60th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGIONS

Sendai, Japan
28 July - 1 August 2025

AGENDA ITEM 4: AIR NAVIGATION

DATA-DRIVEN PERFORMANCE MONITORING FRAMEWORK FOR AIR TRAFFIC MANAGEMENT: THE KOREAN ATPMS INITIATIVE

(Presented by the Republic of Korea)

SUMMARY

The Republic of Korea (ROK) has developed the Air Traffic Performance Management System (ATPMS), a data-driven system designed to implement the vision of the International Civil Aviation Organization (ICAO) by monitoring Key Performance Indicators (KPIs) and simulating policy effects. Building on this achievement, the ROK is now researching and developing new KPIs focused on sustainability and resilience. Furthermore, ROK proposes the establishment of a regional KPI sharing framework, which is crucial for the collaborative advancement of air navigation services throughout the Asia-Pacific region to ensure sustainable growth of aviation industry for the future.

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1. INTRODUCTION

1.1 ICAO emphasizes a data-driven approach through the implementation of Aviation System Block Upgrades (ASBU), providing a modernization roadmap for air navigation systems. The importance of data is consistently reflected in the Global Air Navigation Plan (GANP, Doc 9750).

1.2 ICAO measures the effectiveness of the GANP using 11 Key Performance Areas (KPAs) and 23 Key Performance Indicators (KPIs). The 8th edition of the GANP, discussed at the 14th Air Navigation Conference (AN-Conf/14) in 2024, focused on environmental KPIs within the GANP.

2. DISCUSSION

2.1 The Republic of Korea (ROK) has established a data-driven performance monitoring framework capable of collecting, storing, and analyzing air traffic data. This system enables the management of Key Performance Indicators (KPIs) within the GANP.

2.2 This framework is called the ATPMS (Air Traffic Performance Management System), which is a decision support system designed to monitor ATM performance automatically on KPI target points, identify areas for improvement, and support the formulation of data-driven policies.

2.3 The ATPMS is composed of two main models: the Performance Gap Monitor (PGM) and the Decision Support Model (DSM). PGM diagnoses the current status of each KPI against its target and monitors for areas requiring improvement, while DSM allows for pre-implementation simulations to assess the potential impacts of new policies on the air traffic system, including flight time, on-time performance, and traffic throughput.

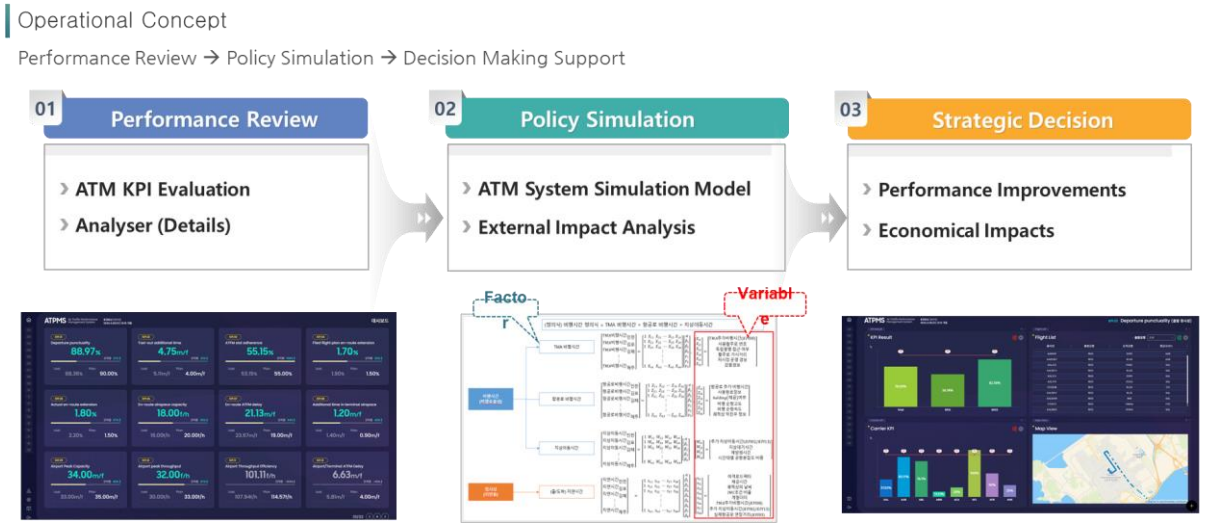

Figure 1: ATPMS Operational Concept

Figure 2: ATPMS Dashboard: Sample View

2.4 By automatically collecting air traffic data directly from Air Navigation Service Providers (ANSPs), the ATPMS has the foundational capability to calculate the full suite of KPIs outlined in the GANP. Building on this, the ROK is currently researching ways to generate customized KPIs that reflect our specific national environment. The ATPMS utilizes data from the preceding 24 hours to ensure robust, data-driven decision-making.

2.5 In line with the new directions of the GANP discussed at AN-Conf/14, research is underway to develop new KPIs focused on carbon emission estimation and operational resilience. Based on the discussion with regard to KPA and KPI within the GANP from the 14th AN-Conf, the ROK has been developing KPIs specifically for our national context. Moving forward, these new KPIs will be housed and monitored by the ATPMS.

2.6 The Republic of Korea holds the view that sharing nationally-developed KPIs is fundamental to realizing the ICAO ATM development of a safe, efficient, and sustainable air traffic management system within the Asia and Pacific region.

2.7 The establishment of a platform to share nationally-developed KPIs and best practices is believed to deliver significant, tangible benefits to all participating Member States. These benefits include, but are not limited to:

a) **Accelerated Performance Improvement:** The platform would enable States to learn from the proven strategies and best practices of their peers. This facilitates the adoption of effective solutions, thereby reducing lengthy trial-and-error periods and fast-tracking performance enhancements across the region.

b) **Fostering of Innovation:** Access to a diverse range of KPIs, each of which is developed to address unique national challenges, can serve as a catalyst for innovation. It allows States to identify novel approaches and apply new performance measurement concepts to their own operational environments.

c) **Objective Benchmarking:** A common repository of performance data allows for objective, data-driven comparisons. This empowers States to accurately assess their own performance against regional benchmarks, identify specific areas for improvement, and make better-informed policy and investment decisions.

d) **Enhanced Regional Harmonization and Interoperability:** A shared understanding and alignment of performance goals is fundamental to a harmonized regional air navigation system. The platform would promote interoperability and contribute directly to the safety, efficiency, and seamlessness of the entire APAC Air Traffic Management (ATM) network, in line with the ICAO vision.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) Note the information in this paper;

b) Encourage States to collaborate the development of new and innovative KPIs in ATM for the region; and

c) Propose ICAO Asia and Pacific Regional Office to establish a common platform to facilitate the sharing of States' national KPIs with Member States.

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