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GUIDANCE MATERIAL ON DEVELOPMENT OF FLIGHT DATA ANALYSIS PROGRAMMES (FDAP)

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The first revision of the guidelines was developed by RASG-EUR, as part of IE-REST/IE-FDG/01 deliverables related to the enhancement of air operators' Flight data analysis (FDA) programmes, based on the work performed by the IE-REST Flight Data Analysis and Air Operator Safety Management System Group (IE-FDG) in collaboration with the ICAO EUR/NET Regional Office and the European Regional Aviation Safety Group (RASG-EUR).

Air Operator from Kazakhstan (Air Astana) agreed to champion the effort and developed its Flight Data Analysis Programme (FDAP) as a sample that can be utilized by other Air Operators in the region. This FDAP was approved by Civil Aviation Authority of Kazakhstan and was reviewed by expert of RASG-EUR.

The second edition of the safety advisory was prepared by the EASPG Regional Expert Safety Group (RESG) and further approved by EASPG via correspondence. It is based on the text of the materials developed by IFALPA and the model advisory circular developed by ICAO RASG APAC. The current edition is available in English language only.

Disclaimer

The purpose of this document is to facilitate the development and implementation of a non-punitive FDAP to promote compliance with the Annex 6 requirements.

This document has been compiled by members of aviation industry to enhance implementation of relevant ICAO provisions. It is not intended to supersede or replace existing materials produced by the Civil Aviation Authorities (CAA) or in ICAO SARPs. The distribution or publication of this document does not prejudice the CAA's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

1 Background

1.1 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. 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.

1.2 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.

1.3 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.

1.4 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.

1.5 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.

1.6 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, analyse and improve operational efficiency as part of continuing airworthiness. This represents a separate part the FDAP program which is distinct from flight parameters exceedance detection.

2 Applicability to States/Industry

2.1 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.

3 Recommended Action

3.1 EASPG encourages RASG-EUR encourages the States and aviation stakeholders:

a. To 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. To analyze all guidance materials currently available and develop an Advisory Circular outlining the standards and guiding principles for the establishment and implementation of FDAP using attached model.

c. States to issue Model Advisory Circular, monitor status of implementation and confirm that air operators have developed and implemented an effective FDA program.

MODEL 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 that the 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 is 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, analyse and improve operational efficiency as part of continuing airworthiness. This represent a separate part the FDAP program which is distinct from flight parameters exceedance 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 Exceedance Detection and Routine Measurements

5.1.1 Analysis of flight data gathered through the FDAP shall be undertaken with the aim of identifying areas of operational risk through a pro-active and routine collation of a pre-determined core set of flight parameter exceedances. Unsafe circumstances and deviation from Standard Operating Procedures (SOPs) can be detected from de-identified data and quantified into undesirable and unsafe trends for remedial action(s) to be taken.

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

5.1.3 The FDAP shall also be used for 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. FDAP-captured flight parameters, performance and system status assist in identifying the contributing factors and consequences 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 analysed to ensure that the operator's aircraft are in a condition for safe and efficient operation.

5.3.2 FDAP can also be used by the operator as an engine-monitoring program to analyse 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 exceedance 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 quality and confidentiality of FDAP 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 exceedance 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 exceedance events contributes to the development of trust for the FDAP. De-identification of exceedance 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 exceedance events shall be reached prior to FDAP implementation. It should be stressed that such agreement only encompass exceedance data management and shall not include data required by the operator for reportable incident investigation and continuing airworthiness aspect of the FDAP. See IFALPA template for sample FDAP agreement: https://www.ifalpa.org/media/3913/23aapbl01-template-agreement-for-fdap.pdf

6.3 FDAP Team

6.3.1 Administration of the FDAP shall 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 As a minimum, members of the FDAP team shall include a team leader, a data analyst and a flight crew representative.

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

6.4 Positive Safety Culture

6.4.1 An FDAP supports a Positive Safety Culture, provides lessons learned and facilitates the identification of trends and the review of organizational processes and procedures for the impact they have on safety. For a description of a Positive Safety Culture, see https://www.ifalpa.org/media/3705/21pos12-positive-safety-culture.pdf

6.4.2 A positive safety culture environment would include as a minimum:

(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.

(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 shall

be to maintain and improve safety, and not be used 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