International Civil Aviation Organization
Asia and Pacific Office

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Agenda Item 5: Presentations – State / Industry / ICAO

FLIGHT DATA MONITORING (FDM) OVERSIGHT BEST PRACTICES: PROMOTING THE OPTIMAL USE OF FDM INSIGHTS AND A POSTIVE SAFETY CULTURE

(Presented by Boeing)

SUMMARY

Flight Data Monitoring (FDM) is vital for the proactive identification of hazards in airline operations and offers valuable insights to regulators regarding flight operation risks. Cross-stakeholder collaboration, a strong safety culture, and the use of advanced technology and safety analytics to optimize FDM oversight through a balanced and collaborative approach. Furthermore, regulatory frameworks and information exchange mechanisms that enhance safety without promoting a punitive environment should be developed, with a focus on just culture principles. The meeting is invited to adopt a balanced approach to a regulator's oversight of their Air Operator Certificate (AOC) holder's Flight Data Monitoring (FDM) programs and participate in the full presentation on this topic at the upcoming ICAO COSCAP SEA and SA meetings to explore and share best practices.

1. INTRODUCTION

1.1 Flight Data Monitoring (FDM) is a crucial program for all airlines, offering valuable insights into operations and enabling proactive hazard identification. Also known as the Flight Data Analysis Program (FDAP) or Flight Operational Quality Assurance (FOQA), the program was introduced in the early 2010s with relevant Standards and Recommended Practices (SARPs) established in ICAO Annex 6 Part I and Annex 6 Part III and the publication of the Manual on Flight Data Analysis Programmes (Doc 10000) in 2014. FDM is a proactive safety program that systematically collects and analyzes flight data to generate objective safety insights. Effective FDM programs promote adherence to standard operating procedures (SOPs) and identify deviations, ultimately enhancing safety performance. FDM programs support both the safety risk management and safety assurance components of an operator's Safety Management System (SMS).

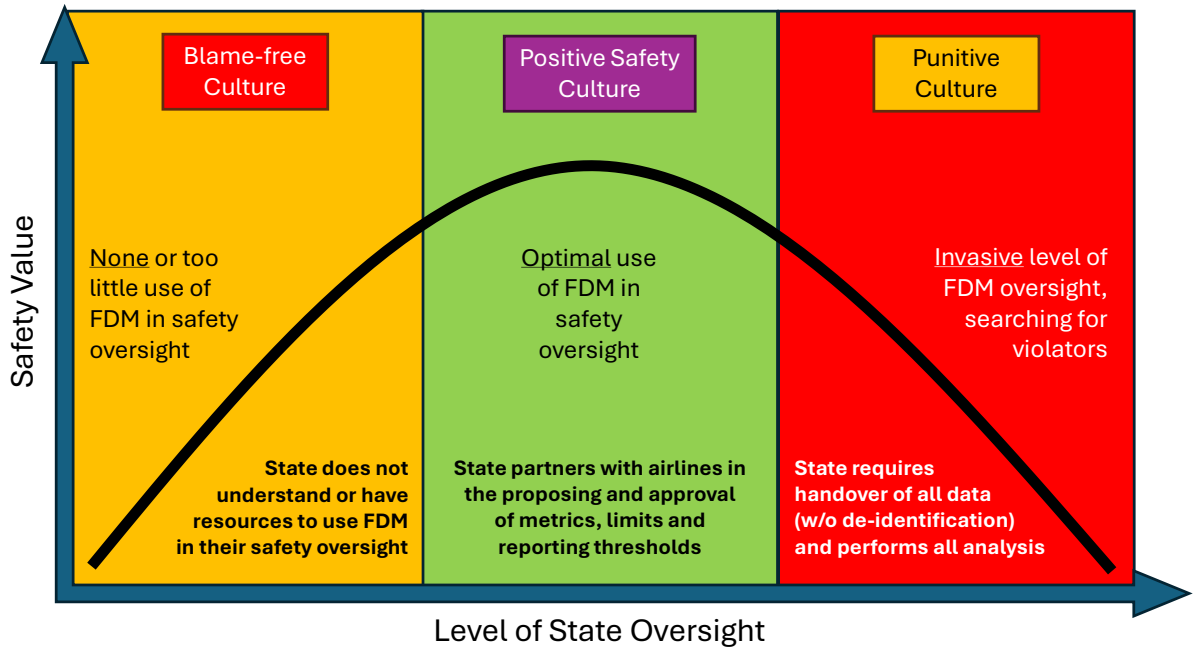
2. DISCUSSION

2.1.1 FDM programs offer numerous benefits, particularly in improving operational safety. They provide airlines with valuable insights that help identify potential hazards before they result in incidents. Beyond airline operations, the data-driven insights from FDM programs can also support the broader aviation safety framework, complementing the State Safety Program (SSP) of the primary State in which they operate. Furthermore, regulators can leverage insights from operator FDM programs to complement the insights derived from voluntary and mandatory safety reports, creating a more comprehensive understanding of current and emerging safety risks at the State level.

2.1.2 The collection of safety information from airline FDM programs can be particularly beneficial for regulators when conducting targeted safety studies or reassessing safety risks. However, it is important to note that regulators do not necessarily need access to raw FDM data. High-level, aggregated insights may suffice for identifying trends and shaping effective safety strategies at the State level. Some regulators, however, express their belief that their responsibilities include the need for direct access to all airline-specific FDM data for independent analysis. This approach, if not handled carefully, may lead to a punitive regulatory culture that discourages transparency and proactive safety reporting. A balanced approach, aligned with the principles outlined in ICAO Doc 10000 and ICAO Doc 9859 – Safety Management Manual, is essential to fostering a collaborative safety culture.

2.1.3 A strong safety culture is a fundamental aspect of an effective FDM program, as highlighted in Chapter 3.3 of ICAO Doc 10000. Successful FDM programs are characterized by consistent and competent management, which not only ensures their effectiveness but also fosters a positive safety culture within an airline's SMS. Regulators and airlines alike must recognize that the way FDM data is managed and utilized has a direct impact on the industry's safety culture. A constructive approach to FDM oversight should focus on collaboration rather than enforcement-driven scrutiny.

2.1.4 With the emergence of powerful analytical technologies such as artificial intelligence and machine learning, fed with massive data sets, it may be observed that regulators often find themselves in a position of being "data-rich but knowledge-poor". Striking the right balance is essential. Regulators must have access to sufficient data to perform meaningful analysis and effective safety oversight. However, regulators should avoid methods of collecting or analyzing data, or implementing corrective action, that could create a perception of a punitive approach. Equally important is understanding how this balance influences safety culture, shaping the industry's willingness to share and act on safety insights. This relationship is illustrated in the figure below.



2.1.5 Collecting large volumes of safety data does not automatically lead to improved safety outcomes. If regulators play too limited a role in monitoring airline FDM programs, valuable safety insights may be overlooked, resulting in missed opportunities for risk mitigation. This may also result in a blame-free culture. Conversely, an overly intrusive regulatory approach, where the State mandates airlines to submit all FDM data without de-identification and conducts independent analysis, can create a punitive environment, discouraging airlines from openly sharing safety-related information. Per the

European Authorities Coordination Group on Flight Data Monitoring (EAFDM) Good Practice document, the most effective approach is a balanced, collaborative partnership in which regulators and airlines work together to define safety performance indicators, reporting thresholds, and safety limits. This method fosters a non-punitive safety culture while ensuring that insights from FDM programs are effectively leveraged for oversight and continuous safety enhancement.

2.1.6 Achieving a balanced approach to FDM oversight with high safety value requires collaboration across multiple stakeholders, including airlines, regulators, and industry partners. Key elements essential for effective implementation include a well-defined regulatory framework, a strong culture of just reporting, robust Information Technology (IT) infrastructure, seamless digital interfaces, and advanced safety analytics. These components work together to ensure that FDM insights are utilized effectively while maintaining a non-punitive and collaborative safety culture.

2.1.7 Further insights into these critical aspects of FDM oversight will be presented at the upcoming ICAO Cooperative Development of Operational Safety and Continuing Airworthiness Program (COSCAP) South East Asia (SEA) and South Asia (SA) meetings, where a comprehensive presentation will be delivered by Boeing. The presentations at both meetings will offer an opportunity for regulators and industry experts to exchange perspectives and explore best practices for optimizing the use of insights generated from FDM programs within a collaborative and supportive safety framework.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Adopt a balanced approach to FDM oversight;

b) Support the development of regulatory frameworks and information exchange mechanisms that promote safety while avoiding a punitive culture, emphasizing the adherence of just culture principles, advanced safety analytics, and effective IT infrastructure; and

c) Participate in the full presentation on this topic at the upcoming ICAO COSCAP SEA and SA meetings.

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