1 FLIGHT DATA ANALYSIS PROGRAM OVERVIEW

1.1 INTRODUCTION

Flight Data Analysis Program (FDAP) provides a systematic tool for proactive identification of hazards in aircraft operations before they may result in an accident, serious incidents, and incidents. It complements hazards identification and mandatory safety reporting system.

FDAP is a non-punitive program for routine collection and analysis of flight data to develop objective and predictive information for advancing safety, e.g. through improvements in flight crew performance, training effectiveness and operational and engineering procedures.

The Safety Office of Riyadh Air will ensure effective functioning of the program in coordination with the operations, training, and other concerned Divisions.

Flight Data Analysis Program involves processing QAR/DFDR data through GE Aerospace Safety Insight software and running through filters for aircraft type. This program is based on collection and analysis of the QAR/DFDR and CVR data, which enables the Airlines to improve:

1. Safety of Aircraft Operations.
2. Flight Crew Performance.
3. Operations Training Program and procedures.
4. Adherence to Air Traffic Control (ATC) procedures.
5. Aircraft Maintenance.
6. Reduction in incidents and consequent reduction in cost.
7. Additional data available for timely troubleshooting.
8. Fewer unscheduled component changes.
9. Better preventive maintenance.
10. Reduced requirements for spare part inventories.

1.1.1 Flight Data Analysis Program

The FDA Program enhances the cooperation between Safety Department and other operational departments including the Flight Operations and Engineering, thus promoting mutual trust towards the improvement of safety.

Those involved in this Program have to explore new or other possibilities, keeping in mind that the FDA Program is a safety program and it is proactive and non-punitive. This FDA Program allows Riyadh Air Safety Department to validate the adherence to the standard operating procedures with the actual daily flights flown. The FDA program allows the safety departments to:

1. Identify areas of operational risk and quantify current safety margins.

   This system helps to identify the deviations from the company procedures, the precursor risks in operations and in measuring current safety margins for effectiveness. For this program an operational baseline has been established and fed into the GE software, from which we detect and measure any deviations and is enclosed with this document.

2. Identify and quantify operational risks by highlighting when non-standard, unusual, or unsafe circumstances occur.

   The system enables us to highlight operational risks based on the deviations from SOPs, unconventional and unsafe conditions detected during the flight data analysis.

3. Use the FDAP information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.

   The information generated from the system provides an oversight of our overall flight operations. The system also determines if an individual or fleet risk is within an acceptable level and is able to identify whether a trend towards unacceptable risk is present. The trend analysis of the FDAP events identifies the significant risk areas.

4. Put in place appropriate procedures for remedial action once an unacceptable risk, either present or predicted by trending, has been identified.

   Through this Program, a set of remedial actions that would be appropriate to an unacceptable risk, which is either present or predicted through trend analysis. Keeping in mind, the risk will not simply be transferred elsewhere in the system.

5. Confirm the effectiveness of any remedial action by continued monitoring.

   The effectiveness of the remedial actions taken are closely monitored to ensure that the actions taken were appropriate, that it has reduced the risk at same time the hazard was not transferred.

6. The Program also demonstrates a feedback loop. As part of the SMS process, this loop allows the timely implementation of corrective actions on the Hazards identified and where safety may have been compromised by significant deviations from the standard operating procedures.

1.2 FDM PROGRAM STAKEHOLDERS

1. **Riyadh Air:** Airline is the primary stakeholder for the FDA Program and uses data monitoring to enhance safety and improve operational efficiency and monitor compliance.
2. **Post Holder Safety:** Uses FDAP data to identify safety risks, trends, and potential areas for improvement.
3. **Flight Operations:** Uses the FDAP data to access the overall performance of the aircraft and its systems. It can use data to enhance operational performance, training program and operational procedures.
4. **Crew Members:** Crew members play a crucial role in ensuring safe operations of aircraft and use the FDA Program to improve their skills and decision making.
5. **Maintenance and Engineering Department**: Uses the FDAP data to identify trends and issues that may require maintenance actions.
6. **Regulators:** Aviation regulators use the FDAP program to assess the compliance with laid down regulations.
7. **Aircraft Manufacturer:** Uses FDAP data to monitor the performance of aircraft and to identify any issue that may support maintenance of aircraft.
8. **Insurance Company:** Insurance companies may use FDAP data to assess an airline's safety record and determine insurance premiums.

1.3 OBJECTIVES

The objective of the Flight Data Analysis Program (FDAP) is accident prevention by observing and analyzing operational trends in Riyadh Air flight operations, to recommend accident prevention measures. FDAP program aims at continuous improvement of the overall safety performance, and it is integrated in the safety assurance component of Riyadh Air.

As a part of SMS's safety assurance processes, Riyadh Air has identified Safety Performance Indicators or parameters chosen for measuring and monitoring the Operations Safety Performance including "operational events.".

The Main Objectives for FDAP Program are:

1. Monitoring of the flight data to determine the exceedances in flight parameters from the stipulated limit and analysis of the detected exceedances.
2. Identify areas of operational risk and quantify current safety margins.
3. Identify trends.
4. Provide actual rather than presumed performance measurement for risk management purposes.
5. Identify and quantify changing operational risks by highlighting when non-standard, unusual, or unsafe circumstances occur.
6. To use the FDAP information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the risks and to determine which may become unacceptable if the discovered trend continues.
7. To put in place appropriate risk mitigation techniques to provide remedial action once an unacceptable risk, either present or predicted by trending, has been identified.
8. Confirm the effectiveness of any remedial action by continued Analysis.
9. Analysis of the systemic aspects of an incident by comparing the flight data of the related flight with the fleet profile data, thereby facilitating the actual root cause.
10. Engine monitoring programs may utilize the data for reliable trend analysis as manually coded engine data are limited in terms of accuracy, timeliness, and reliability. It is also possible to monitor other aspects of the airframe and other systems.

1.4 FDAP AND THE SMS

Safety management system is a data driven system which identifies any potential risk within the system of the organization. Flight Data Analysis Program data provides valuable data to the SMS system within the organization about actual safety related events and trends.

Outcomes from the flight data monitoring system are fed within the Riyadh Air SMS database and form the primary basis for the Safety Performance Indicators of the Operations of aircraft.

This Program complements our positive safety culture. Everyone is willing to raise potential risks within the organization in such a way that remedial actions are taken in a non-punitive way, however if anyone involves in cases of possible gross negligence will receive fair treatment and proportionate remedial action to prevent a reoccurrence. This is as per Riyadh Air just culture policy. This policy is an important part of Riyadh Air safety culture.

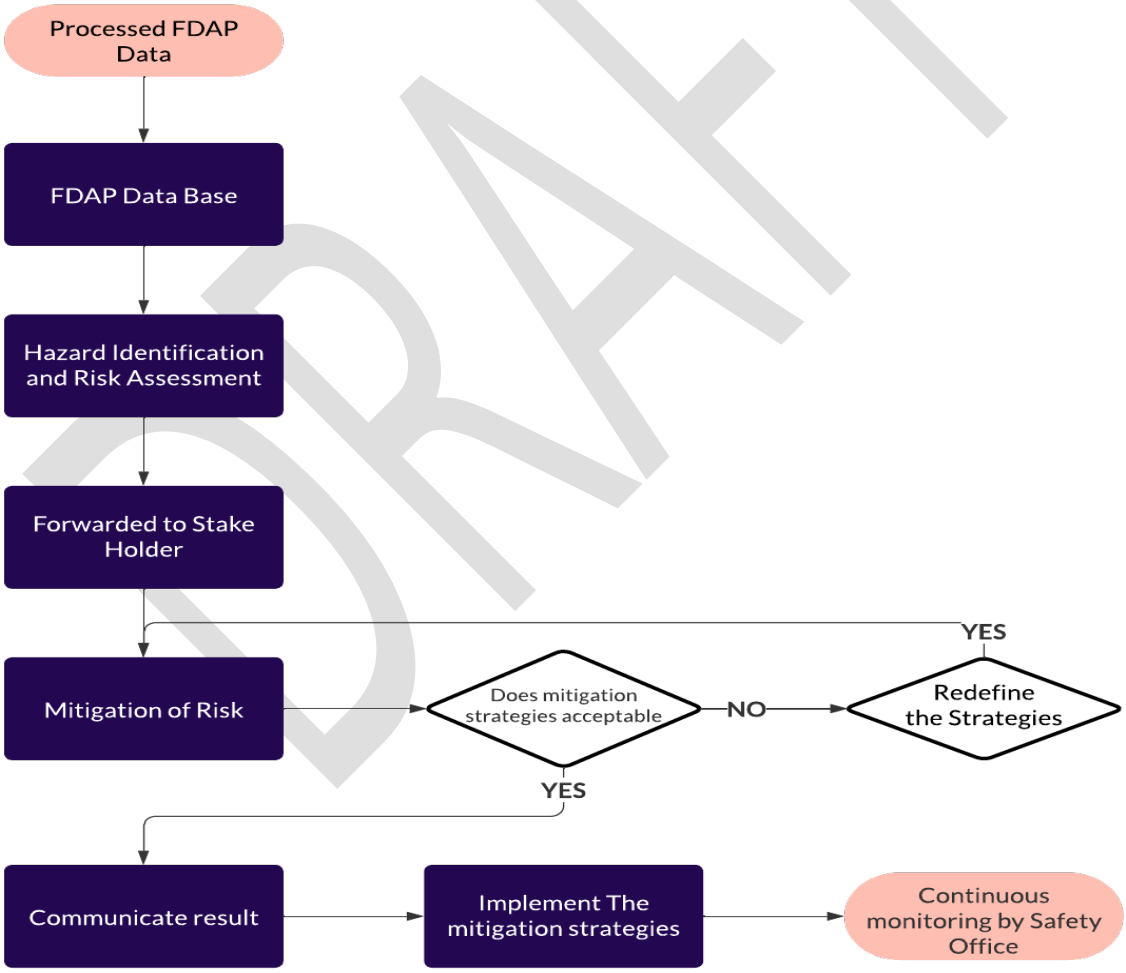

Figure 1 FDAP Process in SMS

1.4.1 RISK MANAGEMENT

The process starts with the identification of hazards and their potential consequences. The safety risks are then assessed against the threat of potential damage related to the hazard. These risks are weighted in terms of probability and severity. If the assessed safety risks are deemed not to be tolerable, appropriate corrective action is taken.

1.4.1.1 Identify Hazards

FDAP provides a powerful tool for proactive hazard identification. Limitation of FDAP data is that it only tells what happened and needs the situational context to understand why an event happened. The FDAP data gives quantitative information to support other subjective reports to identify system weaknesses and deficiencies.

1.4.1.2 Risk Management

Initial Risk Assessment: FDAP provides information and measures to support expert opinion and experiences that form a baseline against which future changes and risks are measured.

1.4.1.3 Reinforce Defenses

Based on the existing identified hazards, risk assessment is performed and informed decisions are taken whether to strengthen defenses and monitor the existing defenses. Trigger levels are established, and actions are taken to reduce the probability of occurrence.

1.4.1.4 Safety Assurance

FDAP gives information of actual operations and acts as a tool for continuous monitoring for safety assurance.

1.4.2 ASSURANCE

FDAP Data is a good source to identify any potential threats to operations and emerging trends within Riyadh Air's operations. It helps identify the area for improvement, prevent safety incidents and continuously enhance the safety culture within the airline.

This is achieved via:

1. **Compliance with the regulation:** FDAP provides a good means to monitor established standards and procedures. This proactive approach enables the identification and correction of any deviations promoting adherence to regulatory requirements.
2. **Performance Monitoring:** FDAP provides a systematic way to monitor the performance of flight operations. By analyzing flight data, the organization assesses the effectiveness of operational procedures, adherence to standard operating practices, and the overall performance of both aircraft and flight crews.
3. **Auditing and reviewing:** Regular auditing and reviewing of FDAP data allows Riyadh Air to conduct thorough assessments of safety-critical events and operational practices. Audits can identify trends, patterns, and areas for improvement, helping the organization to maintain a high level of safety standards.
4. **Continuous improvement:** FDAP data is a key tool in fostering a culture of continuous improvement within the organization. By analyzing data trends and safety events, Riyadh Air implements targeted measures to enhance operational procedures, provide additional training and make informed decisions for continuous safety enhancements.
5. **Communication to the various stakeholders:** Communication of FDAP findings and safety-related information to various stakeholders is essential. This includes sharing insights with flight crews, maintenance personnel, regulators, and other relevant parties. Transparent communication promotes a shared understanding of safety goals and fosters collaboration in maintaining a strong safety culture.

1.4.3 FDAP INTERNAL AUDITS

As a part of Riyadh Air Corporate Quality Management System, a periodic review of FDAP will be conducted to check its effectiveness and compliance with the applicable regulations and industry best practices.

VPSSE will be in-charge of FDAP team and is accountable for maintaining the FDAP as per regulations.

1.4.4 MANAGING EXTERNAL AUDITS

The Director of Safety takes a leadership role in leading the FDAP team during external regulatory and other audits. The Director of Safety is accountable for maintaining the FDAP in accordance with applicable regulations and standards. In the event of any observations or findings during an external audit, the Director of Safety takes the lead in providing responses and addressing concerns raised by auditors. The Director of Safety extends assistance to corporate quality auditors during external audits, ensuring a collaborative and comprehensive approach to the audit process.

The Flight Data Specialist is designated as the person responsible for the Flight Data Analysis (FDA) Program. During external audits, the Flight Data Specialist takes an active role in assisting external auditors, providing insights into FDAP processes, and facilitating a thorough understanding of the program and leverages expertise in FDAP processes to address specific queries or concerns raised by external auditors, ensuring clarity and accuracy in responses.

There is a collaborative effort between the Director of Safety and the Flight Data Specialist to ensure a seamless audit process. Any observation or finding arising during an external audit is comprehensively addressed by the Director of Safety and the Flight Data Specialist plays a pivotal role in providing detailed and accurate information.

1.4.5 STRATEGIC REVIEW AND CONTINUAL IMPROVEMENT

Internal audits, conducted by Riyadh Air's own auditing processes, provide an opportunity for self-assessment and identification of areas for improvement within the FDAP. External audits, carried out by regulatory bodies or independent auditors, bring an external perspective and objective evaluation of the FDA program's adherence to industry standards and regulations.

Observations made during audits highlight specific gaps, weaknesses or areas that may benefit from enhancement within the FDA program. A thorough analysis of audit observations allows for the identification of root causes, addressing not just the symptoms but the underlying issues that may impact program effectiveness.

Internal and external audit findings create a feedback loop, fostering a collaborative approach between auditors, FDAP personnel and relevant stakeholders. Engaging in a constructive dialogue with auditors and stakeholders helps in gaining a deeper understanding of the context behind the observations, facilitating more targeted improvements.

Observations serve as a catalyst for developing and implementing corrective actions to address identified deficiencies, ensuring that the FDA Program evolves to meet the highest standards. External audit observations provide insights into how well the FDA program aligns with industry standards and regulatory requirements, allowing for adjustments to ensure ongoing compliance.

Observations made during internal and external audits will provide the basis to improve the FDA Program within Riyadh Air.