

**61ST CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGION**

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AGENDA ITEM [X]: AVIATION SAFETY

**ACCELERATING REGIONAL SAFETY THROUGH THE
AI-ASSISTED RISK-BASED OVERSIGHT (RBO) PILOT PROJECT**

(Presented by The Republic of Indonesia)

SUMMARY

This paper proposes transitioning from a conceptual framework to the practical execution of the AI-assisted Risk-Based Oversight (RBO) Pilot Project. By utilizing Artificial Intelligence (AI) and Large Language Models (LLM) to prioritize surveillance based on objective operator risk profiles, the initiative directly addresses regional oversight capacity constraints and USOAP findings related to CE-3 and CE-8. The Conference is invited to endorse this Pilot Project as the primary regional implementation, utilizing the APRAST framework as the platform and reporting mechanism.

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1. INTRODUCTION

1.1 The Asia-Pacific aviation sector is expected to triple over the next two decades. This rapid expansion was marked by increasingly diverse operators, complex route structures, and millions of annual flight movements, exceeding the capacity of limited regulatory oversight personnel and safety inspectors. Existing surveillance programmes rely predominantly on uniform and rigid inspection cycles, often do not adequately reflect the varying levels of operational risk among service providers, leading to potential safety gaps, inefficient resource allocation, and recurring USOAP findings, particularly on Critical Element 3 (Organization) and Critical Element 8 (Resolution of Safety Issues).

1.2 This concept of transforming existing surveillance programmes was originally introduced and presented by the Directorate General of Civil Aviation (DGCA) of Indonesia at the ICAO APAC Workshop on Innovation and Emerging Technologies in Aviation, held on 20–21 November 2025 in Bangkok, where it received positive feedback from participating States/Administrations, indicating interest in exploring potential participation in this initiative under a COSCAP-SEA framework. This early presentation has since matured into a crucial COSCAP-SEA partnership supporting the program to research, identify, and explore the technical possibilities of data-driven Risk-Based Oversight (RBO), applying safety intelligence tools to transition oversight from reactive monitoring toward a proactive and predictive approach.

1.3 To address these systemic challenges, Indonesia proposed and presented the AI-Assisted Risk-Based Oversight (RBO) Pilot Project Initiative at the 23rd COSCAP-SEA Steering Committee Meeting on 22–23 April 2026 in Bali. This concept utilizes advanced data analytics, AI, and Large Language Models (LLM) to integrate safety data, identify risk trends, and prioritize surveillance based on operator risk profiles. The initiative aligns with upcoming ICAO Annex 19 amendments (effective November 2026) and Safety Intelligence Manual (Doc 10159) guidance on incorporating predictive indicators into decision-making. It also conforms to the Safety Oversight Manual (Doc 9734) and Doc 8335 (Part IV, Section 2.2.2) allowing Safety Risk-Based Surveillance (SRBS) programs. This alignment reinforces safety oversight as a core State/Administrations responsibility under the State Safety Programme (SSP), utilizing ICAO Safety Management Implementation (SMI) tools and forthcoming Safety Management Manual (Doc 9859) guidance.

2. DISCUSSION

2.1 States/Administrations serve as forums for sharing knowledge and best practices. However, addressing implementation challenges, including data governance and capacity limitations requires a direct operational approach. Consequently, Indonesia proposes establishing an RBO Implementation Task Force. The objective of this task force is to provide participating States/Administrations with a structured roadmap, guiding stakeholders from initial preparation to the operational deployment of the AI-assisted RBO framework.

2.2 The system utilizes a hybrid architecture that integrates objective mathematical risk scoring with Large Language Model (LLM) analysis. This enables the system to analyze structured data, such as flight cycles, and unstructured qualitative information, alongside narrative audit reports. The framework derives an aggregate risk score by weighting historical compliance data, safety deviation records, and implemented corrective actions. This score is then cross-referenced with a complexity indicator to determine an optimal surveillance interval, which varies between 6 and 18 months. This mechanism ensures that regulatory oversight resources are allocated commensurate with the risk profile of each operator.

2.3 Civil Aviation Authorities (CAAs) frequently manage systemic findings from USOAP audits, particularly under CE-3 (Organization) and CE-8 (Resolution of Safety Issues). The AI-Assisted RBO

system supports the remediation of these issues by automating data-intensive processes, thereby allowing safety oversight personnel to allocate their expertise toward areas of significant safety concern, subject to applicable State/Administration policy. To facilitate a structured rollout, the Pilot Project will follow a phased roadmap designed to build regional capability and promote transparency. Initial activities will focus on coordinating with participating States/Administrations, industry partners, and technical bodies, such as COSCAP-SEA and APRAST, to align project objectives with prevailing State/Administration policies. A formal project taskforce, composed of regulatory, safety, and technical experts, will be established to lead the pilot's implementation and provide peer-review support. This taskforce will define the specific project framework, governance structure, and deliverables, including standardized risk templates and non-proprietary AI algorithms, to ensure they fulfill regional regulatory needs. Furthermore, a detailed implementation timeline will be established, defining milestones for system configuration, training, and operational deployment within participating States/Administrations to ensure the project remains aligned with the 62nd DGCA Conference.

2.4 To utilize coordination and avoid duplication of effort, it is proposed that the AI-Assisted RBO Pilot Project be formally established under the Asia Pacific Regional Aviation Safety Team (APRAST) framework. Under this proposal, APRAST would serve as the primary platform and reporting pathway for the project, providing a structured regional forum where participating States/Administrations and industry partners can share case studies, technical insights, and lessons learned. This proposed institutional alignment seeks to ensure that the pilot's progress is formally documented and communicated through established ICAO APAC safety, facilitating a coordinated regional approach to the adoption of emerging technologies.

2.5 In alignment with emerging global standards, the Pilot Project integrates AI to ensure responsible deployment in safety-critical oversight. This commitment focuses on:

- a) Human-in-the-loop oversight, ensuring AI serves as a support tool where inspectors retain final authority for all surveillance decisions;
- b) Explainability and Transparency, requiring the hybrid architecture to provide clear, actionable rationales for all risk assessments to facilitate inspector review;
- c) Accountability and Bias Mitigation, through strong data governance to ensure objective oversight and continuous validation of AI outputs against established regional safety standards
- d) Operational Prototyping (Sandbox), establishing a secure, isolated testing environment to validate the hybrid AI-Human architecture against historical data. This ensures that algorithmic performance is rigorously tested for safety and reliability prior to any live operational deployment, minimizing risk and ensuring system integrity.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) note the information provided regarding the potential of AI to transform resource-intensive manual processes, including safety data analysis and standards interpretation and acknowledge that a coordinated regional approach is necessary to address shared implementation challenges such as data governance and regulatory capacity constraints;
- b) support the establishment of the AI-assisted Risk-Based Oversight (RBO) Pilot Project as the primary regional implementation for safety technology, providing practical, phased roadmap that enables States/Administrations to prioritize surveillance activities based on operator safety risk profiles rather than uniform inspection cycles;
- c) invite interested States/Administrations and industry partners to express interest in participating in the pilot project and to share implementation tools, non-proprietary

case studies, and lessons learned to help the region manage growing oversight demands through the automation of data-intensive processes while maintaining human accountability; and

- d) approve that Indonesia presents this Pilot Project to the Asia Pacific Regional Aviation Safety Team (APRAST) and COSCAP-SEA for their consideration and approval of their respective roles, with progress reports to be presented at the 62nd DGCA Conference.

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