International Civil Aviation Organization
Asia and Pacific Office

Thirteenth Meeting of the Regional Aviation Safety Group – Asia and Pacific Regions (RASG-APAC/13)

Hong Kong, China, 18-19 December 2023

Agenda Item 3: **Update from ICAO HQ, APRAST and AIG outputs for RASG-APAC consideration and approval**

SAFETY ENHANCEMENT INITIATIVE (SEI) OUTPUT REVISION FOR RASG-APAC CONSIDERATION AND APPROVAL

(Presented by APRAST – SEI WG)

SUMMARY

Controlled Flight into Terrain (CFIT) is a high-risk category of occurrence identified in the Global Aviation Safety Plan and the Asia Pacific Regional Aviation Safety Plan. In an effort to mitigate the risk of CFIT in commercial aviation, RASG-APAC/5 initiated guidance for the establishment of a flight data analysis program.

The SEI outputs are continuously reviewed for currency and validity by APRAST. The APRAST has completed its review of CFIT/4, *Model Advisory Circular for the Establishment of a Flight Data Analysis Program* and proposes the attached revision of the SEI output be approved by RASG-APAC.

1. INTRODUCTION

1.1 Controlled Flight into Terrain (CFIT) is a high-risk category of occurrence identified in the Global Aviation Safety Plan and the Asia Pacific Regional Aviation Safety Plan. In an effort to mitigate the risk of CFIT in commercial aviation, RASG-APAC/5 initiated guidance for the establishment of a flight data analysis program (FDAP). An FDAP can be described as a proactive programme for the routine collection and analysis of flight data to develop objective information for advancing safety.

1.2 Following the development of an SEI, the implementation of an SEI output is supported by APRAST members and tracked for effectiveness. It is important the completed SEI outputs are current for realistic implementation by the members to reduce the identified risk. With this regard, the SEI WG has a process to conduct a periodic currency and validity review on an SEI output between every APRAST meeting. SEI outputs are prioritized by batch based on the date it received RASG-APAC approval.

2. DISCUSSION

2.1 ICAO Annex 6 Part 1 Chapter 3 requires operators of an aeroplane of a maximum certificated take-off mass in excess of 27,000kg shall establish and maintain a FDAP as part of its safety management system. It also recommends that an operator of an aeroplane of a certificated take-off mass in excess of 20,000kg should establish and maintain a FDAP as part of its safety management system. A similar recommendation for helicopter operators of a certified take-off mass in excess of 7,000kg, or having a passenger seating configuration of more than nine and fitted with a flight data recorder, is found in ICAO Annex 6 part III Chapter 1.

2.2 As originally approved by RASG-APAC/5 in October 2015, the purpose of the CFIT/4 SEI output, *Model Advisory Circular for the Establishment of a Flight Data Analysis Program*, is for States/Administrations and Industry to develop and implement a non-punitive FDAP to promote compliance with the Annex 6 requirements.

2.3 The SEI WG has conducted its periodic review for the output of the SEI for CFIT/4. Based on the feedback from the SEI WG, the output is still valid for implementation, however, some recommendations were made to enhance its currency. India volunteered as the champion for revising the SEI output during APRAST/17. The draft revised version of the SEI output was agreed upon by the SEI WG at APRAST/19. Per APRAST Decision 19/7, the revision was subsequently circulated among all APRAST members for their feedback via the ICAO Regional Office State Letter (T 6/8.5 – AP050/23 (FS)) dated 22 March 2023. At APRAST/20, the SEI WG determined all feedback is incorporated and the revised output is ready to be submitted to the RASG-APAC. The revised CFIT/4 SEI output is attached in this working paper for RASG-APAC consideration and approval.

2.4 With respect to the recommendations received from the APRAST members, the SEI CFIT/4 output revision encompasses the following changes:

- Integrated SMS terminology to emphasize the critical connection between an SMS and the non-punitive programs that inform an SMS.
- Deleted paragraphs in order to clarify the necessary caution in the use of FDAP data for safety investigations.
- Added language to emphasize defining the appropriate safeguards when linking identifiable data, such as a safety report, for the purposes of safety analysis.
- Included Annex 6 FDAP references to helicopter operators.
- Changed “just culture” to “positive safety culture” and provided specific examples of a positive safety culture of an operator.
- Edits to the members of the FDAP team.
- Added reference documents such as Annex 19 Appendix 3, *Principles for the protection of safety data, safety information and related sources*.
- Minor edits and removal of duplicated sentences.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Note the process and changes to the revised safety output;

b) Approve the proposed CFIT/4 SEI output revision as attached in this working paper; and

c) Inform all RASG-APAC members of the SEI revision for their implementation and update the safety tools section on the ICAO APAC website.

— END —

International Civil Aviation Organization (ICAO)

Regional Aviation Safety Group
(Asia & Pacific Regions)

Asia Pacific Regional Aviation Safety Team

GUIDANCE ON THE ESTABLISHMENT OF A FLIGHT DATA

ANALYSIS PROGRAM (FDAP)

developed by

Singapore Airlines

(In collaboration with government and industry members of APRAST)

Executive Summary

The purpose of this SEI is to develop and implement a non-punitive FDA program to promote compliance with the Annex 6 requirements regarding establishment of non-punitive FDA program.

This model advisory circular (AC) provides information and guidance to Air Operators for the establishment of a Flight Data Analysis Program (FDAP).

Version 2 dated DD MMM 2022

Preamble

Background on Regional Aviation Safety Group – Asia & Pacific (RASG – APAC)

The Regional Aviation Safety Group Asia-Pacific (RASG-APAC) was established in 2011 by the Council of ICAO. The RASG-APAC is tasked with improving aviation safety in the Asia & Pacific regions by developing and implementing a work programme, in line with the ICAO Global Aviation Safety Plan, aimed at identifying and implementing safety initiatives to address known safety hazards and deficiencies in the region.

The Asia Pacific Regional Aviation Safety Team (APRAST), a sub-group of the RASG-APAC, assists the RASG-APAC in its work by recommending safety interventions which will reduce aviation safety risks.

The full commitment and active participation of APAC States/Administrations and the industry partners is fundamental to the success of the RASG-APAC in reducing aviation safety risks and accident rates in the Asia and Pacific regions.

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Feedback/Enquiries

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CFIT-4 SAFETY ENHANCEMENT INITIATIVE

MODEL ADVISORY CIRCULAR FOR THE ESTABLISHMENT OF A

FLIGHT DATA ANALYSIS PROGRAM (FDAP)

Introduction

1 The purpose of this SEI is to develop and implement a non-punitive FDA program to promote compliance with the Annex 6 requirements regarding establishment of non-punitive FDA program.

Background of Safety Enhancement Initiative (SEI)

2 ICAO Annex 6 Part 1 Chapter 3 requires operator of an aeroplane of a maximum certificated take-off mass in excess of 27 000kg shall establish and maintain a flight data analysis programme as part of its safety management system. It also recommends that an operator of an aeroplane of a certificated take-off mass in excess of 20 000 kg should establish and maintain a flight data analysis programme as part of its safety management system.

3 ICAO Annex 6 Part III Chapter 1 recommends the operator of a helicopter of a certified take-off mass in excess of 7000 kg, or having a passenger seating configuration of more than 9, and fitted with a flight data recorder should establish and maintain a flight data analysis programme as part of its safety management system.

4 Flight Data Analysis Program (FDAP) is a continuous pro-active safety program that utilizes Quick Access Recorder (QAR) data to collate and analyse digital flight data in routine line operations. The program is also known as the Flight Data Monitoring (FDM) or Flight Operations Quality Assurance (FOQA). It is mainly used to identify adverse safety trends from Flight Operations and enable corrective actions can be introduced before unsafe trend leads to accidents. It provides a tool for the systematic, proactive identification of hazards. FDA is a complement to hazard and incident reporting, line operations safety audit (LOSA) and Evidence-based training. It provides a tool for the systematic, proactive identification of hazards. FDA is a complement to hazard and incident reporting, line operations safety audit (LOSA) and Evidence-based training.

5 An FDAP may be described as a proactive programme for the routine collection and analysis of flight data to develop objective information for advancing safety. Data gathered can be analysed to improve flight crew awareness, training effectiveness, operational procedures, maintenance and engineering, and air traffic control (ATC) procedures.

6 In Incident Investigation, the FDAP provides the Quantitative description of the event supplementing the Contextual crew report and provides valuable information for investigation and follow-up of other technical reports.

7 Additionally, flight profile and engine operations parameters can also be collated through FDAP for the operator’s maintenance program and as part of the continuing airworthiness program to monitor, analyze and improve operational efficiency as part of continuing airworthiness. This represents a separate part the FDAP program which is distinct from flight parameters exceedence detection.

Applicability to States/ Industry

8 This Model Advisory Circular (AC) provides information and guidance to Air Operators for the establishment of a Flight Data Analysis Program (FDAP). All air operators should review these guiding principles for the implementation and management of an effective Flight Data Analysis Program.

SEI Phases/ Contents

9 Broadly, the phases for this SEI project are simplified below:

a. Output 1
Goal: Develop generic principles on the management of collection of information to prevent use of the data collected under FDAP from inappropriate use against the airlines or their employees.

b. Output 2
Goal: Analyze all guidance materials currently available and develop an Advisory Circular outlining the standards and guiding principles for the establishment and implementation of FDAP.

c. Output 3
Goal: States to issue Model Advisory Circular and monitor status of implementation by air operators. States to confirm air operators have developed and implemented an effective FDA program.

Action/ Comments by RASG

10 The RASG-APAC/5 has approved the first version of this CFIT-4 SEI Model AC on establishment of a Flight Data Analysis Program (FDAP). This SEI output will be monitored for implementation and effectiveness.

ADVISORY CIRCULARS FOR AIR OPERATORS

SUBJECT: GUIDANCE ON THE ESTABLISHMENT OF A FLIGHT DATA ANALYSIS PROGRAM (FDAP)

DATE: DD-MM-YEAR

1. PURPOSE

1.1 This advisory circular provides information and guidance to Air Operators for the establishment of a Flight Data Analysis Program (FDAP).

2. APPLICABLE REGULATIONS

2.1 *(Insert State Regulations)*

3. BACKGROUND

3.1 ICAO Annex 6 Part 1 Chapter 3 requires operator of an aeroplane of a maximum certificated take-off mass in excess of 27 000kg shall establish and maintain a flight data analysis programme as part of its safety management system.

3.2 It also recommends that an operator of an aeroplane of a certificated take-off mass in excess of 20 000 kg should establish and maintain a flight data analysis programme as part of its safety management system.

3.3 ICAO Annex 6 Part III Chapter 1 recommends the operator of a helicopter of a certified take-off mass in excess of 7000 kg, or having a passenger seating configuration of more than 9, and fitted with a flight data recorder should establish and maintain a flight data analysis programme as part of its safety management system.

3.4 FDAP shall contain adequate safeguard to protect the source(s) of data in accordance with Appendix 3 to Annex 19.

3.5 Flight Data Analysis Program (FDAP) is a continuous pro-active safety program that utilizes Quick Access Recorder (QAR) data to collate and analyse digital flight data in routine line operations. The program is also known as the Flight Data Monitoring (FDM) or Flight Operations Quality Assurance (FOQA). It is mainly used to identify adverse safety trends from Flight Operations and enable corrective actions can be introduced before unsafe trend leads to accidents. It provides a tool for the systematic, proactive identification of hazards. FDA is a complement to hazard and incident reporting, line operations safety audit (LOSA) and Evidence-based training.

3.6 The FDAP places emphasis on data de-identification as a mean to support the positive safety culture. Exceedance events provides learning lessons and trends are to be generated without the threat of censure to the event actors.

3.7 An FDAP may be described as a proactive programme for the routine collection and analysis of flight data to develop objective information for advancing safety. Data gathered can be analysed to improve flight crew awareness, training effectiveness, operational procedures, maintenance and engineering, and air traffic control (ATC) procedures.

3.8 In Incident Investigation, the FDAP provides the Quantitative description of the event supplementing the Contextual crew report and provides valuable information for investigation and follow-up of other technical reports.

3.9 Additionally, flight profile and engine operations parameters can also be collated through FDAP for the operator's maintenance program and as part of the continuing airworthiness program to monitor, analyze and improve operational efficiency as part of continuing airworthiness. This represent a separate part the FDAP program which is distinct from flight parameters exceedence detection.

4. SCOPE

4.1 The scope of this AC is to provide guiding principles to Air Operators performing commercial air transport operations with aeroplanes and helicopters for implementation and management of an effective Flight Data Analysis Program.

5. OBJECTIVES OF A FLIGHT DATA ANALYSIS PROGRAM

5.1 Identification of Undesirable and Unsafe Trends through Exceedence Detection and Routine Measurements

5.1.1 FDAP enables analysis of flight data to identify areas of operational risk through a pro-active and routine collation of a pre-determined core set of flight parameter exceedances. These de-identified non-standard flight operations, deviation from prescribed operating procedures and unsafe circumstances can be detected and quantified into undesirable and unsafe trends for remedial action(s) to be taken.

5.1.2 De-identified exceedence detection data gathered and lessons learnt are shared with the operator's flight crew for risk awareness.

5.1.3 The FDAP also enables the continued monitoring of the effectiveness of remedial actions introduced.

5.2 Incident Investigation

5.2.1 The FDAP is not specifically designed for Incident Investigation. However, the FDAP provides quick and valuable quantifiable recorded data for safety investigation of mandatory reportable incidents. FDAP captured flight parameters, performance and system status assist in concluding the cause and effect of the event.

5.3 Continuing Airworthiness

5.3.1 Routine and specific event data from the FDAP can be utilized as an integral part of an operator's continuing airworthiness function as required under ICAO Annex 8. The data are analyzed to ensure that the operator's aircraft are in a condition for safe and efficient operation. Effective use of the FDAP data can potentially provide significant savings in operating costs and dispatch reliability.

5.3.2 FDAP can also be used by the operator as an engine-monitoring program to analyze engine performance and its efficiency. Other use of the data includes airframe drag measurements, avionics and other system performance monitoring, flight control performance, taxi fuel monitoring, brake and reverse thrust usage.

5.3.3 Routine or specific event data acquired from FDAP for continuing airworthiness forms part of the operator's maintenance and efficiency program and are separate from the flight parameters exceedence detection and safety trend data collection. Therefore, the extent and dimension of data collection in this category remains solely at the discretion of the operator provided the non-punitive and confidentiality aspect of the FDAP is maintained.

5.4 **Integrated Safety Analysis**

5.4.1 Findings gathered from the FDAP should be considered as safety data and safety information sources in support of the operator's SMS in order to obtain a more complete understanding of safety issues.

5.4.2 Automatic data capture systems and safety reporting systems work complementarily in terms of safety data and safety information collection and processing to support safety management.

5.4.3 Operator should define adequate procedures and provide protections to safeguard the confidentiality of FDA data when linking to identifiable data, like a safety report.

6. IMPLEMENTATION

6.1 **Reference Documents**

To assist with the implementation of the Flight Data Analysis Program, operators should make reference to:

(i) ICAO Annex 6 Operation of Aircraft- Part I International Commercial Air Transport-Aeroplanes
(ii) ICAO Annex 6 Operation of Aircraft- Part III International Operations-Helicopters
(iii) ICAO Doc 10000 *Flight Data Analysis Programme Manual (FDAPM)*
(iv) ICAO Doc 9995 Manual of Evidence-Based Training
(v) ICAO Annex 19 Appendix 3 *Principles for the protection of safety data, safety information and related sources*

6.2 **Pilot Support**

6.2.1 Pilot support and cooperation is essential for a successful implementation of the FDAP. The narrative provided by the pilots on exceedence detection provides an important part in the investigation and analysis loop. Raw data itself collated from the FDAP will not provide meaningful understanding of hazards and the associated risk.

6.2.2 De-identification of crew involved in exceedence events from management contributes to the development of trust for the FDAP. De-identification of gross exceedence data also forms the tool for the non-punitive aspect of the FDAP.

6.2.3 Formal agreement/ protocol between the management and pilots on the procedures and data protection for gross exceedence events should be reached prior to FDAP implementation. It should be stressed that such agreement only encompass gross exceedence data management and must not include data required by the operator for reportable incident investigation and continuing airworthiness aspect of the FDAP.

6.3 **FDAP Team**

6.3.1 Administration of the FDAP should involve all stakeholders and the formation of a team which can vary in size from one person for a small fleet, to a dedicated section for large fleets. However, it is recommended that the FDAP be managed by a dedicated staff with a high degree of specialization and logistical support.

6.3.2 Members of the FDAP team should include the following:

(i) Team leader
(ii) Flight operations interpreter
(iii) Technical interpreter
(iv) Flight crew contact person
(v) Engineering technical support
(vi) Air safety coordinator
(vii) Replay operative and administrator

6.3.3 All FDAP team members need appropriate training or experience for their respective area of data analysis and should be subject to a confidentiality agreement.

6.4 Positive Safety Culture

6.4.1 FDAP provides learning lessons, facilitates generation of trends and review of organizational processes and procedures for their safety impact. A consistent and competent programme management characterizes not only successful FDAPs but also positive safety culture, in support of the operator's SMS.

6.4.2 Indications of a positive safety culture of an operator include:

(i) top management's demonstrated commitment to promoting a positive safety culture;

(ii) the cooperation and accountability of all organizational levels and relevant personnel representatives, meaning that anyone believing to have identified a hazard should feel able to report and expect follow-up action to be considered to address related safety risks. From the line pilot to the fleet manager all have responsibility to act;

(iii) a written policy for the protection of safety data, safety information and related sources that covers FDA and makes clear that the main objective of an FDAP should be to maintain and improve safety, and not for disciplinary, civil, administrative and criminal proceedings against employees, operational personnel or organizations;

(iv) an identified safety manager whose role and functions are defined following the recommendations of the Safety Management Manual (SMM) (Doc 9859);

(v) dedicated staff under the authority of the safety manager and involvement of persons with appropriate expertise when identifying hazards and assessing the associated safety risks. For example, flight crews experienced on the aircraft type being analysed are required for the accurate diagnosis of operational hazards emerging from FDA analyses;

(vi) a focus on monitoring fleet trends aggregated from numerous operations. The identification of systemic issues adds more value for pro-active safety management;

(vii) a well-structured de-identification system to protect the confidentiality of the data; and

(viii) an efficient communication system, to permit timely safety action, for disseminating information on the prevention of consequences of hazards identified and subsequent safety risk assessments internally and to other organizations