.
 - (1) Situation misdiagnosed (e.g. after misdiagnosing a time-critical emergency that should have led to a structured response, decision made to select and apply a procedure (a way ahead) that is inappropriate for the situation).
 - (2) Situation not recognized / ignored (e.g. after taking no notice or overlooking a caution / warning indicator that should have led to a structured response, decision made to select and apply a procedure (a way ahead) that is inappropriate for the situation).

NOTE

As an example, an Unsafe Act such as the decision to takeoff without a proper takeoff clearance (assuming that there is no wilful intent to disregard orders / procedure) could result from either a Knowledge-based or Information error (e.g. a pilot received an ambiguous departure clearance from ATC, but interpreted it to be a takeoff clearance and decided to initiate the takeoff) or from a Procedural or Rule-based error (e.g. a pilot overlooked the fact that a takeoff clearance had not been issued yet, but nonetheless decided to initiate the takeoff). Therefore, when facing a Decision Error, it is important to identify the source of the error within its specific context.

Skill-based Errors

17. Operation, workmanship or mechanical skills become automatized with extensive practice. As a result, the execution of such activities becomes routine and therefore occurs without significant conscious thought. Skill-based Errors can occur when automatized activity is performed incorrectly. Unlike Decision Errors, which result from intended courses of action, Skill-based Errors are the result of unintended actions. These types of errors can result from Inadequate Technique, Attention Failures or Lapses in Memory. Examples of preconditions that could lead to this kind of error are inadequate proficiency (*i.e. degraded or sub-optimal capabilities with regards to procedures and emergencies, limited total experience*), lack of appropriate training or a deficient level of currency (*i.e. limited recent experience, inability to achieve number of hours to be flown and / or sequence to be performed over a specified period of time, leading to erosion of skills and knowledge*) with the task being performed.

- a. Inadequate Technique. Occurs when an individual(s) performs a task with workmanship, mechanical skills or an operation that is below the level expected from an individual(s) fully trained and experienced to perform the task. These are particularly linked to failures of proficiency, appropriate training and currency. They can occur, for example when a maintainer damages a delicate engine valve by handling it roughly or a pilot applies insufficient crosswind control inputs on landing.
 - (1) Poor / inappropriate technique (e.g. overcontrol, undercontrol, failure to execute a proper visual scan technique or an anti-G straining manoeuvre – AGSM –, inadvertent activation / operation of a pump or lever, rough handling of a delicate component).
 - (2) Delayed response (e.g. control inputs initiated too late to correct for crosswind on landing).
 - (3) Omitted proper technique (e.g. complete failure to execute the required technique, failure to activate / operate a pump or lever).
- b. Attention Failures. Occurs when an individual(s) did not devote sufficient attention to a given task in order to complete the task properly. Individual(s) tends to create “short-cuts” or “fill in” missing information based upon familiarity with the situation. This is especially true when performing highly practiced tasks with which an individual(s) is extremely familiar, while relying on incomplete or partially fabricated information. They can occur, for example when a pilot fails to make a routine mandatory transmission to ATC because he / she is encountering unanticipated weather conditions or when a maintainer misses a hand signal.
 - (1) Failed to recognize condition (e.g. failure to recognize a deteriorating condition, failure to recognize a hand signal).
 - (2) Interruption in process (e.g. while encountering unanticipated disruption or interruption in process, failure to complete checklist, skipping or omitting item(s) in checklist, breakdown in visual scan on instruments or radar screen or for traffic).
 - (3) Negative transfer (e.g. importation of an already highly practiced technique into a new environment, which proves to be inadequate).
- c. Memory Lapses. Occurs when an individual(s) either fails to recall or recalls incorrectly information from memory that is required to complete a task. Once tasks become automatized for the individual(s), the successful completion of them relies more and more on the ability of the individual(s) to recall completely and correctly important information about the task from memory. When there is a breakdown in this recollection, Skill-based Errors can occur. The breakdown can occur undetected by the individual(s) committing it (*in the case of an incorrect recollection of the order of the steps in a procedure*) or can be detected immediately by the individual (*in the case of a failure to recall the steps of a procedure in a given situation*).
 - (1) Incorrect recall (e.g. incorrect ordering of steps in a procedure).
 - (2) Failed to recall (e.g. failed to recall critical emergency checklist item).

Deviations

18. Deviations are events where there was a wilful disregard of orders, regulations or other rules. If “wilful disregard” is not present, the active human failure(s) which lead to the occurrence must be categorized as Error(s). Unlike errors, Deviations are deliberate and usually point to serious FS issues. The

two types of Deviations, Routine and Exceptional, are not differentiated by the nature or the outcome of the act but by whether or not the act had become the norm within the organization (Routine Deviation) or is totally odd and unacceptable for this organization (Exceptional Deviation)

Routine Deviations

19. Routine Deviations are considered normalized practices of “*bending the rules*” by individuals and are *tolerated or condoned by some supervisory / leadership authorities and/or peers*. They are the result of accepted individual behaviour not conforming to established rules or regulations. Routine Deviations tend to be common or habitual behaviours by nature and are often enabled by close supervisors, and/or peers that tolerate such departures from rules or regulations. If a Routine Deviation is identified, further investigation up the supervisory chain is required to determine the extent of the acceptance of this behaviour. Routine “work-arounds” and unofficial procedures are examples of Routine Deviations.

- a. Transgression of Orders / Directives / Regulations / SOP – Strategic. For example deviation from B-GA-100-001/AA-000 National Defence Flying Orders, A-OA-148-001/AA-000 Manual of Instrument Flying, C-05-005-P03/AM-001 CF Maintenance Activity Authorizations and Training Standards.
- b. Transgression of Orders / Directives / Regulations / SOP – Wing, Base or Unit. For example deviation from Wing Flying Orders, Unit SOPs.

NOTE

There are no nanocodes under this stream. This stream is to be used as a final selection within this Routine Deviations sub-category.

NOTE

Routine Deviations normally have related latent conditions. It is important for the FSO to inform the commanding officer of any routine deviations as they may be a sign of supervisory problems at many levels of the organization.

Exceptional Deviations

20. Exceptional Deviations are isolated departures from established rules or regulations. They are unusual or isolated to very specific individual(s) rather than larger groups. They are definitely not sanctioned or condoned by supervisory / leadership authorities nor supported by peers. While most Exceptional Deviations are flagrant, it is important to note that they are not to be considered exceptional because of their extreme nature. Rather, they are to be considered exceptional because they are not typical of an organization’s accepted behaviour pattern. An occurrence can only be treated as an Exceptional Deviation when the investigator has positively determined that the unsafe act / active failure that caused the occurrence cannot be assigned to an Error or a Routine Deviation. Flying an aircraft beyond operating limits or under a bridge without valid operational reasons, signing-off an aircraft repair when maintenance work has not been performed or unapproved material/procedures were used may be, depending on the context, examples of Exceptional Deviations. In a “just culture”, the presence of Exceptional Deviations are usually rare and serious. While PM may still be derived from Exceptional Deviations, resolution of the problem often resides outside of the FS Program.

NOTE

A “just culture” lies between a non-punitive culture and one of sanction and punishment. While a non-punitive environment is fundamental for a good reporting culture, negligence or wilful, deliberate deviations must not be tolerated by leadership. A “just culture” recognizes that, in certain circumstances, there may be a need for punitive or administrative action. It defines the line between acceptable and unacceptable behaviour.

- a. Transgression of Orders / Directives / Regulations / SOP – Strategic. For example deviation from B-GA-100-001/AA-000 National Defence Flying Orders, A-OA-148-001/AA-000 Manual of Instrument Flying, C-05-005-P03/AM-001 CF Maintenance Activity Authorizations and Training Standards.
- b. Transgression of Orders / Directives / Regulations / SOP – Wing, Base or Unit. For example deviation from Wing Flying Orders, Unit SOPs.

NOTE

There are no nanocodes under these streams. These streams are to be used as a final selection within this Exceptional Deviations sub-category.

NOTE

If an Exceptional Deviation is suspected, the FSO shall recommend to the Commanding Officer the conduct of a collateral investigation.

NOTE

Any collateral investigation must be separate and independent of the FS investigation. Privileged information collected in the conduct of a FS investigation shall not be released to the collateral investigation team or the chain of command.

PRECONDITIONS FOR UNSAFE ACTS

21. This is the latent condition level that is usually directly associated with personnel involved in an Unsafe Act. Identification of causes at this level reveals additional information about the circumstances within which the Unsafe Act occurred. Preconditions for Unsafe Acts are subdivided into Working Conditions, Practices of Personnel and Conditions of Personnel.

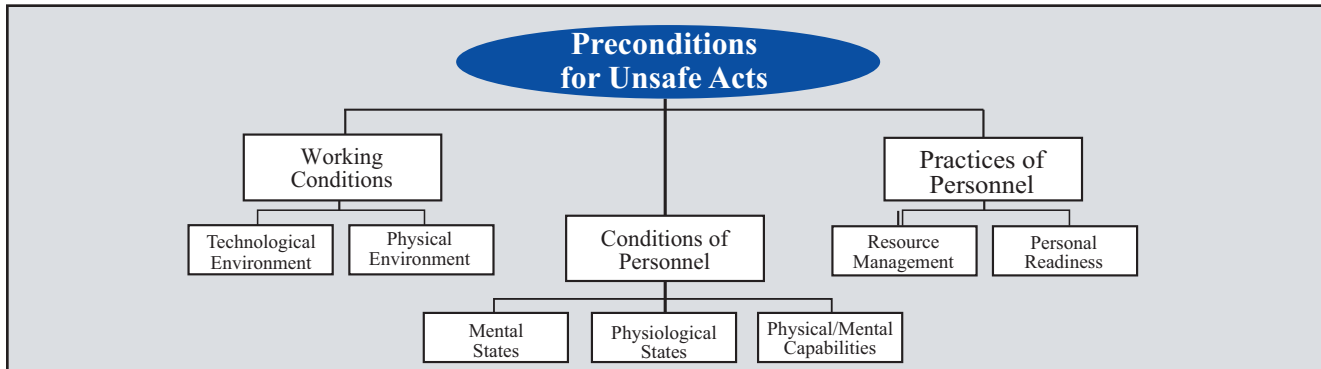


Figure 2 – Latent Conditions – Preconditions for Unsafe Acts

Working Conditions

22. The Working Conditions category relates to the immediate environment of the individual(s) directly involved with the occurrence. Working Conditions can, in themselves or by influencing the Conditions of Personnel or Practices of Personnel, lead to Unsafe Acts. This category is divided into the following sub-categories: Technological Environment and Physical Environment.

Technological Environment

23. Technological Environment relates to the equipment used to perform a task / mission or the interaction of the individual(s) with that equipment. This sub-category encompasses individual(s) using equipment that is inappropriate for the task / mission, the unavailability of the right equipment for the job, or an individual's sub-optimal interface with equipment. These characteristics create the circumstances whereby an individual(s) is forced to “*make do*”, thereby increasing the potential for error.

- a. Equipment (physical or virtual). Occurs when the equipment used, whether mechanical or electronic, impedes the individual(s) ability to perform safely and effectively.
 - (1) Inappropriate for the task (e.g. unsafe, unreliable, inoperable, uncontrollable, miscalibrated, damaged, outdated).
 - (2) Unavailable (e.g. no equipment available for the job).
- b. Operator / Equipment Interaction. Occurs when an individual(s) is unable or has difficulty accessing / processing information or operating equipment as a result of the design / layout or automation of the equipment.
 - (1) Inadequate design / layout (e.g. problems with software design or checklist layout that impede proper human-machine interface).
 - (2) Inadequate display / automation (e.g. problems with color display or automation characteristics that impede proper human-machine interface)

Physical Environment

24. The Physical Environment sub-category is present when the immediate surroundings, such as weather / exposure and workspace, impede the ability of personnel to complete the task / mission ef-

fectively. Physical hazards that contribute to the occurrence will also be included in this precondition category.

- a. Weather / Exposure. Occurs when climatic factors or a particular exposure impede the ability of the individual(s) to perform the task / mission.
 - (1) Thermal stress (e.g. cold / warm temperature, frostbite, heat stress, immersion in cold water).
 - (2) Cloud / precipitation (e.g. rain, snow, drizzle, fog, brownout, whiteout).
 - (3) Wind (e.g. crosswinds, gusts, nocturnal jets, wind shear).
 - (4) Density Altitude.
- b. Physical Hazards. Occurs when personnel are impeded from performing tasks / missions in a safe and effective manner due to the presence of physical factors (or inadequacy or absence thereof, in the case of lighting).
 - (1) Lighting (e.g. inadequate cockpit / hangar lighting, light at dusk, night time, sunlight).
 - (2) Noise (e.g. ambient cockpit noise, flight line noise, noise from tools).
 - (3) Vibrations / Turbulence (e.g. whole-body vibration from helicopters, hand-arm vibration from tools).
 - (4) Lasers (e.g. unauthorized pointers / light show displays, target designators).
- c. Workspace / Immediate Surroundings. Occurs when cockpit, hangar, flight line or other working area / environments are inadequate to safely perform the task / mission.
 - (1) Constrained / obstructed (e.g. insufficient workspace, constrained position).
 - (2) Inaccessible (e.g. totally or partially).
 - (3) Poorly defined / Markings inappropriate.
 - (4) Slippery surfaces (e.g. hangar floors, ladder steps, aircraft surfaces).

Practices of Personnel

25. This category includes situations or circumstances such as resource management and personal readiness associated with the individual(s) directly involved in the occurrence, which affect their conditions, practices and actions and contribute to the final sequence of events in the occurrence by predisposing it to happen.

Resource Management

26. All phases of air operations and maintenance require effective teamwork. Effective teams make use of the knowledge, skills and abilities of all members involved and take advantage of proper interactions among them; deficiencies and breakdowns in Communication / Coordination and Planning can be detrimental to their cohesion, impact performance negatively and impede safety.

- a. Communication / Coordination. This relates typically to the lack of effective communication / coordination among aircrew, maintenance and support personnel, which can create confusion and lead to unsafe conduct of operations. Examples of this include ineffective or inadequate communication / coordination within and between aircraft, as well as with air traffic control, maintenance, and other support personnel. It also includes ineffective or inadequate communication / coordination before and after the task / mission with the brief and debrief of aircrew, maintenance and support personnel.

- (1) Crew / team leadership (e.g. failure to facilitate a proper team / crew climate, failure to establish and maintain an accurate and shared understanding of the evolving mission and plan on the part of all team / crew members, failure to actively manage the distribution of mission tasks to prevent overloading of any team / crew member).
 - (2) Inadequate task / mission briefing (e.g. inadequate content, inadequate time allocation).
 - (3) Ineffective communication (verbal, written, hand signal) (e.g. lack of assertiveness, misinterpretation of information, miscommunication of critical information, use of non-standard / improper terminology, inappropriate challenge and reply / acknowledgement, inadequate shift turnover, inadequate log entry).
 - (4) Failure to cross-monitor performance / assist / back-up (e.g. inadequate monitoring of the pilot flying during an instrument approach, no assistance provided during the handling of an emergency or the repair of an aircraft).
 - (5) Rank / position authority gradient (e.g. inappropriate trans-cockpit authority gradient, whether level or steep).
- b. Planning. Occurs when an individual, crew or team fails to complete all preparatory tasks associated with planning the mission, or fails to re-assess changes in their dynamic environment during task / mission execution and review their plan accordingly. Planning and re-planning tasks / missions include information collection and analysis, dispatching activities within the crew / team and with appropriate support personnel and external agencies, contingency planning, and risk assessment.
- (1) Inadequate task / mission planning (e.g. inadequate contingency planning).
 - (2) Inadequate task / mission-in-progress re-planning (e.g. failure to assess changing weather during mission execution and review the plan).

Personal Readiness

27. In any occupational setting, individual(s) are expected to show up for work ready to perform at optimum levels. This is even more so in aviation. If personal habit patterns or behaviours interfere with this requirement, then this sub-category is present. A breakdown in Personal Readiness can occur when individual(s) fail to prepare physically and mentally for the task / mission they must perform, which in turn can be detrimental to their performance, lead to errors and impede safety. Not all Personal Readiness failures occur because rules and regulations have been disregarded or broken. While certain behaviours or conditions may not be governed by any rule or may not be against any existing regulation, individual(s) must use good judgement when deciding whether they are “fit” to work or not. A person arriving at work just after over-exercising (e.g. dehydrated after a long-distance run in a hot and humid environment), a person arriving at work without adequate rest, hung over (e.g. under the influence of residual effects of alcohol despite a bottle-to-work period that was in accordance with regulations) or with impaired vigilance (e.g. from direct, secondary or residual effects of drugs / medication) are examples within this sub-category. Such individual(s) are not ready to function effectively and at optimum levels in the workplace.

- a. Inadequate Physical /Mental Preparation. Occurs when self-imposed physical or mental stresses, in terms of fitness and rest, or unreported medical conditions, impair performance and do not support task / mission demands.
- (1) Inadequate physical fitness (e.g. when the relative physical state of the individual(s), in terms of a regular exercise program or a physically active life-

NOTE

Issues such as circadian desynchrony (e.g. jet lag, crossing several time zones or shift work) can lead to either acute or chronic fatigue. Therefore, when selecting either “acute” or “chronic” fatigue, it is important to identify the source of the fatigue.

- style, is not adequate to support task / mission demands).
- (2) Inadequate rest (e.g. when the opportunity for rest was provided but the individual(s) failed to rest appropriately, leading to fatigue and impaired cognitive performance).
 - (3) Unreported medical condition (e.g. when the individual(s) intentionally performs a task / mission with a known, unreported medical condition that impairs performance and leads to an unsafe situation).
- b. Inappropriate Consumption. Occurs when self-imposed stresses such as dietary practices, consumption of alcohol, drugs, supplements or self-medication (including over-the-counter drugs) result in degraded performance and lead to an unsafe action.
- (1) Nutrition (e.g. when poor dietary practices are inadequate to fuel the brain and body functions, resulting in degraded performance).
 - (2) Alcohol (e.g. when acute or residual effects of alcohol impairs performance).
 - (3) Drugs / supplements / self-medication (e.g. when the individual(s) takes any drug, *other than prescribed*, that interferes with performance).

Conditions of Personnel

28. This category identifies the latent condition(s) that affect the personnel directly involved in the occurrence. These Conditions of Personnel are divided into Mental States, Physiological States and Physical / Mental Capability

Mental States**NOTE**

Issues such as boredom or inattention (as two examples) can result from either reduced attention over time or task overload / underload. Therefore it is important to assess the nature and level of activity before determining the type of attention deficiency.

29. The Mental States sub-category involves those mental conditions that directly affect performance. The complexity of most aviation related tasks / missions requires the individual(s) performing them to be mentally prepared. A deficiency in mental preparedness, and therefore cognitive performance, can result from Fatigue, Attention Deficiencies and Personality Traits / Attitudes.

- a. Mental Fatigue. Occurs when the effects of fatigue impair the individual’s cognitive performance. Many tasks / missions performed in aviation require an individual(s) to process large amounts of information in a short period of time and to do this on a continuous basis. An individual’s ability to do this can be reduced by beginning the task without the appropriate amount of rest. Likewise, the continuous information processing required during sustained operations can deteriorate an individual’s ability to perform a task. Given the high operational tempo experienced by most individuals involved with military aviation, mental fatigue can be common under certain circumstances. This can occur for example, when a maintenance technician or pilot sleeps for only a few hours the

night before a task / mission or when an air traffic controller is required to control a large volume of air traffic over a period of several hours.

NOTE

Situation awareness (SA) in itself does not appear in this text. Though a well-known concept in aviation, the focus and interest must be on the problems or issues that can lead to “loss of SA” or “inability to achieve SA” as opposed to SA itself. A few examples of such issues are reduced attention, overload / underload, fatigue, pressing, inadequate proficiency or experience and many physiological states, which in turn steer the PM in the appropriate direction. In a sense, a parallel can be made with the concept of “fever” in medicine: what counts is to know where the fever comes from, not the fever in itself. Therefore it is important to assess the issues that influence SA to understand the Preconditions leading to Unsafe Acts.

- (1) Acute fatigue (e.g. lack of, or low quality, sleep the night before a task / mission, circadian rhythm effects).
 - (2) Chronic fatigue (e.g. sleep debt accumulated over a period greater than 48 hours, circadian rhythm effects).
- b. Attention Deficiencies. Occurs when an individual’s ability to devote sustained attention to a task / mission has deteriorated resulting in a reduction in performance. This deterioration in attention can be the result of maintaining sustained attention over time, task overload / underload or stress (whether self-imposed or external). Humans, by their very nature, are not very effective at maintaining sustained attention over extended periods of time. This can result in either incomplete or inaccurate processing of information, therefore predisposing the individual(s) to errors. The ability of individual(s) to manage simultaneous, multiple tasks (e.g. task overload) or perform tasks when void of external motivators (e.g. task underload / boredom), can also lead to attention deficiencies. Individual(s) are also particularly susceptible to attention deficiencies when attempting to perform tasks / missions while experiencing either externally-imposed or self-imposed stress. This can occur, for example when a pilot performing a complex mission becomes overwhelmed with the surroundings and makes decisions or takes action based upon a flawed appreciation of the situation or when a maintenance technician attempts to complete a repair task while preoccupied with marital or family problems.
- (1) Reduced attention – sustained attention over time (e.g. inattention, boredom).
 - (2) Reduced attention – task overload / underload (e.g. boredom, channelized attention, task saturation, haste).
 - (3) Reduced attention – stress (e.g. self-imposed stress, life stress, job stress, distraction from stress, stress generated by peer pressure).
- c. Personality Traits and Attitudes. Occurs when certain personality traits or attitudes of individuals has an effect upon their ability to perform safely. Presence of these traits / attitudes will influence the likelihood that an Unsafe Act will occur. This can occur for example, when an individual’s overconfidence, ego or stubborn attitude impedes the ability to safely complete a task / mission.
- (1) Expectancy (e.g. pre-determined mindset such as the anticipation to find traffic in

- a given portion of the sky or the hope that weather will hold).
- (2) Motivation (e.g. misplaced motivation, inadequate motivation, hidden agenda).
 - (3) Carelessness / complacency (e.g. contentment, lack of concern in the face of new or changing conditions, unawareness of danger or hazard).
 - (4) Overconfidence / over-aggressiveness (e.g. macho attitude, “can do” attitude).
 - (5) Pressing / haste / get-home-itis (e.g. cutting corners to get a job done by a certain deadline).
 - (6) Personality / psychological trait (e.g. conflicted social interaction, irritability, disrespectful or insubordinate behaviour).

Physiological States

30. The Physiological States sub-category refers to a medical or physiological condition that precludes safe operations. Certain medical or physiological conditions make individual(s) particularly susceptible to adverse reactions and inaccurate sensations in an aviation environment. Particularly important to aviation are physiological conditions that increase the susceptibility of the individual(s) to spatial disorientation, illusions, G-induced loss of consciousness (G-LOC), almost loss of consciousness (A-LOC), hypoxia, physical fatigue as well as the numerous pharmacological and medical abnormalities known to affect performance. This can occur, for example, when a pilot flies while suffering from an ear infection, rendering the pilot more susceptible to spatial disorientation or a maintenance technician on prescription medication who is more susceptible to increased drowsiness while working at heights or operating specialized machinery.

a. Adverse Medical Conditions.

- (1) Medical illness / injury / physical fatigue.
- (2) Pharmacological / toxicological effects (e.g. direct, secondary or residual effects of prescribed drugs / medication, incapacitation from carbon monoxide poisoning).

b. Adverse Physiological Consequences of Flight

- (1) Motion sickness (e.g. air sickness, simulator sickness).
- (2) Acceleration effects / G-LOC / A-LOC (e.g. push-pull effect, grey-out, incapacitation following G-LOC, A-LOC *i.e. impairment but not LOC*).
- (3) Decompression sickness (DCS) (e.g. the ‘bends’ following exposure at a reduced environmental / atmospheric pressure sufficient to cause DCS, such as in an aircraft with failed or inexistent pressurization system or in a hypobaric chamber).
- (4) Hypoxia / hyperventilation (e.g. inadequate supply of oxygen to the tissues, most importantly the brain, following a sudden aircraft depressurization or a malfunction of an oxygen regulator, nervousness or unease in a passenger leading to an increased rate of breathing and associated symptoms).
- (5) Trapped gas disorders (e.g. following ascent or descent in an aircraft or on loss of cabin pressurization, expansion or compression of gas contained in closed and semi-closed cavities of the body leading to conditions such as sinus pain / squeeze, eardrum pain / perforation, lung rupture, bowel discomfort / pain).
- (6) Illusions (e.g. visual illusions such as *false horizon illusion* or *height-depth perception illusion* when flying over an area devoid of visual references – desert, snow, water –, vestibular illusions such as somatogyral illusion – *e.g. the Leans* – during angular acceleration or somatogravic illusion – *e.g. oculogravic illusion* – during linear acceleration).

- (7) Spatial disorientation (e.g. SD1 (unrecognized), SD2 (recognized), SD3 (incapacitating)).

Physical / Mental Capabilities

31. The Physical / Mental Capabilities sub-category refers to those instances when the task / mission requirements exceed the capabilities of the individual(s) involved in the activity. This could be the result of the limitations in the capabilities of human beings in general or capability limitations of the individual(s) involved. If the task / mission exceeds the capabilities of humans in general, the human-machine interface or the task itself needs to be addressed. If however the task / mission exceeds the capability of the individual(s) involved, then re-assignment, training or adjustment of the recruiting / selection standard may be required. This sub-category includes aptitudes or other physical characteristics over which the individual(s) involved may not have much control. This can occur, for example, when a pilot cannot reach the rudder pedals of aircraft because the legs are too short. It also includes qualification and training issues over which remedial approaches may be possible. Additionally, this can occur when a maintainer lacks proficiency with the task being performed.

- a. Physical Capabilities Limitations. Occurs when the physical limitation(s) of the human impairs the individual's ability to perform work duties to a safe and effective level.
 - (1) Anthropometric / biomechanical limitations (e.g. in body size, reach, view over the nose, strength).
 - (2) Visual limitations (e.g. in visual acuity, color vision, contrast sensitivity).
 - (3) Hearing limitations (e.g. in hearing acuity, speech discrimination).
 - (4) Motor skill / coordination / reaction time deficiency (e.g. insufficient hands-feet coordination).
- b. Mental Capabilities Limitations. Occurs when the mental limitation(s) of the human impairs the individual's ability to absorb and process the information required to safely complete tasks / missions.
 - (1) Incompatible aptitude (e.g. ability to mentally absorb and process information regarding the flying, controlling or repair / maintenance of aircraft is unsuited for the aviation environment, which impairs the safe completion of task / mission).
 - (2) Limited learning / memory ability (e.g. limited ability to learn and retain advanced notions and concepts to safely complete task / mission).
- c. Inadequate Qualification and Training. Occurs when the level of training or standard of qualification provided to, or demonstrated by, individual(s) is not sufficient to complete assigned duties or tasks / missions safely.
 - (1) Inadequate proficiency (e.g. degraded or sub-optimal capabilities with regards to procedures and emergencies, limited total experience with the task being performed).
 - (2) Lapsed currency (e.g. inability to achieve number of hours to be flown and / or sequence to be performed over a specified period of time, leading to erosion of skills and knowledge, limited recent experience with the task being performed).
 - (3) Inappropriate training (e.g. not trained for the task, unrealistic training, ineffective skill training).

SUPERVISION

32. Supervisors influence the conditions and practices of individuals and the type of environment they work in. Supervision is a factor in an occurrence if the methods, decisions or policies of the super-

visory chain-of-command directly affect practices, conditions or actions of individuals or their working conditions and result in human error or unsafe situations.

33. Supervision factors are often part of the causal chain of events. As latent conditions, such factors found within the individual(s) immediate supervisory chain are not considered to be the direct cause of the occurrence. However, though they may lie dormant or undetected for a while, they can contribute to the final sequence of events to which they are associated by predisposing it to happen. In that sense, Unsafe Acts can be “set up” by Supervision factors. Supervision factors are sub-divided into: Level of Supervision, Planned Activities, Problem Correction and Supervisory Deviations.

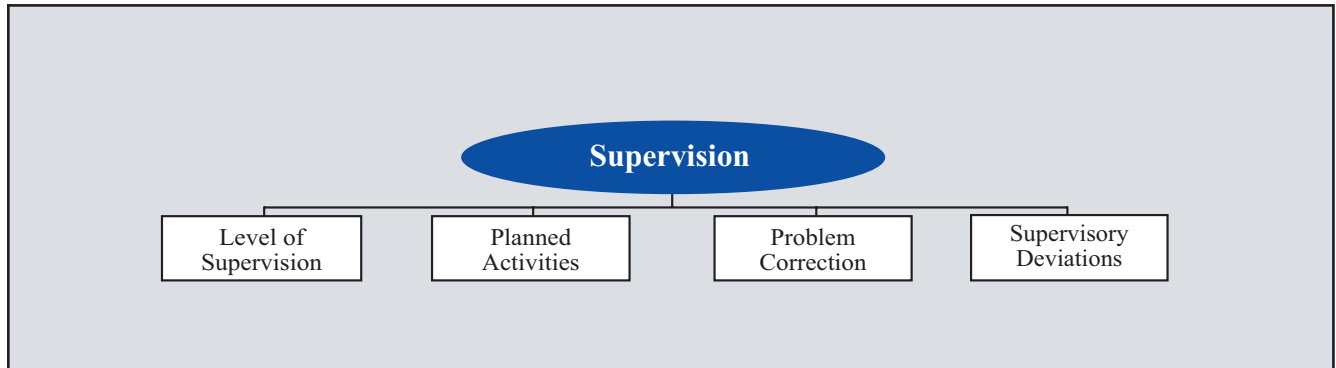


Figure 3 - Latent Conditions – Supervision Factors

Level of Supervision

34. The role of any supervisor is to provide the subordinates the opportunity to succeed. To do this the supervisor, regardless of the level, must provide leadership, sound professional guidance and oversight, doctrine, training opportunities, constructive feedback, motivation and the proper role model to ensure that the work is done safely and effectively. This category applies when supervision proves inappropriate or improper, and fails to identify hazards, recognize and control risk, provide guidance, oversight and / or training, which results in human error or unsafe situations.

- a. Inadequate Leadership / Supervision / Oversight / Guidance. Occurs when the availability, competency, quality or timeliness of leadership, supervision or oversight does not meet task / mission demands and creates unsafe situations.
 - (1) Inadequate communication (e.g. absence or unavailability of supervisor, inadequate feedback or handover, for example in terms of quality or timeliness).
 - (2) Inadequate oversight / guidance (e.g. inadequate tracking of performance / proficiency, inadequate tracking of qualifications, currency and authorizations, improper inspection of work).
- b. Training – Inadequate or Unavailable. Occurs when one-time or recurrent training programs, upgrade programs, transition programs or any other local training is inadequate or unavailable and creates unsafe situations.
 - (1) Training inadequate (e.g. some training provided, however inadequate in terms of quality, quantity, timeliness).
 - (2) Training unavailable (e.g. no training provided).
- c. Policy / Doctrine – Inadequate or Lacking. Occurs when policy or doctrine, or lack of policy or doctrine, leads to an unsafe situation.

- (1) Policy / doctrine inadequate (e.g. publications, technical data, procedures, operational doctrine not current or inadequate).
- (2) Policy / doctrine lacking (e.g. publication, technical data, procedure, operational doctrine lacking / inexistent).

Planned Activity

35. A key role of supervisors is to properly assess risk and plan tasks / missions to achieve operational success at an acceptable level of risk. The Planned Activity category applies when supervisors fail to provide resources or adequately assess the hazards associated with an operation and allow for unnecessary risk and improper planning of activities, which in turn can adversely affect performance and put the safety of the task / mission at risk. Examples of such issues include supervisors who allow non-proficient or inexperienced personnel to attempt tasks or missions beyond their abilities, improper or inappropriate crew / team pairing for the task / mission, improper manning, improper work tempo or inadequate opportunity for rest.

- a. Improper Risk Assessment. Occurs when supervision does not adequately evaluate the risks associated with a task / mission or when pre-mission risk assessment tools or risk assessment programs are inadequate.
 - (1) Inadequate risk assessment of task / mission (e.g. some risk assessment done, however improperly, inadequate risk assessment tools / programs).
 - (2) No risk assessment of task / mission (e.g. no risk assessment done).
- b. Planning Beyond Ability / Capability of Personnel. Occurs when supervisors allow / authorize personnel to undertake a task / mission beyond their abilities, beyond the capabilities of their equipment or without appropriate rest.
 - (1) Authorized personnel not proficient for task / mission (e.g. authorization given for personnel with degraded or sub-optimal capabilities with regards to procedures and emergencies or with limited total experience to undertake task / mission).
 - (2) Authorized personnel not current for task / mission (e.g. authorization given for personnel who did not achieve number of hours to be flown and / or sequence to be performed over a specified period of time or with limited recent experience to undertake task / mission)
 - (3) Inadequate opportunity for rest (e.g. failure to provide appropriate length of time or adequate environment to rest properly).
 - (4) Improper work tempo (e.g. inadequate schedule or improper task prioritization leading to increased pace of work / work overload)
- c. Inadequate Provision of Resources. Occurs when the task / mission is planned without proper manning / resources or when the composition of the crew / team is inadequate.
 - (1) Insufficient resources – human (e.g. improper manning for the task / mission).
 - (2) Insufficient resources – other than human (e.g. insufficient number of tools, aircraft or vehicles provided for the task / mission).
 - (3) Inadequate crew / team composition (e.g. inadequate crew pairing for the complexity of task / mission).

Problem Correction

36. The Problem Correction category refers to instances when deficiencies concerning individual(s), equipment, training or related safety areas are known to the supervisor, yet are allowed to continue uncorrected. The failure on the part of a supervisor to consistently correct or discipline inappropriate

behaviour or unsafe actions of individual(s) and the failure to correct known deficiencies in documents, processes or procedures, are examples of this category. As a consequence, this lack of supervisory action can certainly foster an unsafe atmosphere and create unsafe situations. This precondition often leads to a Routine or Exceptional Deviation.

- a. Inadequate Correction of Human Behaviour / Performance. Occurs when supervision does not correct inappropriate human behaviour or performance.
 - (1) Failure to correct personnel behaviours (e.g. when supervision does not adequately correct inappropriate conduct and / or behaviours of subordinates known to impede the safe completion of tasks / missions).
 - (2) Failure to correct training deficiencies (e.g. when supervision does not adequately correct known deficiencies related to the training of personnel that impede the safe completion of tasks / missions).
- b. Inadequate Correction of Equipment / Documentation. Occurs when supervision does not correct deficiencies in equipment or documentation
 - (1) Failure to correct equipment deficiencies (e.g. when supervision does not adequately correct known deficiencies related to equipment / tools that impede the safe completion of tasks / missions).
 - (2) Failure to correct deficiencies in documents / processes (e.g. when supervision does not adequately correct known deficiencies in documents, orders and processes that impede the safe completion of tasks / missions).

Supervisory Deviations

37. A Deviation represents the wilful disregard of orders, regulations or other rules. Supervisory Deviations are isolated departures from established rules or regulations (*wilful disregard*), are not necessarily typical of a supervisor's behaviour pattern and are not condoned by higher authorities. The Supervisory Deviations category is used for those instances when supervisors wilfully disregard existing instructions, regulations, rules or SOPs, which indirectly leads to an unsafe situation or FS occurrence (e.g. permitting or directing an individual to perform duties without current qualifications or authorization).

- a. Transgression of Orders / Directives / Regulations / SOP – Strategic. For example failure to enforce, or deviation from, B-GA-100-001/AA-000 National Defence Flying Orders, A-OA-148-001/AA-000 Manual of Instrument Flying, C-05-005-P03/AM-001 CF Maintenance Activity Authorizations and Training Standards.
- b. Transgression of Orders / Directives / Regulations / SOP – Wing, Base or Unit. For example failure to enforce, or deviation from, Wing Flying Orders, Unit SOPs.

NOTE

There are no nanocodes under these streams. These streams are to be used as a final selection within this Supervisory Deviations sub-category.

ORGANIZATIONAL INFLUENCES

38. Unsound decisions by upper-level leadership, although latent in nature, can have a direct impact on the organization; moreover, they can have a direct negative effect on supervisory practices or the conditions and actions of individuals. Although the impact of organizational influence on the areas in question is direct, it is considered an indirect latent condition because it does not play an active role in

the condition or act under examination. These latent Organizational Influences are sub-divided into three categories: Organizational Resource Management, Organizational Climate and Organizational Processes.

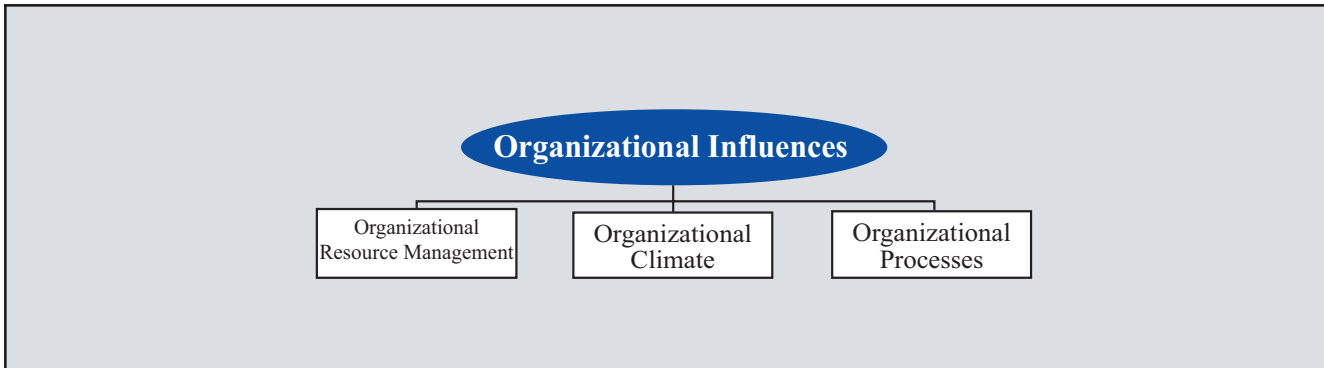


Figure 4 - Latent Conditions – Organizational Influences Factors

Organizational Resource Management

39. This category refers to the management, allocation and maintenance of organizational resources such as personnel, financial and equipment / facilities. Personnel Resources refers to the management of operators, staff, support and maintenance personnel. Issues that directly influence safety include selection, training and staffing / manning. Financial Resources refers to the management of non-human resources, primarily monetary resources. For example, excessive cost cutting or a lack of funding for proper acquisition and safe utilization of equipment and resources may adversely affect safety. Finally, Equipment / Facility Resources refers to issues related to inadequate equipment, use of unsuitable equipment, inadequate design of workspaces or failure to correct known design flaws.

- a. Personnel Resources. Occurs when the management and allocation of human resources such as aircrew, maintenance personnel, staff and support personnel adversely influence safety. Deficiencies in aircrew selection, enrolment quotas, management of personnel attrition and availability of training programs are examples of this precondition.
 - (1) Deficiencies in selection (e.g. enrolment quotas, aircrew selection)
 - (2) Deficiencies in staffing / manning (e.g. allocation of personnel and supervisory staff to different units, management of personnel turn-arounds / attrition).
 - (3) Deficiencies in training (e.g. management of training quotas, elaboration of training programs, availability, use and maintenance of training facilities).
- b. Financial Resources. Occurs when the management and allocation of monetary resources adversely influence safety. Excessive cost cutting or a lack of funding for proper acquisition and safe utilization of equipment and resources are examples of this precondition..
 - (1) Lack of funding – capital expenditures / program.
 - (2) Lack of funding – operations and maintenance.
- c. Equipment / Facility Resources. Occurs when the management and allocation of equipment and facilities adversely influence safety. Equipment unsuitable for the task / mission or inadequate design of equipment or workspaces are examples of this precondition.

- (1) Inadequate equipment (e.g. inadequate design or use of unsuitable equipment such as aircraft, tools, support equipment or radar, failure to correct known design flaws).
- (2) Inadequate facility / workspace (e.g. inadequate design of workspaces such as control towers or hangar facilities, inadequate hangar space).

Organizational Climate

40. This category refers to a broad class of organizational variables that adversely influence worker performance and safety. Organizational Climate is the prevailing atmosphere or environment within the organization. Organizational Structure, Policies and Culture are elements that affect the Organizational Climate. An organization's structure is reflected in the delegation of authority and communication channels. Organizations with maladaptive structures will be more prone to FS occurrences. Policies are official guidelines that direct leadership's decisions about such things as personnel management and the handling of documents and processes within the organization. When policies are ill-defined, adversarial or conflicting, or when they are supplanted by unofficial rules or values, safety may be compromised. Finally, culture refers to the unspoken or unofficial rules and norms, values, attitudes, beliefs and customs of an organization, i.e. "*the way things really get done around here*".

- a. Structure. Occurs when issues such as delegation of authority and communication channels within the organization adversely influence safety. Ambiguous or conflicting delegation of authority and adversarial communication are examples of this precondition.
 - (1) Deficiencies in delegation of authority (e.g. ambiguous or conflicting authority).
 - (2) Deficiencies in communication (e.g. adversarial communication, closed communication channels).
- b. Policies. Occurs when official directives and guidelines on personnel management and the handling of documents and processes within the organization adversely influence safety. Policies that are ill-defined, adversarial, conflicting or supplanted by unofficial rules or values are examples of this precondition.
 - (1) Deficiencies in personnel policies (e.g. policies on recruiting, promotion, posting, retention and release).
 - (2) Deficiencies in documents and processes (e.g. policies on the process of tracking amendments in CF Technical Orders (CFTO), policies on the handling of Records of Airworthiness Risk Management (RARM) and Unsatisfactory Condition Reports (UCR)).
- c. Culture. Occurs when unspoken or unofficial rules and norms, values, attitudes, beliefs and customs within the organization adversely influence safety.
 - (1) Misconceived rules and norms (e.g. unwritten, unspoken or unofficial agreement, approach or "*way of doing things*", such as the predisposition to "*bend the rules*" or tendency not to report FS occurrences, that exists within the organization and adversely influence safety and the way tasks / missions are conducted).
 - (2) Misaligned values, attitudes, beliefs and customs (e.g. elements of the organizational culture, such as the presence of *group think* behaviour, inexistent or disintegrating *esprit de corps* or ill-conceived traditions, that adversely influence safety and the way tasks / missions are conducted).

Organizational Processes

41. This category refers to the formal processes by which things get done in the organization. Three

factors are included in this area: Operations, Procedures and Oversight / Guidance. Operations refers to the characteristics or conditions of work that have been established by leadership. These characteristics include operational tempo, time pressures, production quotas, incentive systems and schedules. When set up inappropriately, these working conditions can be detrimental to safety. Procedures are the official or formal directives that dictate how the job is to be done. Examples include performance standards, objectives, documentation and instructions about procedures. All of these can negatively impact supervision, performance and safety. Finally, Oversight / Guidance refers to leadership's monitoring and checking of resources, climate and processes to ensure a safe and productive work environment. Issues here relate to organizational self-study, risk management, and the establishment and use of safety programs.

- a. Operations. Occurs when the characteristics or conditions of work that have been established by leadership adversely influence safety. Inappropriate schedules and workload, time pressures or ill-defined incentive systems are examples of this precondition.
 - (1) Inadequate operational tempo / workload (e.g. inappropriate schedules, deployment rates, secondary duties).
 - (2) Inadequate training / certification (e.g. inappropriate pace of on-going / development training or certification for newly trained aircrew or maintenance technicians).
- b. Procedures. Occurs when the official or formal directives that dictate how the job is to be done (the “*how to*”) within the organization adversely influence safety. Ambiguous performance standards and objectives, unavailability of documentation and instructions about procedures are examples of this precondition.
 - (1) Unclear doctrine (e.g. doctrine / guiding principles not clearly delineated, ambiguous, vague or confusing performance standards and objectives).
 - (2) Unavailability of documentation / publications / SOPs (e.g. unavailability of the proper documentation, publications and instructions to safely complete the tasks / missions).
- c. Oversight / Guidance. Occurs when the monitoring and scrutiny of organizational resources, climate and processes by upper level leadership are sub-optimal, which adversely influence safety and hinder a productive work environment.
 - (1) Improper risk management (e.g. improper or inadequate risk assessment of flight safety related issues, improper or inadequate management of *RARM* and *UCR* or open flight safety PM).
 - (2) Improper use of safety programs (e.g. improper monitoring and scrutiny of the CF Flight Safety program in terms of its implementation / performance within the organization).

MATERIEL CAUSE FACTORS

- 42. Materiel cause factors can only be assigned in cases which identify:
 - a. flaws in the basic material used to manufacture a part;
 - b. improper design, manufacture, construction or assembly by a non-CF organization (design); or
 - c. failure or malfunction of components when there was no overstress, abuse or misuse, and proper maintenance practices were carried out (undetected progressive breakdown).

43. Materiel 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 CF 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.

MATERIEL – AIRCRAFT OR ENGINE COMPONENTS

44. Aircraft or engine equipment failure or malfunction. The failed or damaged component must be specified. 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.

MATERIEL – RELATED FACILITIES

45. 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, 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.

46. 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 FACTORS

47. Environmental cause factors are applied to conditions that are beyond human control with the present state of the art. Care must be taken when considering the application of environmental cause factors. Environmental cause factors are not usually assigned in place of, but are normally assigned in conjunction with, personnel or materiel cause factors. Environmental cause factors apply only to those events where adequate and reasonable care and precautions were exercised. Reasonable precautions include, but are not limited to, full use of forecast information, use of airborne weather radar and requests for vectoring to avoid areas of hazardous weather.

ENVIRONMENT – WEATHER

48. Phenomena such as cloud, hail, lightning, rain, snow, sea state and wind.

ENVIRONMENT – SURFACE OPERATING AREA

49. The condition of an area of land, deck or water used for take-off, landing and surface manoeuvring of aircraft, which caused the occurrence and could not have been detected or avoided.

ENVIRONMENT – BIRD STRIKE

50. Self-explanatory. Applicable only when reasonable avoidance measures have been taken.

ENVIRONMENT – UNUSUAL PHENOMENA

51. Reserved for environmental conditions that cannot be specifically assigned under other categories, e.g. tidal waves, earthquakes and landslides.

ENVIRONMENT - REDUCED ATMOSPHERIC PRESSURE AND SIMULATORS

52. Assigned when personnel suffer adverse physiological consequences during or after exposure to reduced atmospheric pressure or simulators.

NOTE

This selection could be assigned independently in specific circumstances. For instance, when the investigation reveals that an individual exposed to such an environment suffered from decompression sickness, a trapped gas disorder, hypoxia, etc. and that no further incident / accident or safety of flight compromise resulted from Personnel actions / inactions (as it would most often be the case in an hypobaric chamber), then no Personnel Cause Factor assignment is needed in addition to the Environmental one.

OPERATIONAL CAUSE FACTOR

53. This factor can be assigned only when the C Air Force or the Comd 1 Cdn Air Div or higher authority has accepted the high risk (in accordance with B-GA-100-001/AA-000 National Defence Flying Orders, Volumes 1 and 3):

- a. to meet a commitment related to the preservation of national security;
- b. to conduct a flight essential to the interests of the Government of Canada; or
- c. to conduct a specific search and rescue flight.

54. Assignment of an Operational cause factor acknowledges that no other controllable circumstances contributed to the event. Therefore, this cause factor shall not be assigned in conjunction with, or in addition to, any other cause factor. When this cause factor is assigned, it must be recommended by either the Comd 1 Cdn Air Div or, for occurrences resulting from Development Test and Evaluation (DT&E) or Engineering Test and Evaluation (ET&E), the CO AETE. All Operational cause factor recommendations will be forwarded through Comd 1 Cdn Air Div to C Air Force for approval.

UNIDENTIFIED FOREIGN OBJECT DAMAGE (FOD) CAUSE FACTOR

55. The Unidentified FOD cause factor is applied to an occurrence where an unidentified foreign object has caused or has the potential to cause aircraft damage or personal injury. This cause factor shall not be assigned in conjunction with, or in addition to, any other cause factor. Identifiable foreign objects shall be assessed under the appropriate Personnel, Material or Environmental cause factor. Examples of FOD that should not be assessed using an Unidentified FOD cause factor are systems or component failures, loose or lost parts or pieces, lost personal equipment and bird or ice ingestion.

NOTE

If the evidence presented in the investigation can only eliminate any two of the three main cause factor categories (Personnel, Materiel or Environmental), the remaining cause factor becomes probable and shall be assigned even if the precise malfunction or failing cannot be identified. The cause factor narrative will list the possible cause factors.

UNDETERMINED CAUSE FACTOR

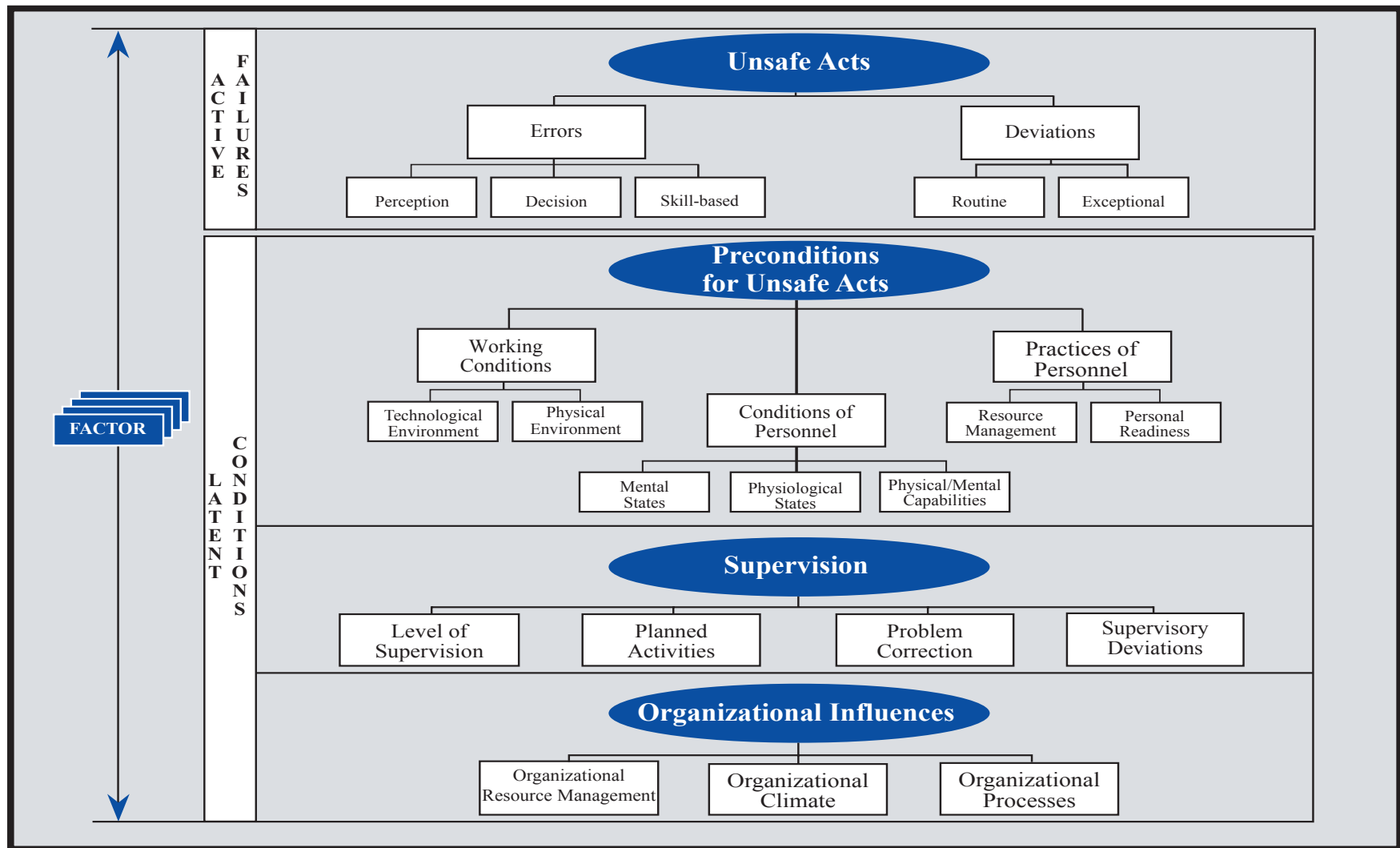
56. An Undetermined cause factor shall be assigned only when the investigation does not provide enough evidence to reasonably determine a specific cause factor. Prior to assigning an Undetermined cause factor, the investigation shall consider assigning cause to one or more of the three main cause factor categories (Personnel, Materiel and or Environmental). If the evidence eliminates all other cause factors as causal, then an Undetermined cause factor should be assigned. An Undetermined cause factor should only be assigned as a last resort when all investigative avenues have been exhausted.

ANNEX A – PRE-HFACS PERSONNEL CAUSE FACTORS

NOTE

The Pre HFACS Personnel cause factors used before the introduction of HFACS in January 2004 can be found on the DFS website.

ANNEX B – HFACS CHART



CHAPTER 11 – PREVENTIVE MEASURES AND ANALYSIS

APPLICATION OF TERMINOLOGY

1. Common terminology accepted by the CF 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 CF aviation resources. The analysis and subsequent PM steps are the most important of investigation activities because the successful implementation of PMs is means to achieve the goals of the FS Program 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 PM 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 assigned. 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;
- b. the most common types of occurrences and cause factors (look for trends and their root causes);
- c. the most common PM (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. The FSOMS is the primary tool used to aid this process and is useful for identifying trends.

ANALYSIS AVAILABLE FROM FSOMS

8. The FSOMS 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 B 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, comds and FSOs should 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 SR, 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 Web site under the FSOMS Ops Guidance page at http://airforce.mil.ca/fltsafety/fsoms/docs/HFIX_Checklist.pdf.

REVIEWING PM

1 Cdn Air Div Review

16. On review of the occurrences and hazards reported, 1 Cdn Air Div 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 Cdn Air Div, 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 IMPLEMENTING PM

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.

TRACKING OF PM

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 B.

MAPPING CF DATA TO ICAO DATA

20. For data comparison and exchange of information, the FSOMS is required to be mapped to ICAO data. Annex A details the relationship between the CF occurrence categorization system and the ICAO occurrence categorization system.

21. In order to map FSOMS data to ICAO data, CF FS occurrences are divided into three major occurrence classes. Appendix 1 to this Annex details the specific mapping.

- a. 100 Accident Class. A 100 accident is defined as any occurrence categorized as an “A”, “B” or “C” category occurrence. It involves a CF aircraft, its equipment or its operation having caused someone to be missing (Grey) or have received fatal (Black), very serious (Red) or serious (Yellow) injuries or illness, or where the CF aircraft is either destroyed, missing or left with serious damage which adversely affects the structural strength, performance or flight characteristics of the aircraft and would normally require major repair or replacement of the affected component(s).
- b. 200 Serious Incident Class. A 200 serious incident is defined as any “D” or “E” category occurrence involving a CF aircraft, its equipment or its operation where there was extreme to medium potential for a serious accident or where someone received a minor injury or where the CF aircraft sustained minor damage. A list of likely serious incidents can be found at Appendix 1 of Annex A.
- c. 300 Incident. A 300 incident is defines as any “D” or “E” category occurrence involving a CF aircraft, its equipment or its operation where a low potential for an accident or serious incident existed.

Annex A
Chapter 11
A-GA-135-001/AA-001

ANNEX A – MATRIX MAPPING CF OCCURRENCES TO ICAO DATA

OCCURRENCE CATEGORY	SAFETY OF FLIGHT COMPROMISE	ICAO OCCURRENCE CLASS
A	Yes	100 ACCIDENT
B		
C		
D, E	Extreme to Medium	200 SERIOUS INCIDENT
D, E	Low to Nil	300 INCIDENT

Appendix 1
Annex A
Chapter 11
A-GA-135-001/AA-001

APPENDIX 1 – LIST OF SERIOUS OCCURRENCES

1. The incidents listed are typical examples of incidents that are likely to be serious. The list is not comprehensive and only serves as guidance to the definition of serious incident.

- a. Near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate;
- b. Controlled flight into terrain (CFIT) only marginally avoided (near CFIT);
- c. Aborted take-off on a closed or occupied runway;
- d. Take-off from a closed or occupied runway with marginal separation from obstruction;
- e. Landing or attempted landing on a closed or occupied runway;
- f. Gross failure to achieve predicted performance during take-off or initial climb;
- g. Engine fire or fire and smoke in the passenger cabin or cargo compartment, even though such fires were extinguished with extinguishing agents;
- h. Event requiring the emergency use of oxygen by the flight crew;
- i. Aircraft structural failure or engine disintegration not classified as an accident;
- j. Multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft;
- k. Flight crew incapacitation in flight;
- l. Fuel quantity requiring the declaration of an emergency by the pilot;
- m. Incidents such as runway undershoot or overshoot or running off the side of a runway;
- n. System failure, weather phenomenon, operation outside the approved flight envelope or other occurrences that could have made controlling the aircraft difficult; and
- o. Failure of more than one system in a series of redundant systems mandatory for flight guidance and navigation.

Annex B
Chapter 11
A-GA-135-001/AA-001

ANNEX B – 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 CF, 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 chain of command (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; and
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 FSOMS. 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 to 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 FSOMS.
5. PM Validation Process. The validation process detailed in the flow chart (originated at block PM-1), has four steps:
 - a. assignment of the PM to the proper FS level (UFSO, WFSO, Div FSO, or DFS);
 - b. verification of the PM to determine if PM is acceptable and suggest the Action Organization (AO);
 - c. pre-coordination of the PM between the FS network and the AO; and

d. feedback to the investigator accepting and confirming the validity of each PM.

6. PM Assignment Process. For all PMs with an AO outside the unit, the relevant PMs will be forwarded to the WFSO. Similarly, the WFSO will forward the PMs with AO outside the wing to the Div FS team, who will forward PMs with AO outside the Division's responsibility to DFS. It is expected that before a PM is passed to the next level (up the FS chain), the FS officer will ensure that the PM meets the criteria of an effective PM (Chap 11 para 13).

7. 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 AO should be the Wing and the FSOMS 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 AO should be the unit managing the contract with the applicable contractor (normally the Weapon System Manager).

8. PM Verification and Pre-coordination Process. Once the proper level is reached, the FSO of that organization will confirm that an appropriate AO has been assigned. In most cases, a pre-coordination should be performed with the AO, ensuring a buy-in from the start, and possibly a quicker implementation of the PMs. It must be noted that often, many PMs are implemented prior to the release of the final report. In a situation where the pre-coordination process is not completed on some PMs and the FS report is ready to be sent, the UFSO / WFSO can still release the FS report and select 1 Cdn Air Div / Div FS as the AO. Once the PM has been pre-coordinated with the appropriate AO by the Div staff, the FSOMS AO will be updated accordingly

9. 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 AO assigned.

10. PM Assignment to AO 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). If the validation process was completed adequately, there should not be any PMs that were wrongly assigned; however it is possible that some PMs will be returned to the WFSO if the PM is not supported by the FS Chain (Block PM-11A).

11. 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).

12. 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 meet the original intent. In such a situation, correspondence with the appropriate FS 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 inputted in FSOMS 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.

13. PM Tasking by CoC. Once the PM have been accepted, a formal tasking should be done by the commanders at all levels. This is a necessary step that not only formally tasks the appropriate AOs, but confirms acceptance of the PM by the CoC.

14. 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 FSOMS shall include an appropriate comment, e.g. "RARM Ref #XX includes this PM as mitigating action #YY, with an ex-

pected 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.

15. 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 Div FSO, or DFS). Once a PM is completed, the AO will provide the specific records / documentation to the appropriate FS network. If the responsible FSO concurs, he will close the PM and include the details in FSOMS (Blocks PM-9 and PM-17). Also, the appropriate documentation will be forwarded to the FSO that originated the occurrence for tracking purposes; or
- b. when the PM not to be implemented by the CoC has undergone the review detailed at para 12 above. The appropriate reference(s) showing the CoC refusal of the PM will be included in the FSOMS tracking field before closure of the PM.

16. 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. PMs 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 FSOMS. Similarly, if an independent report / study has identified FS risks, a hazard report shall be generated in FSOMS if one or more PMs have been identified.

17. Occurrence Report / Hazard Report Closure. Once all PMs for a specific Occurrence or Hazard are completed, that specific investigation will be formally closed in FSOMS, by the originating unit.

18. PM Tracking. Although the Commanders at all levels are responsible for the tracking of PMs, the FS staff will provide all necessary tools (regular reports) to facilitate this function, and ensure that no PMs are forgotten. For traceability purposes, the FS Representative will update FSOMS using the following guidelines stipulated in Table 1.

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. 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 (para 11).

NOTE

For the purpose of tracking the PM, the responsible organization, in FSOMS, will change as the UCR/PDR/SOCD is staffed up the chain.

FLOW CHART BLOCK	ACTION TO RECORD	REQUIREMENTS
H-6	Transfer Hazard to CoC for Risk Assessment	Date stamp / Full reference ³
PM-4 & PM-12	PM Transfer to CoC	Date stamp / Full reference
PM-5A & PM-13A	PM Refused or modified	Full reference
PM-6 & PM-14	PM Tasked	Date stamp / Full reference
PM-8 & PM-16	PM Audit (When considered incomplete)	Date stamp / FSO Name / comment field
PM-9 & PM-17	PM Closure	Date stamp / FSO Name/ comment field

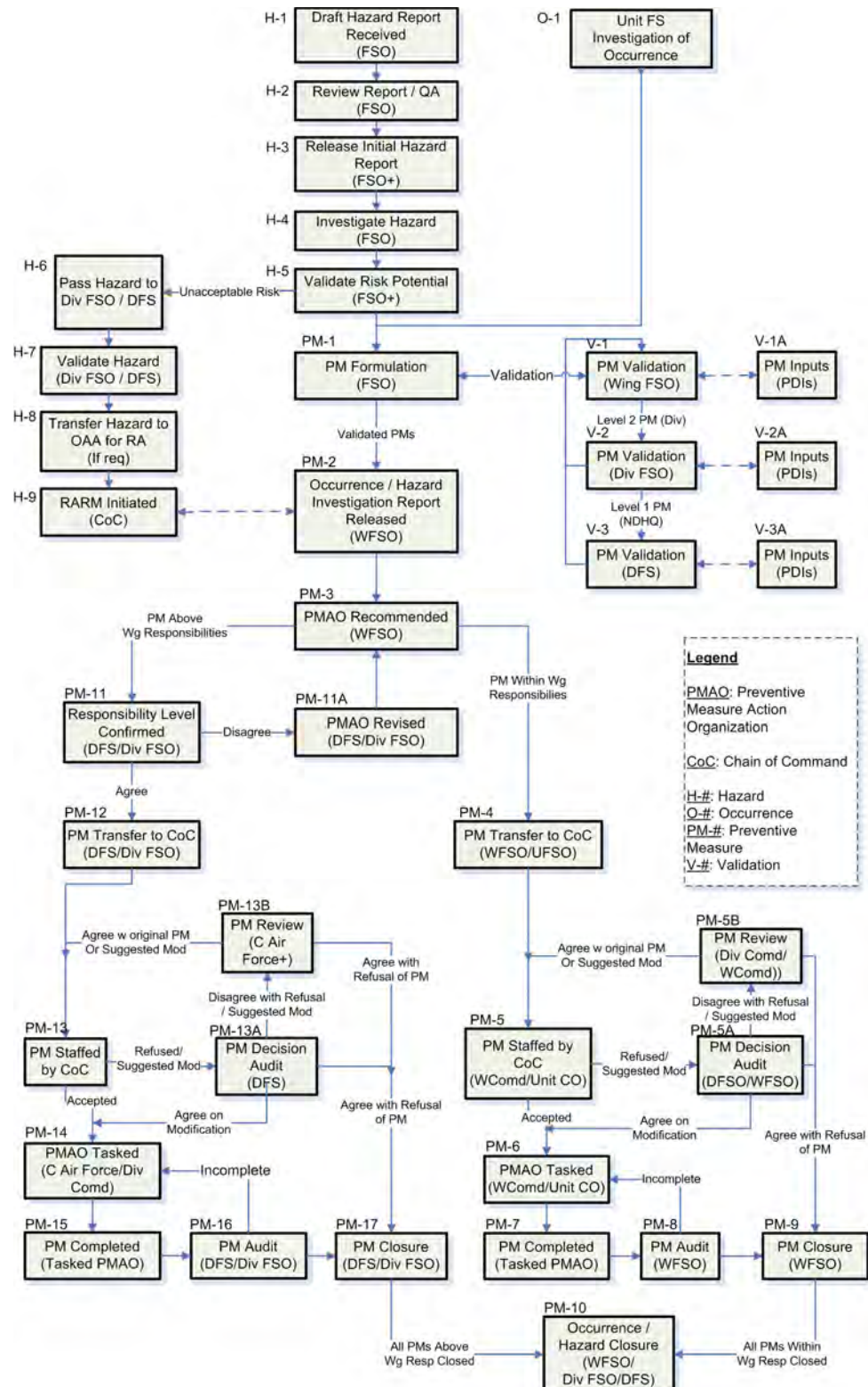
Table A1: Information to be recorded in FSOMS (refer to Appendix 1)

NOTE

Full reference is defined as follows: WFSO to keep a copy of the correspondence (e-mail, letter or message) on file; FSOMS to include reference details with a short description (in free text field).

Appendix 1
Annex B
Chapter 11
A-GA-135-001/AA-001

APPENDIX 1 – PM MANAGEMENT PROCESS DIAGRAM



ABBREVIATIONS

AA: Airworthiness Authority
ACGP: Air Cadet Glider Program
ACFPF: Air Cadet Powered Flight Program
ADL: Aircraft Damage Level
ADM (Mat): Assistant Deputy Minister (Materiel)
AERE: Aerospace Engineer
AETE: Aerospace Engineering Test Establishment
AFSO: Aviation Fluids Services Officer
AGL: Above Ground Level
AIA: Airworthiness Investigative Authority
AIG: Address Indicator Group
AIM: Airworthiness Investigator Manual
AI: Airworthiness Investigator
ALSE: Aviation Life Support Equipment
AOC: 1 Canadian Air Division Air Operations Centre
ATESS: Aerospace and Telecommunications Engineering Support Squadron
ATI: Access to Information
AWO: Air Weapons Officer
AWS: Air Weapons System
AWSTM: Air Weapons Safety Technical Member
BI: Basic Investigator
BOI: Board of Inquiry
Canada COM: Canada Command
CANSOFCOM: Canadian Special Operations Forces Command
C Air Force: Chief of the Air Force Staff
CDLS: Canadian Defence Liaison Staff
CDS: Chief of the Defence Staff
CEFCOM: Canadian Expeditionary Forces Command
CF: Canadian Forces
CFAO: Canadian Forces Administrative Order
CFICC: Canadian Forces Integrated Command Centre
CFMO: Canadian Forces Medical Order
CFQAR: Canadian Forces Quality Assurance Region
CFR: Aircraft Crash, Firefighting and Rescue
CFTO: Canadian Forces Technical Order
CoC: Chain of Command

COMSEC: Communication Security
CPI: Crash Position Indicator
CTAISB: Canadian Transportation Accident Investigation Safety Board
CVR: Cockpit Voice Recorder
CR: Combined (Initial and Supplementary) Flight Safety Investigation Report
DAEPM: Director Aerospace Equipment Program Management
DAOD: Defence Administrative Orders and Directives
D Cdts: Director Cadets
DFS: Director/Directorate of Flight Safety
Div FSO: Division FSO
DQA: Director Quality Assurance
DRDC: Defence Research and Development Canada
ESR: Enhanced Supplementary Flight Safety Investigation Report
FDR: Flight Data Recorder
FLU: French language unit
FOD: Foreign Object Damage
FS: Flight Safety
FSI: Flight Safety Investigation
FSIR: FS Investigation Report
FSO : Flight Safety Officer
FSOMS: FS Occurrence Management System
FSOS (W): Flight Safety Officer Specialist (Weapons)
FSS: FS Specialist
FTI: From the Investigator
FTPO: For Tracking Purpose Only
HALE UAV: High-altitude Long Endurance UAV
HFACS: Human Factor Analysis Classification System
HUD: Head-Up Display
HUMMS: Health Usage Maintenance Monitoring System
IAS: Indicated Airspeed
IAW: In accordance with
ICAO: International Civil Aviation Organization
IFR: Instrument Flight Rule
IIC: Investigator-In-Charge
IR: Initial Flight Safety Investigation Report
JAG: Judge Advocate General
MALE UAV: Medium altitude long endurance UAV
MOU: Memorandum of Understanding

MRP: Mobile Repair Party
MTOW: Minimum takeoff weight
NATO: North Atlantic Treaty Organization
MSDRS: Maintenance Signal Data Recording Set
NDHQ: National Defence Headquarters
NDQAR: National Defence Quality Assurance Region
NOTAM: Notice to Airmen
NRCC: National Research Council of Canada.
OAA: Operational Airworthiness Authority
OLM: Operational Load Monitor
PAO: Public Affair Officer
PCL: Personnel Casualty Level
PDI: Persons with a Direct Interest
PM: Preventive Measure
PMAO: Preventive Measure Action Organization
POL: Petrol, Oil and Lubricants
QA: Quality Assurance
QETE: Quality Engineering Test Establishment
QR&O: Queen's Regulations and Orders
RA: Risk Assessment
RCSU: Regional Cadet Support Unit
Reg FSO: Region FSO (Cadets)
RO: Repetitive Occurrence
RASO: Recovery and Salvage Officer
RCAF: Royal Canadian Air Force
RCA Ops O: Regional Cadets Air Operations Officer
SAMA: Senior Aircraft Maintenance Authority
SFCL: Safety of Flight Compromise Level
SoF: Safety of Flight
SOP: Standard Operating Procedure
SITREP: Situation Report
SR: Supplementary Flight Safety Investigation Report
STANAG: NATO Standardization Agreement
TAA: Technical Airworthiness Authority
TSB: Transportation Safety Board of Canada
TSN: Time since new
TSO: Time since overhaul
UAV: Unmanned Aircraft Vehicle

| UAS: Unmanned Aircraft System
VCDS: Vice Chief of Defence Staff
VFR: Visual Flight Rule