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AGENDA ITEM 4: AIR NAVIGATION

ESTABLISHMENT OF THE FOUNDATION FOR THE TRANSITION TO SWIM OPERATION

Presented by the Republic of Korea

INFORMATION PAPER

SUMMARY

This information paper aims to introduce the Republic of Korea's initiatives to build the foundational infrastructure required for the transition to SWIM (System Wide Information Management), a new concept in aviation information management.

ESTABLISHMENT OF THE FOUNDATION FOR THE TRANSITION TO SWIM OPERATION

1. INTRODUCTION

1.1 This Information Paper (IP) aims to introduce to the ICAO Asia-Pacific member states the efforts undertaken by the Republic of Korea to establish a foundation for the transition to SWIM operation.

1.2 In order to align with ICAO SWIM policies, the Republic of Korea has developed a medium- to long-term roadmap for the transition to SWIM-based aviation information exchange, with the goal of facilitating the transition after 2030.

* In 2023, the ICAO Asia-Pacific SWIM Task Force decided that aviation information exchange between member states via SWIM would commence from 2030 onwards.

1.3 Recognizing the necessity of strategies and frameworks for the establishment and operation of SWIM, the Republic of Korea, under the leadership of the Ministry of Land, Infrastructure and Transport (MOLIT), formed a group consisting of experts from aviation institutions and airlines in 2023 to develop a SWIM medium- to long-term roadmap.

1.4 The SWIM medium- to long-term roadmap of the Republic of Korea outlines a strategy for the implementation of domestic SWIM for the next ten years from 2024 to 2033, and includes plans for its establishment and operation.

1.5 In accordance with this roadmap, the Republic of Korea aims to complete the establishment of SWIM by 2028 and initiate aviation information exchange through SWIM with ICAO member states.

2. DISCUSSION

2.1 The SWIM medium- to long-term roadmap establishes a strategy for SWIM implementation and includes plans for the domestic establishment and operation of SWIM.

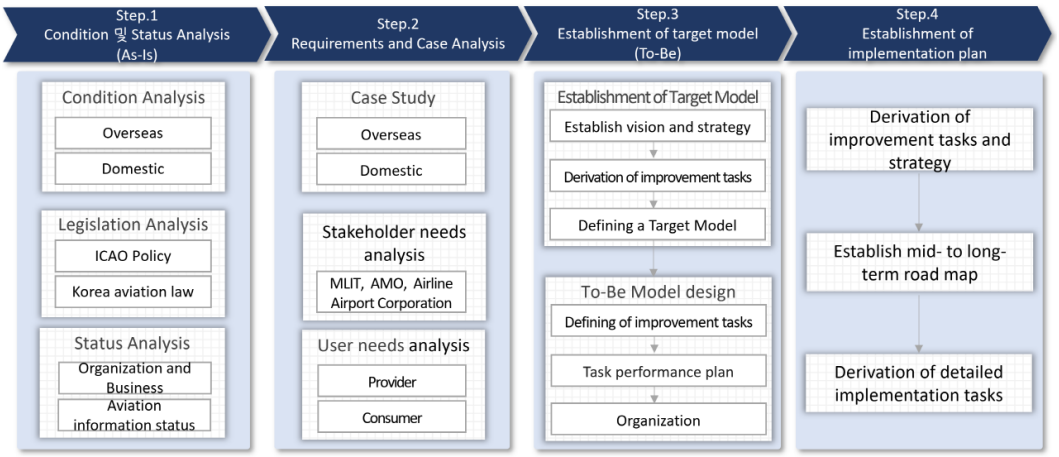
2.2 The SWIM strategy was developed by analyzing both domestic and international conditions and environments to identify tasks required for SWIM implementation, and by formulating a target model and long-term strategy for SWIM.

2.2.1 To derive tasks for domestic SWIM implementation, an analysis was conducted based on ICAO policies, SWIM-related activities of the SWIM Task Force and associated meetings, as well as a review of ICAO policies and domestic aviation laws related to SWIM. Furthermore, an analysis of the current status of aviation information in the Republic of Korea was carried out for identification of key tasks for implementation.

2.2.2 A comparative analysis of SWIM-related international case studies was conducted to identify differences with the domestic SWIM landscape, and possible improvements were identified by incorporating the requirements of stakeholders and users.

2.2.3 Based on the results from the environmental and situational analysis, as well as the requirements and case study analysis, the target model for each phase of domestic SWIM implementation was established, along with a roadmap and the necessary tasks for implementation.

Figure 1. SWIM strategy formulation process



2.3 The SWIM establishment plan involves designing the processes for implementing SWIM-related tasks, and formulating a structure for the SWIM network, systems, and infrastructure, as well as determining their functions and composition.

2.3.1 To develop the SWIM establishment plan, an analysis was conducted on the information provided by aviation information facilities and their respective data formats. Facilities to be connected to SWIM were selected based on SWIM's core functionalities and policies, prioritizing those capable of providing information via established information exchange models (XMs) or those where services and information exchange models have already been developed and are operational. The selected facilities include the Aeronautical Information Management (AIM) system, which provides airport information for flight operations, the Meteorological Information system for aviation weather, surveillance facilities providing aircraft position information for en-route and airport surface areas, the Flight Plan Processing System (FPPS) that supplies domestic and international flight schedules, and the Collaborative Decision-Making (CDM) system, which provides aircraft turnaround and preparation times. Table 1 outlines the status of facilities connected to SWIM in the Republic of Korea.

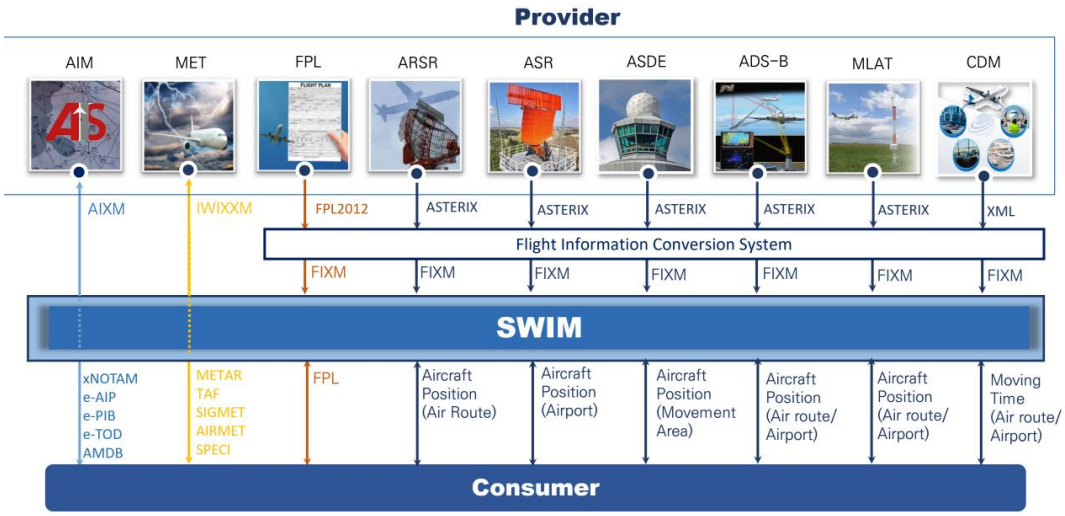
Table 1. Status of domestic SWIM access facilities

Division	Information Name	Provided Information	Format	Information Provider
Aeronautical Information	xNOTAM	DATA NOTAM	AIXM5.1	Air Traffic Management Office
	e-AIP	Electronic Aeronautical Information Publication	AIXM5.1	Air Traffic Management Office
	e-PIB	Electronic pre-flight information posting	AIXM5.1	Air Traffic Management Office
	e-TOD	Electronic Airport Obstacle DATA	AIXM5.1	Air Traffic Management Office
	AMDB	3D Airport Geographic Information	AIXM5.1	Air Traffic Management Office
Weather Information	METAR	1 Hour Airport weather Observation Information	IWIXXM3.0	Aviation Meteorological Office
	TAF	Airport Weather Forecast Information	IWIXXM3.0	Aviation Meteorological Office
	SIGMET	Bad Weather Information (FL100 or above)	IWIXXM3.0	Aviation Meteorological Office

	AIRMET	Bad Weather Information (FL100 or above)	IWIXXM3.0	Aviation Meteorological Office
	SPECI	Observation Information when abnormal changes occur	IWIXXM3.0	Aviation Meteorological Office
Flight Information	Flight Plan	International and Domestic flight plans	FPL 2012	Air Traffic Management Office
	ARSR	Airspace aircraft position information	ASTERIX	Air Traffic Management Office
	ADS-B	Airspace/Airport aircraft position information	ASTERIX	Airspace: Air Traffic Management Office Airport: Incheon, Gimpo, Jeju
	MLAT	Airspace/Airport aircraft position information	ASTERIX	Airport: Incheon, Gimpo, Jeju
	ASR	Airport approach aircraft position information	ASTERIX	Airport: Incheon, Gimpo, Gimhae, Jeju, Ulsan, Yeosu, Muan , Uljin
	ASDE	Airport movement area aircraft position information	ASTERIX	Airport: Incheon, Gimpo, Gimhae, Jeju
	Collaborative Decision Making	Aircraft movement and preparation Information	XML	Airspace: Air Traffic Management Office Airport: Incheon, Gimpo, Gimhae, Jeju

2.3.2 The next step involves analyzing the data formats provided by the domestic SWIM-connected facilities to design a process for collecting aviation information for SWIM implementation. While aviation and meteorological information can be exchanged via SWIM using the Aeronautical Information Exchange Model (AIXM) and the Weather Information Exchange Model (IWXXM), flight information such as aircraft position is provided in facility-specific formats. Therefore, the collection process requires the conversion of flight information into the Flight Information Exchange Model (FIXM). Figure 2 below illustrates the aviation information collection process in the SWIM target model for the Republic of Korea.

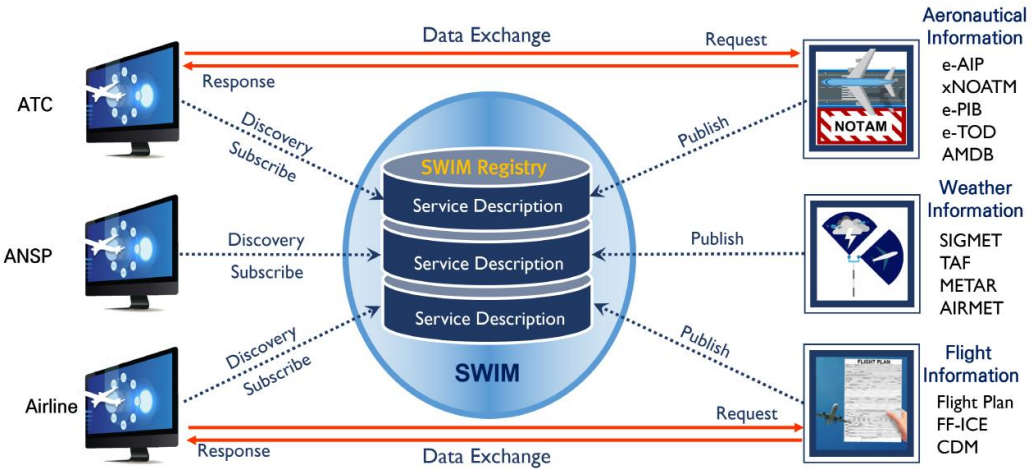
Figure 2. Aviation information collection process



2.4 The SWIM operational plan was developed through an analysis of the operational requirements and governance structures for domestic SWIM users and stakeholders.

2.4.1 The operational process in the SWIM environment differs from the current aviation information management process. In a SWIM environment, information providers post details of the services they offer, allowing users to search for and request the information directly from the providers.

Figure 3. SWIM operation process



2.4.2 To establish governance for the operation of domestic SWIM, a review of current aviation laws and regulations is being conducted. The goal is to define the roles, responsibilities and obligations of information providers, users and oversight authorities, and to establish legal and regulatory frameworks governing their operations. Table 2 outlines the roles and responsibilities of the organizations involved in managing and operating SWIM.

Table 2 SWIM Operation/Management Organizations and Their Responsibilities/Roles

Division		Responsibilities and Roles
SWIM Management Agency		• Providing SWIM Technology Infrastructure Functions
		• SWIM Center System and SW, Communication Network Maintenance
		• SWIM Center System Improvement and Upgrade
Provider	Air Traffic Management Office	• Providing Aeronautical Information, Flight Information and Services
		• Management of Information Management Model (AIXM, FIXM)
		• Development of Aeronautical Information, Flight Information and Services
		• Maintenance of Systems and SW for Aeronautical Information, Flight Information Services
	Aviation Meteorological Office	• Providing Weather Information and Services
		• Management of International Weather Information Exchange Model (IWIXXM)
		• Development of Weather Information Service

		• Maintenance of Systems and SW for Providing Information and Service
	Navigation Facility Manager	• Providing Flight Information and Services at the Control Airport
		• Information Management Model (XMs) Management
		• Information Service Development
		• Maintenance of Systems and SW for Providing Information and Services
User	ANSP, Airlines, etc.	• Installation of Systems and SW for Information Use

2.5 The Republic of Korea plans to proceed with the establishment and operation of SWIM in accordance with the medium- to long-term roadmap developed for the future operation of SWIM.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) note that the Republic of Korea plans to actively engage in ICAO SWIM policies to support the successful transition to SWIM in the Asia-Pacific region and calls for the attention and cooperation of ICAO Asia-Pacific member states.

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