

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

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**AGENDA ITEM 6: ECONOMIC DEVELOPMENT OF
AIR TRANSPORT**

**THAILAND'S DATA-DRIVEN AVIATION MANAGEMENT
THROUGH CAAT BIG DATA AND AVIATION DATA
EXCHANGE**

(Presented by Thailand)

SUMMARY

The transition toward data-driven oversight addresses fragmented data governance and regional interoperability gaps. Thailand has centralized high-value civil aviation datasets within a unified infrastructure, bridging technical directorates and industry stakeholders through the ASC. To protect this interconnected data ecosystem against evolving threats, advanced technological controls and strict confidentiality tiers have been implemented. Harmonizing regional cybersecurity benchmarks is essential to resolve trust deficits and fully unlock efficient cross-border data sharing.

THAILAND'S DATA-DRIVEN AVIATION MANAGEMENT THROUGH CAAT BIG DATA AND AVIATION DATA EXCHANGE

1. INTRODUCTION

1.1 The rapid evolution of the global aviation sector, characterized by a massive surge in operational volumes, increasing integration of digital systems, and heightened exposure to macroeconomic and geopolitical disruptions, necessitates a fundamental shift from reactive oversight to proactive, data-driven civil aviation management.

1.2 Historically, civil aviation authorities have operated within highly siloed data architectures. Critical regulatory, safety, security, and economic datasets are frequently maintained across separate technical departments or distinct stakeholder platforms, severely limiting real-time visibility and impeding comprehensive, evidence-based policy formulation.

1.3 To bridge these gaps and align with regional goals for seamless and efficient airspace management, the Civil Aviation Authority of Thailand (CAAT) has initiated a digital transformation agenda. This strategy is anchored by two central pillars: the CAAT Big Data platform and the Aviation Service Centre (ASC), serving as the unified technical core and coordinated front-end interface, respectively, for the state's aviation intelligence ecosystem.

2. DISCUSSION

2.1 The core objective of Thailand's integrated architecture is to combine and process fragmented aviation data into a centralized, single source of truth. The platform aggregates high-value internal data streams—including the aircraft registry, personnel licensing logs, airworthiness directives, airport operational statistics, and financial reports from air transport operators—and blends them with key external variables such as e-commerce trends, global fuel prices, and macroeconomic vulnerability indicators.

2.2 To achieve cross-organizational synergy without disrupting specialized statutory mandates, the framework establishes the Aviation Service Centre (ASC). The ASC acts as a non-technical guidance and coordination bridge for investors, operators, and international bodies, channeling inquiries efficiently into CAAT's technical directorates while ensuring that analytical outputs from the Big Data core are transformed into actionable business and regulatory intelligence.

Current Progress and Strategic Alignment

2.3 With the implementation of core database connections and data ingestion workflows, several strategic use cases are now live and actively operational, providing direct support to Thailand's airspace master plans and broader regulatory toolkits:

- **Predictive Airspace and Capacity Optimization:** Utilizing historical and real-time traffic statistics to model delays, route structural bottlenecks, and peak terminal loads, enabling proactive adjustments in coordination with Air Navigation Service Providers (ANSPs).
- **Performance-Linked Economic Oversight and Consumer Protection:** Transitioning airport economic regulation to an evidence-based model by utilizing automated data pipelines to feed service-quality scorecards, directly linking aeronautical fee adjustments to verifiable operational performance.
- **Critical Workforce Pipeline Integration:** Cross-referencing current flight crew, air traffic controllers, and maintenance engineer licensing data against projected market growth to fast-track targeted training academy quotas and mitigate impending personnel shortages.

Cyber Resilience and Data Protection Framework

2.4 Recognizing that the consolidation and regional sharing of highly sensitive operational, commercial, and safety-critical aviation data increases the potential attack surface for malicious state and non-state actors, CAAT has systematically embedded a comprehensive cybersecurity preparedness model directly into its data management architecture:

- **Data Governance and Classification:** In strict compliance with national and international security standards, CAAT has instituted a formal Data Governance framework. All ingested, processed, and exchanged civil aviation datasets are systematically audited and categorized according to predefined data classification levels and confidentiality tiers. This ensures that sensitive proprietary commercial information and Security Sensitive Information (SSI) are rigorously protected through granular access controls.
- **Proactive Cyber Defense and Attack Mitigation:** Operational workflows within the ASC and Big Data environment are secured by multi-layered technological controls, including advanced data encryption protocols (both at rest and in transit), robust continuous threat monitoring, and automated anomaly detection systems designed to isolate potential breaches before they affect terminal airside operations or safety-critical data channels.

2.5 While individual Member States can establish rigorous domestic controls, the true value of data-driven aviation management lies in seamless, cross-border data sharing to maximize regional airspace capacity and flight efficiency. However, a major bottleneck to widespread collaboration is the lack of harmonized cybersecurity baselines, which creates trust deficits among states wary of data exploitation, leakage, or collateral cyber contamination. To unlock the full potential of a collaborative "Smart Sky," it is imperative that ICAO establishes standardized regional cybersecurity benchmarks that allow states to exchange data securely and with absolute confidence.

2.6 Currently, CAAT has been structured its foundational aviation datasets and initiated a comprehensive assessment framework for Artificial Intelligence (AI) integration. This evaluation workflow is designed from the outset to guarantee that any deployed AI systems possess high integrity, robust data leakage prevention, and maximum accuracy. By establishing these core guardrails, CAAT aims to safely leverage AI capabilities to achieve effective AI-Human Cooperation, ensuring that automated systems serve as reliable analytical co-pilots while empowering the authority to operate with full regulatory confidence and efficiency.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) note Thailand's significant progress in establishing an integrated aviation data environment through the coordinated architecture of the Aviation Service Centre (ASC) and the CAAT Big Data platform, recognizing that core data streams are already live and operational;
- b) encourage the ICAO Regional Office to actively help coordinate a regional framework that assists and encourages APAC Member States to share critical operational and cross-border aviation data, while establishing standardized Cyber Security baselines and data governance models to ensure secure, trusted, and resilient data communication channels across the region; and
- c) encourage deepened cooperation among Member States to formalize data governance, standardization, and connectivity practices, fostering a highly collaborative and resilient "Smart Sky" across the Asia and Pacific region.

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