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ASSEMBLY — 41ST SESSION

TECHNICAL COMMISSION

Agenda Item 33: Other issues to be considered by the Technical Commission

THE STATUS ON TRIAL OPERATIONS OF SWIM IN THE REPUBLIC OF KOREA

(Presented by the Republic of Korea)

EXECUTIVE SUMMARY	
This paper describes the status of the system-wide information management (SWIM) trial operation in the Republic of Korea (ROF). It introduces ROK's SWIM testbed, the participants of trial operation, and future plan.	
Strategic Objectives:	This working paper relates to Air Navigation Capacity and Efficiency Strategic Objective.
Financial implications:	Not determined.
References:	Doc 10039 *Manual on System Wide Information Management (SWIM) Concept* Doc 9750 *Global Air Navigation Plan (GANP)*

1. INTRODUCTION

1.1 The Republic of Korea (ROK) established the National ATM Reformation And Enhancement (NARAE) roadmap for successful implementation of the Aviation System Block Upgrade (ASBU) modules of ICAO Global Air Navigation Plan (GANP) and released the 2nd edition of the NARAE plan to reflect the amendments of the 6th edition of the ICAO GANP/ASBUs.

1.2 The system-wide information management (SWIM) is one of the most important tasks defined in the NARAE roadmap. ROK has been conducting SWIM research and development (R&D) since 2016 as part of this roadmap to develop SWIM technology.

1.3 The ROK has been operating a SWIM testbed since 2018 at Gimpo International Airport in Seoul.

1.4 SWIM testbed utilizes the SWIM system developed by Korea Airports Corporation (KAC), following the *Manual on System Wide Information Management Concept* (Doc 10039). The system utilizes de-facto technologies, commonly used in the IT industry, and technologies that ensure scalability and availability of the system were adopted as well.

1.5 SWIM system consists of SWIM technical infrastructure, mediation service, information service, and SWIM application. A secured telecommunication network (backbone) ensures the safe transmission or exchange of information between stakeholders.

1.6 Mediation service plays an important role in the SWIM system. The main features of mediation service are as follows:

a) convert a legacy flight plan (FPL 2012) to Flight Information eXchange Model (FIXM) based on eXtensible Markup Language(XML); and

b) convert surveillance data (ASTERIX) to custom models based on JavaScript Object Notation (JSON).

1.7 Information services can be categorized into surveillance, flight, aeronautical, and weather service. Depending on the types of information, information exchanges use web services or messaging services.

1.8 The ROK already deployed systems that are currently in operation and provides information in the form of an XML-based eXchange Model. The Ministry of Land and Infrastructure, Transport (MOLIT) provides x-Notices to Airmen (NOTAM) and Airport Mapping Databases (AMDB) in AIXM format, and Korea Aviation Meteorological Office (KAMO) provides weather information (e.g., Meteorological Aerodrome Reports(METAR), Significant Meteorological Information (SIGMET), etc.) in IWXXM format.

1.9 The ROK has been conducting domestic SWIM trial operations with ATM stakeholders since 2020, using SWIM services implemented in the SWIM testbed.

2. DISCUSSION

2.1 Air navigation services providers (ANSPs), airport operators (AOs), and Regional Aviation Administration Offices (RAAOs) participate in the SWIM trial operations. As of the end of 2021, SWIM-enabled application was installed in these organizations, and the list of participating organization is as follows:

No.	Role	Organization	Since
1	ANSP	Air Traffic Center (ATC), Deagu	2020.10 ~
2	ANSP	Regional ATC (RATC), Incheon	2020.10 ~
3	RAA	Seoul RAA	2021.02 ~
4	AO	KAC	2021.04

2.2 Information services can be divided into Basic Information Service (BIS) and Composed Information Service (CIS). Basic information service reads or writes data to or from one back end. The data should not be structured as a complex database but should consist of simple types. And composed information services are derived from the execution of multiple basic services or composed services. The list of services used in the trial operations is as follows:

No.	Category	Service	Type
1	Flight	Flight Plan Web Service	BIS
		Flight Plan Messaging Service	BIS
		Flight Plan History Web Service	CIS
		FIXM validation Web Service	CIS
2	Surveillance	En-route Surveillance Data Web Service	BIS
		En-route Surveillance Data Messaging Service	BIS
		Airport Surveillance Data Web Service	BIS
		Airport Surveillance Data Messaging Service	BIS
		En-route Surveillance History Data Web Service	CIS
		Airport Surveillance History Data Web Service	CIS
		Estimated Route Generation Web Service	CIS
3	Aeronautical	x-NOTAM Web Service	BIS
		AMDB Web Service	BIS
4	Weather	Weather Information Web Service	BIS
		Aerodrome Metrological Observation System (AMOS) Web Service	BIS
		Aerodrome Metrological Observation System (AMOS) Messaging Service	BIS
5	Geographical Information Service	Aeronautical Data (e.g., fix point, route, waypoint, etc.) WMS	BIS
		Geospatial Data (e.g., building, terrain) WMS	BIS
		Map Data (e.g., satellite, map) WMS	BIS

2.3 SWIM provides Single Access Point (SAP) to enable stakeholders to exchange information and access the services mentioned in paragraph 2.2. The role of SWIM is information exchange, using Application Programming Interface (API), while the role of stakeholders is to utilize the information and develop SWIM-enabled application. However, as a system that can consume information through SWIM is not yet developed or implemented in the ROK, the KAC provides SWIM-enabled application (e.g., SWIM Dashboard) so that participants can consume information through SWIM service.

2.4 The ROK is planning to extend the SWIM trial operations in 2022 with 5 more stakeholders which are as follows:

NO	Organization	Department	Application
1	KAC	Gimpo Int'l Airport Airside Operation Center	Flight Flow Information Collaborative Environment (FF-ICE/R1) ANSP application
2	KAC	Gimpo Int'l Airport Instrument Landing System (ILS) Department	Flight landing monitoring application
3	KAC	Headquarter Airport Planning Department	Surveillance information based time serial analysis and extraction application
4	KAC	Gimpo Int'l Airport Airside Control Tower	3D SWIM Dashboard
5	Korea Airspace Research Institute (KARI)	Collaborative Traffic Flow Management System (CTFMS) R&D Laboratory	CTFMS, 3D SWIM Dashboard

2.5 SWIM-enabled applications, developed to meet the needs of each stakeholder, will be used for trial operations. Organizations that only wish to consume information through SWIM service will be able to do so using their own applications or systems.

3. CONCLUSION

3.1 SWIM Trial operations are likely to contribute to the demonstration of the SWIM system by providing information to related stakeholders.

3.2 The ROK is developing a detailed plan to establish SWIM, and lessons learned from the trial operation would be reflected in the future SWIM implementation of the ROK.

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