



ICAO

The Fourth Meeting of System Wide Information Management Task Force (SWIM TF/4)

Web-conference, 3 – 6 November 2020

Agenda Item 7: State, Regional and Global SWIM Updates**THE STATUS OF SWIM R&D IN THE REPUBLIC OF KOREA**

(Presented by the Republic of Korea, KAC)

SUMMARY

This paper presents the status of SWIM R&D in the Republic of Korea and provides information about SWIM testbed implemented, SWIM- enabled application developed, and trial operation.

1. INTRODUCTION

1.1 The Republic of Korea has been conducting SWIM R&D following the ICAO Global Air Navigation Plan (GANP) and Korea's National ATM Reformation and Enhancement Plan (NARAE) since 2016. Korea Airports Corporation (KAC) is in charge of SWIM R&D and its purpose is to implement SWIM testbed and lay the foundation for the transition to a SWIM environment.

1.2 This IP provides the status of SWIM R&D of the Republic of Korea and future plan.

2. SWIM R&D STATUS

2.1 KAC implemented the SWIM testbed at the Aviation Research Institute and has been developing SWIM core capabilities (i.e., infrastructure) to provide ATM services in the SWIM environment. And the development of SWIM-enabled applications is also in progress.

2.2 SWIM testbed of the Republic of Korea is interfaced with aeronautical, flight, and meteorological information providers. The testbed receives information from providers, and information received is provided through a SWIM service in the SWIM environment. SWIM testbed communicates with information providers through a closed telecommunication network deployed only for aviation information operated by the government.

2.2.1 Figure 1 shows the configuration of the SWIM testbed. The Aviation Information Management (AIM) center provides aeronautical information (e.g., xNOTAM, e-AIP) in AIXM 5.1 format, and Korea Aviation Meteorological Office (KAMO) provides meteorological information (e.g., SIGMET, TAF) in IWXXM 2.0 format. And, information received from AIM center and KAMO is provided to a consumer through a SWIM service developed. In the case of flight information, Aviation Traffic Center (ATC) provides flight plan in ICAO Doc. 4444 format, and Air Route Surveillance Radar (ARSR) data in ASTERIX format and four airports (i.e., Gimpo, Gimhae, Jeju, and Incheon International airport) provides Airport Surface Detection Equipment (ASDE) data in ASTERIX format. SWIM testbed receives legacy data for flight information, converts data to FIXM 4.2 format, and provides converted information through a SWIM service developed.

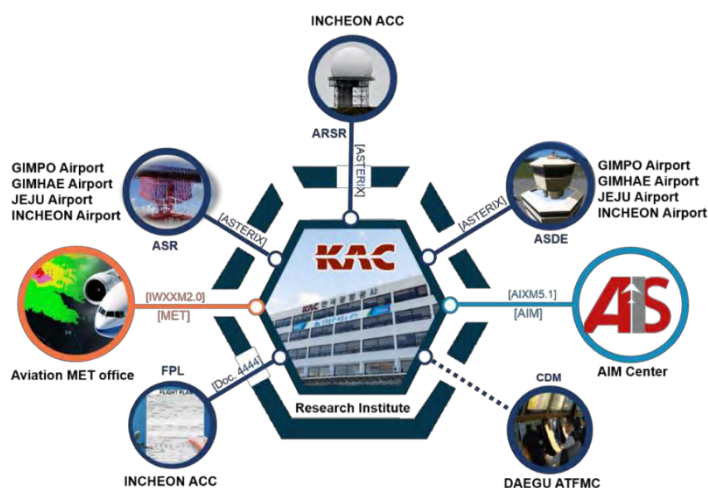


Figure 1 SWIM Testbed Configuration

2.3 A SWIM-enabled application, in response to domestic stakeholders’ opinions, consists of two applications: one is for FF-ICE, and the other is for airlines and Airport Operator(AO).

2.3.1 FF-ICE application is implementation of FF-ICE concept, and it is a key enabler of Trajectory Based Operation (TBO), which is a future ATM concept. FF-ICE application consists of FF-ICE core services and enabled-application, they are developed in compliant with the ICAO ASBU Block 1 and supports information exchange in the pre-departure phase. FF-ICE application developed by KAC provides capabilities both for Airspace User (AU) and ATM Service Provider (ASP).

2.3.2 FF-ICE application classifies the submitted flight plan and displays flight plans accordingly to improve user' information recognition. And it is also able to display the route of the specific flight plan and valid NOTAMs and SIGMETs simultaneously on the map. Figure 2 shows the FF-ICE application for ASP. The table on the bottom provides a list of flight plans submitted, including its change and history. The left sidebar provides information on a specific flight plan submitted. Also, the map is able to graphically display the route of a particular flight plan and valid NOTAMs and SIGMETs. Also, this provides negotiation capability (e.g., concurrence or acceptance) for the flight plan submitted by the AU in accordance with the FF-ICE procedure.

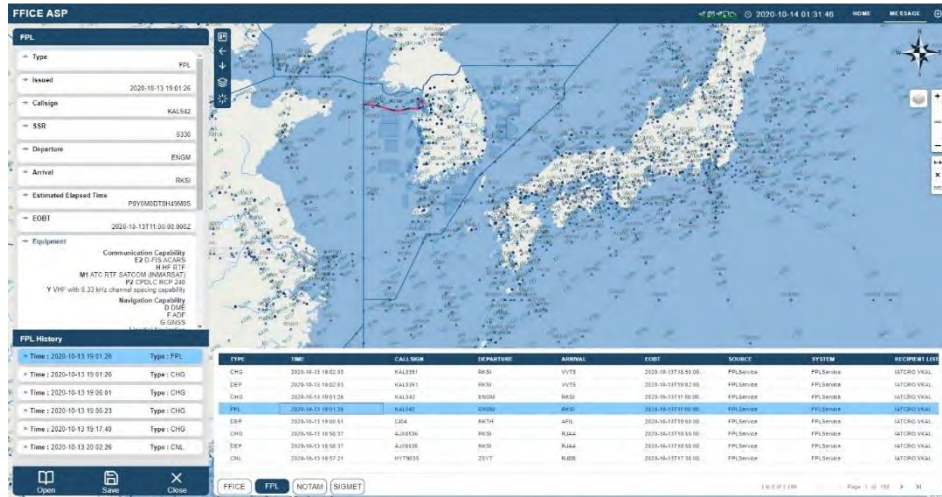


Figure 2 FF-ICE for ASP

2.3.2.1 FF-ICE application for AU is to submit a flight plan to ASP in accordance with the FF-ICE procedure and interact with ASP. Figure 3 shows FF-ICE message types that the FF-ICE application supports following the FF-ICE procedure.

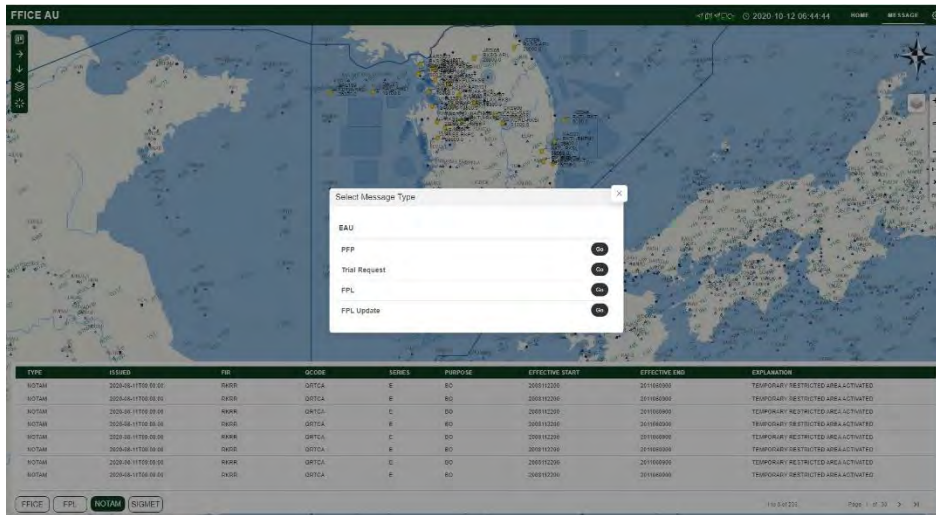


Figure 3 FF-ICE for AU

2.3.3 SWIM-enabled application for airlines and AO is a dashboard application that integrates and displays information received through SWIM services. The application receives FIXM-formatted flight information, AIXM-formatted aeronautical information, and IWXXM-formatted meteorological information from messaging and web services and displays information received on the map. There are two modes in the application: first is en-route and the other is airport mode.

2.3.3.1 En-route mode displays real-time flight information, including its position and flight plan within the FIR. Figure 4 shows the information displayed in the en-route mode. In the en-route mode, all aircraft positions currently in flight, valid NOTAMs, and valid SIGMET within the Korean FIR are displayed. The top on the left sidebar displays statics of the number of aircraft in flight by airline, and the middle displays a list of valid SIGMETs, and the bottom displays a list of valid NOTAMs.

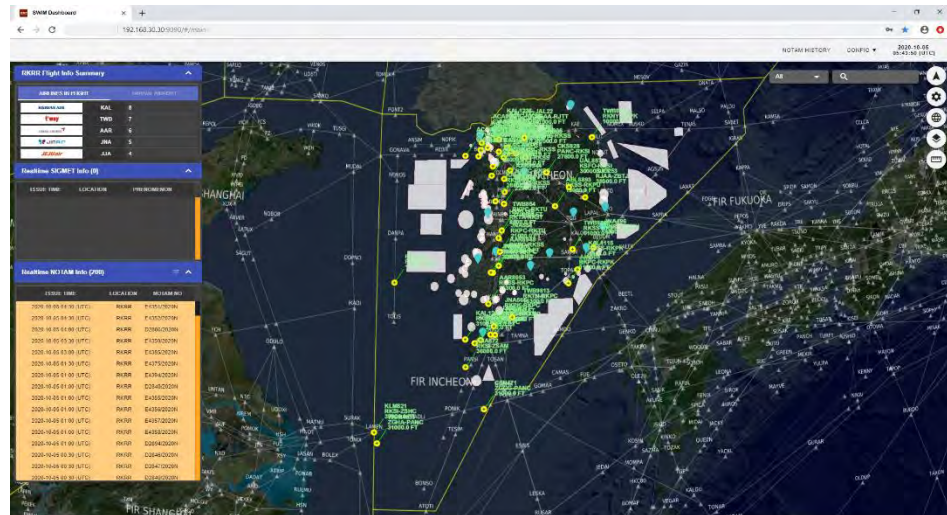


Figure 4 SWIM Dashboard En-Route Mode

2.3.3.2 The airport mode provides information needed for the efficient operation of the airport. Figure 5 shows the aircraft operation status in the Gimpo International airport. Information on runways and Nav aids on the e-AIP received from the AIM Center is displayed. And, aircraft positions and approaching aircraft to Gimpo International airports are displayed using ASDE data and ASR data, respectively. The left sidebar displays TAF information provided by KAMO, and a list of departure and arrival aircraft, and valid NOTAMs.

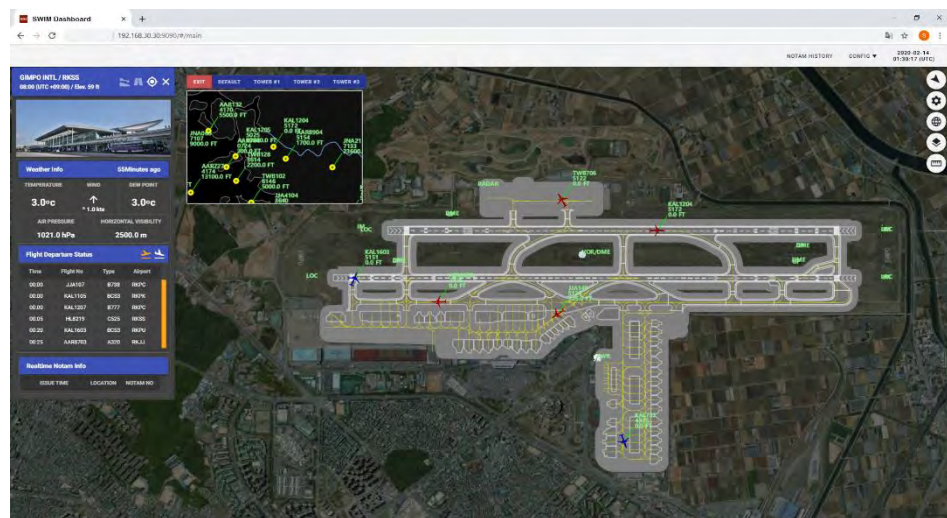


Figure 5 SWIM Dashboard Airport Mode

The airport mode also supports 3D rendering on the map called bird's eye view mode, as shown in Figure 6. The control tower view is the default, and this provides the simulated controller's view. Customization is also supportive, so the user is able to change the settings such as the preferred position and the angle of the view camera.



Figure 6 Bird's Eye View(3D) Mode

2.4 KAC is in consultation with the government to plan a trial run with the SWIM-enabled applications developed. And trail run is expected to proceed from November at the two ATCs (i.e., Daegu and Incheon ATC). Installation of the SWIM-enabled applications to airlines and AO and the service launch would also be initiated step by step.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matter as appropriate
