International Civil Aviation Organization
Second Meeting of the Asia Pacific Regional Aviation Safety Team (APRAST/2)
(Bangkok, Thailand, 21 – 24 August 2012)

Agenda Item 2: Review APRAST/1 Conclusions, the work of its subsidiary bodies and related safety initiatives.

2.4 i) Report and Review the status of SEIs and DIPs on runway safety, LOC and CFIT to identify priorities and establish implementation dates

CONTROLLED FLIGHT INTO TERRAIN (CFIT)

(Presented by CFIT Facilitator)

SUMMARY

Controlled flight into terrain (CFIT) - accidents, where a properly functioning aircraft under the control of a fully qualified and certificated crew is flown into terrain with no apparent awareness on the part of crew. This paper provides an update on the initiatives undertaken by the CFIT sub-group related to reducing the risk of a CFIT occurrence.

1. INTRODUCTION

1.1 Accident Data indicates that controlled flight into terrain (CFIT) accounts for just over 20% of all fatal accidents, a disproportionately high percentage given the low proportion of all accidents attributed to this category. While ICAO and other organizations have undertaken a number of initiatives over the past 15 years which have met with some success, the data would suggest that additional efforts should be considered.

2. DISCUSSION

Note: Safety Enhancements (SEs) that follow refer to those that are currently being worked on by the CFIT sub-group. Remaining SEs will be addressed in the APRAST 2 breakout sessions.

2.1 Initiative 1, (SE1, 120) - Ground Round Proximity Warning Systems (GPWS) With Forward Looking Feature (Safety Impact High)

This safety enhancement substantially reduces or eliminates CFIT accidents by improving pilot situational awareness by through the installation and use of GPWS with forward looking feature (also known as TAWS). It is also important that procedures are developed and used to ensure proper flight crew reaction in regard to TAWS aural and visual warnings.

ICAO Amendment(s) 21 and 27 to ICAO Annex 6 Part I; and Amendment 22 to Annex 6 Part II strengthened the requirements for carriage of GPWS and introduced the requirements for aircraft to be equipped with GPWS with forward looking terrain

As of 1 January 2007, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5,700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

APRAST1/CFIT 1 Ground Round Proximity Warning Systems (GPWS) With Forward Looking Feature - **Priority 1**
Champion - CAAS

The purpose of this SE action is to promote compliance with ICAO SARPS regarding the equipage of GPWS-FLF (Forward Looking Feature) and ensure flight crews are trained and competent to effectively manage GPWS events including degraded performance issues and database validity.

Output 1 Review and combine as required COSCAP AB 001- Information to States of Terrain Avoidance Warning Systems (TAWS); AC 001 Guidance for Operators on Training on Use of TAWS; AC 019 Reduced Effectiveness of TAWS/GPWS-FLF Equipment.

Status: The Champion has progressed work on this SE by developing a draft survey form that will be discussed during the Sub-group breakout sessions.

2.2 Initiative 2 (SE2) – Standard Operating Procedures (SAFETY IMPACT HIGH)

All air operators should have standard operating procedures/training which should address all projected normal situations crews/company personnel will encounter. SOPs address: use of checklists, what each person's responsibilities are, use of available equipment, and expected procedures to be used during preflight, taxi, take-off, climb, cruise, descent, approach, missed approach, landing, taxi and parking.

ICAO Annex 6, requires an Operations Manual which must contain Standard Operating Procedures (SOP) for each phase of flight. ICAO Doc. 8168, PANS – OPS Volume 1 also contains additional guidance material on the requirements for SOPs to include checklist and crew briefings as an integral part of SOPs.

APRAST 1/CFIT 2 Standard Operating Procedures - **Priority 1**
Champion - CAD Hong Kong/Metrojet

The purpose of this SE is to promote the development and issuance of an advisory circular (AC) containing information air operators may utilize to develop Standard Operating Procedures and training for pilots in use of the continuous descent final approach (CDFA) technique when flying non-precision approach procedures in all aircraft types.

Output 1 Review and combine as required COSCAP AB 002 Information to States of Terrain Avoidance Warning Systems (TAWS); AC 002A Standard Operating Procedures for Flight Deck Crewmembers (Amendment No.1)

Status: A detailed review of the COSCAP AB and AC has been completed. Suggested revisions to the document will be discussed at the APRAST 2 CFIT Sub-group meeting.

2.3 Initiative 3 (SE3,4,5,6,7,8) – Precision-Like Approach Standard Operating Procedures (Safety Impact High)

Analysis of accident data indicates that the accident rate is five times greater during non-precision approaches than when aircraft are conducting precision approaches. In the interest of safety, air operators should discontinue the use of step-down or "dive-and-drive" non-precision approach procedures as soon as, and wherever possible. Air operators who have yet to do so should, at the earliest possible date, develop procedures and train pilots to fly continuous descent final approaches (CDFA) when flying non-precision approach procedures. All types of aircraft can fly procedures utilizing a constant rate descent, even those with just basic navigation capabilities.

ICAO *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS), Volume I, Part I, Section 4, Chapter 1, promotes the use of Constant Decent Final Approach through utilizing a number of techniques.

> ***APRAST1/CFIT 3*** Precision-Like Approach Standard Operating Procedures – **Priority 1**
> **Champion - CASA**
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> The purpose of this SE is to promote the development and issuance of an advisory circular (AC) containing information air operators may utilize to develop Standard Operating Procedures and training for pilots in use of the continuous descent final approach (CDFA) technique when flying non-precision approach procedures in all aircraft types.
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> **Output 1**: Is an update of ICAO Doc 9613 Volume II, Part C, chapter 6.3.4 required?
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> **Status:** The revised CFIT DIP will be presented to the APRAST 2 CFIT Sub-group meeting for consideration.

2.4 Initiative 4 (SE10) – Flight Data Analysis (Safety Impact High)

A Flight Data Analysis programme (FDA) is a predictive and non-punitive use of information derived from aircraft flight data recorders to improve aviation safety. The use of FDA as an important safety tool has grown as emerging technology expands the capabilities of gathering and analyzing such data. Daily collection and analysis of data provides valuable information to correct undesirable trends, improve safety and ultimately reduce the number of accidents.

From 1 January 2005 Annex 6, Part 1 requires operators of aeroplanes of a maximum certificated take-off mass in excess of 27,000 kg. to establish and maintain a flight data analysis programme as part of its accident prevention and flight safety programme. A flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

> ***APRAST1/CFIT 4*** Flight Data Analysis
> **Priority - Not assessed**
> **Champion - State**
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> The purpose of this SE is to develop and implement a non-punitive FDA program to promote compliance with the Annex 6, Part 1 requirement regarding establishment of non-punitive FDA program.
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> ***Output 1*** States Review FAA AC 120-82; EC 8/2008; COSCAP RAST ABs and AC and issue ACs in-accordance with their modalities.
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> **Status:** Background materials have been collected by Champion and will be discussed further at APRAST 2 CFIT Sub-group breakout sessions.

2.5 Initiative 5 (SE11) – Crew Resource Management Training (Safety Impact Low)

Annex 6 requires air operators to provide training to flight crew on Human Factors principles. The ICAO Human Factors Training Manual, Document 9683, Part 2 Chapter 2, contains information on Crew Resource Management (CRM) Training.

APRAST1/CFIT 5 Crew Resource Management Training
Priority 1
Champion – KOCA

The purpose of this SE is to promote the implementation of Crew Resource Management (CRM) training programs for flight crew members and other personnel essential to flight safety to reduce the risk of a CFIT event.

Output 1 Review COSCAP AC 011 Crew Resource Management Training Programme, revise as necessary and prepare a draft document to be issued by ICAO.

Status: An initial draft has been prepared by the Champion and will be circulated for comment/discussion during the APRAST 2 CFIT Sub-group breakout sessions.

2.6 Safety Enhancement Initiative CFIT 6 (SE12/23) – CFIT/ALAR Training (Safety Impact Moderate)

CFIT accidents could be substantially reduced if all air operators and training centers developed CFIT prevention training and procedures to be added to their approved training curriculums, stressing position awareness and escape maneuvers in the event of a terrain warning indication. Approach and Landing Accidents could also be reduced if flight crews were properly trained on topics related to stabilized approaches. This training should include: crew resource management, go around criteria, approaches with system malfunctions, non-normal conditions, and emphasis on basic airmanship, approach briefings, approach and missed approach procedures.

APRAST1/CFIT 6 CFIT/ALAR Training
Priority 1
Champion - CAAS

The purpose of this SE is to promote the training of flight crews in Approach and Landing Accident and Controlled Flight Into Terrain Prevention.

The objectives of Approach and Landing Accident and Controlled Flight Into Terrain Prevention Training Program are to provide flight crews with the ability to:

- Recognize the factors that may lead to CFIT accidents and incidents.
- Know the prevention strategies that will ensure a safe flight.
- Improve situational awareness in order to avoid CFIT.
- Learn an escape manoeuvre and techniques designed to enhance the possibility of survival.

Output 1 Review COSCAP AB 010 Information to States on Approach and Landing Accident Reduction (ALAR) and Controlled Flight Into Terrain (CFIT) Prevention Training revise as necessary and prepare a draft document to be issued by ICAO.

Status: DIP has been revised and will be discussed in detail during the APRAST CFIT Sub-group break out sessions.

2.7 Safety Enhancement Initiative CFIT 7 (SE-14/15/16) ALAR - Policies for ALAR (Safety Impact Moderate)

ICAO SARPs in *Annex 6, Operations of Aircraft, Part I,* require that an operator establish a flight safety documents system for the use and guidance of operational personnel as part of its accident prevention and flight safety programme. Previously, Annex 6 required air operators to establish an Accident Prevention programme which was effectively implemented through the establishment of a Flight Safety Department under the direction of a Director of Flight Safety.

APRAST1/CFIT 7 Policies for ALAR
Priority 3
Champion – Hong Kong Civil Aviation Directorate

A flight safety documents system should be organized according to criteria which ensures easy access to information required for flight and ground operations contained in the various operational documents comprising the system and which facilitate management of the distribution and revision of operational documents.

Output 1 Review COSCAP applicable ACs/ABs and revise/combine as necessary and prepare in draft document(s) to be issued by ICAO.

Status: An initial draft is still being developed by the Champion.

2.8 Safety Enhancement Initiative CFIT 8 (SE-9) Minimum Safe Altitude Warning (MSAW) (Safety Impact Moderate)

Recognizing that installation of radars and associated MSAW capability provides the necessary levels of terrain avoidance protection to aircraft operations, States are to consider this aspect when determining the justification for installation of new radar equipment. Justification would be strengthened for installation of radar where the CFIT risk is high. ICAO Recommended Practice is that an MSAW feature should be included with radar and ADB equipment. ICAO *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM) (Doc 4444) provides some guidance on MSAW procedures. Where the MSAW equipment is being utilized it is important that all controllers are aware of the need to issue 'Safety Alert / Warning' when circumstances so warrant and that procedures have been clearly established in this regard.

APRAST1/CFIT 8 MSAW
Priority 1
Champion – To be determined

The purpose of this SE is to promote that where MSAW equipment is being utilized it is important that all controllers are aware of the need to issue 'Safety Alert / Warning' when circumstances so warrant and that procedures have been clearly established in this regard.

Output 1 Review COSCAP AC 013 Issuance of Safety Alert/Warning revise as necessary and prepare a draft document to be issued by ICAO

Status: An initial draft has not yet been developed.

2.9 Safety Enhancement Initiative CFIT 9 Review of existing and emerging technologies for enhanced flight visibility.

FAA AC 90-106 advisory circular provides information to an applicant pursuing airworthiness certification and operational approval of enhanced flight vision systems.
A pilot may use an approved Enhanced Vision Flight Systems (EFVS) to descend below Decision Altitude (DA) or minimum descent altitude (MDA) to 100 feet above the touchdown zone (TDZ) elevation (TDZE) from a straight-in instrument approach procedure (IAP) other than Category II (CAT II) or Category III (CAT III). These operations are permitted for approaches using straight-in IAPs, but not for circle-to-land operations.

APRAST1/CFIT 9 Enhanced Flight Visibility Systems
Priority - To be determined
Champion – To be determined

Output 1 Review FAA AC 90-106 Enhanced Vision Flight Systems and other available materials and develop an Information Circular for APAC States that raises the awareness of regulators and air operators about existing and emerging technologies such as EVFS and the associated safety benefits of the equipment and the need amend existing regulatory requirements to permit EVFS type operations.

Status: Work has not yet begun on this SEI.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Consider the status of the SEs presented in the WP during the Sub-group breakout sessions.

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