International Civil Aviation Organization

Eleventh Meeting of the Air Traffic Management Sub-Group (ATM/SG/11) of APANPIRG

Singapore, 2 – 6 October 2023

Agenda Item 5: ATM Systems (Modernization, Seamless ATM, CNS, ATFM)

THE LONG-TERM VISION FOR THE FUTURE AIR TRAFFIC SYSTEMS OF JAPAN (CARATS)

(Presented by Japan)

SUMMARY

This paper presents the information about status update of the long-term vision for the future air traffic systems of Japan, namely "CARATS: Collaborative Actions for Renovation of Air Traffic Systems".

Information on the CARATS can be also obtained from the following website:

https://www.youtube.com/playlist?list=PLdmDHRi3hAtrZD3z4hmoilrB49S0UMpeB

1. INTRODUCTION

1.1 It was becoming rapidly important to increase the quantity of domestic and international air service while improving its convenience and environmental friendliness. To tackle these issues, a study group was set up and the group compiled "Long-term Vision for the Future Air Traffic Systems" in 2010, which was named "CARATS: Collaborative Actions for Renovation of Air Traffic Systems," followed by roadmap developed in 2011.

2. DISCUSSION

2.1 In order to correspond appropriately to the growth in air traffic demand as well as the diversified needs of users, through the collaboration of industry, academia and government, the future of the air navigation services have been examined from various angles and also based on global trends. It defines goals and directions for renovation toward 2040, such as improving safety, meeting increasing global aviation demand, increasing convenience, and improving operational efficiency.

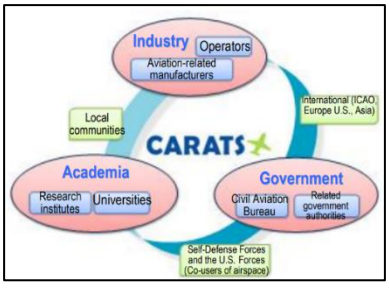

Figure 1. The collaboration in CARATS

2.2 The CARATS is consistent with the GANP ASBU Methodology. JCAB has mapped its planning to respective Block Upgrade Modules in order to ensure the near-and long-term global interoperability of their air navigation solutions.

2.3 It is necessary to respond to the increase in air traffic and reduce CO2 emissions at the same time by improving operational efficiency with renovating air navigation services. JCAB is implementing overall air traffic optimization and improvement for each flight phase in anticipation of future developments in air navigation systems and technological development trends. Collaborative Decision-Making (CDM) will allow all members of the air traffic management community to participate in the decisions that affect them. Enhancing CDM under the future Trajectory Based Operations (TBO) environment that utilizes 4D trajectory, a wide range of mass data must be shared among as many stakeholders concerned as possible. To this end, an information sharing structure is required. SWIM enables stakeholders to share necessary data with each other cost-effectively compared with the conventional style, which requires a dedicated system.

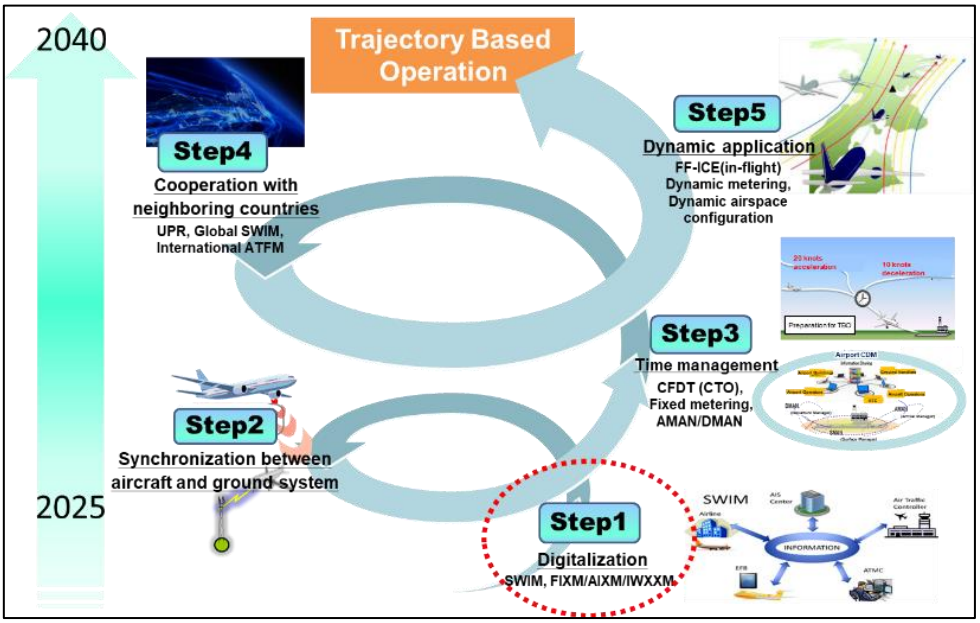

Figure 2. Steps for Trajectory Based Operations (TBO)

2.4 SWIM is an information sharing platform for air traffic management, scheduled to be operational in FY2024. Information services will be available in 1Q, 2025. APAC Regional SWIM will be implemented between from 2024 to 2030.

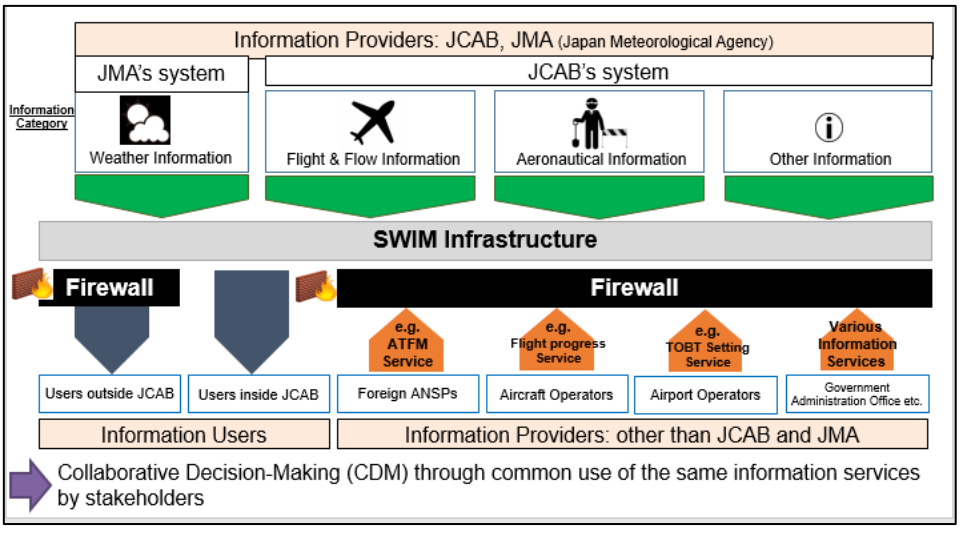

Figure 3. Outline diagram of SWIM

2.5 Besides, in 2020, JCAB launched a five-year plan to reconstruct its domestic airspace to increase ATC capacity. By vertically dividing the airspace where many transit aircraft pass over, such as flights between Asia and North America, into high and low altitudes, it simplifies the workload of controllers and increases the ATC capacity.

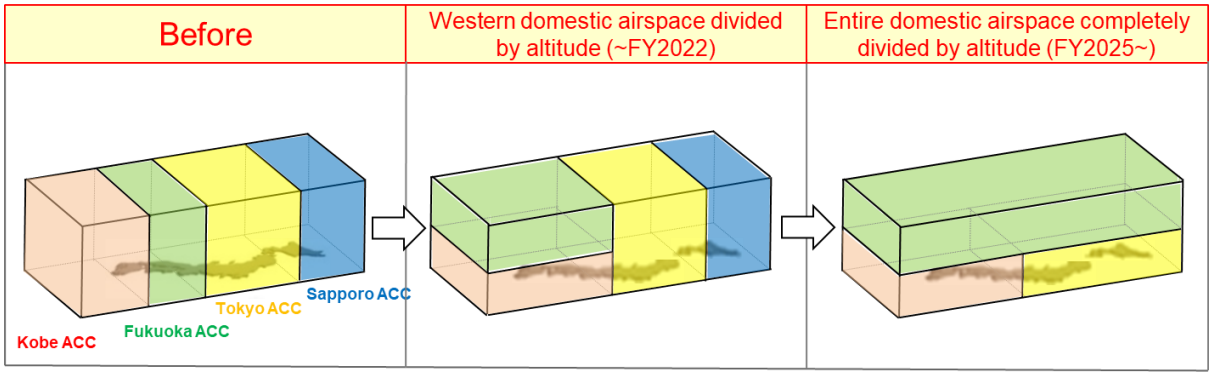

Figure 4. Reconstruction of domestic airspace

2.6 Since JCAB finished to reconstruct the western Japanese airspace, some shortened routes were set as below. The trial operation started in domestic high-altitude airspace in March this year. JCAB is targeting on introduction of UPR and DARP in domestic high airspace in the future.

Figure 5. Direct Routes in the western Japanese airspace

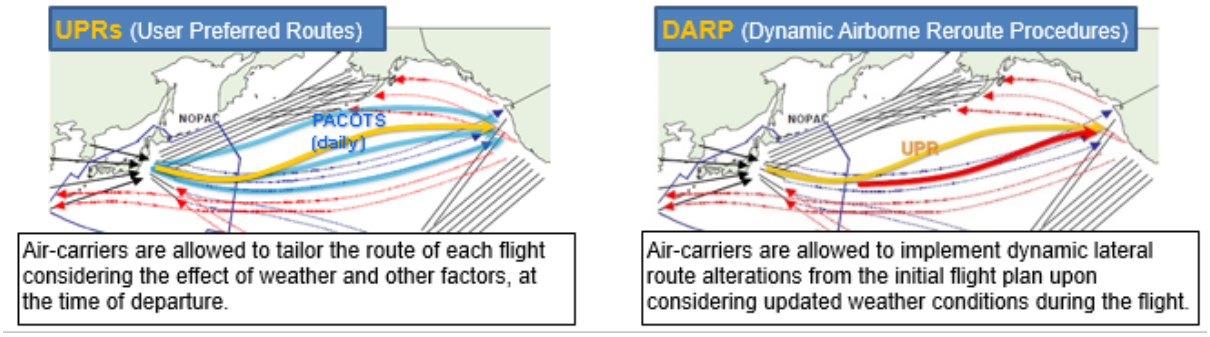

Figure 6. The current operations in Oceanic airspace (UPRs or DARP)

2.7 In addition to that, the trial operation with a speed control based on Calculated Fix Departure Time (CFDT) started in March of this year. By utilizing the passing time of specific point for the aircraft, holding time in congested airspace at low altitude can reduce.

2.8 In terms of the efficient operations around airports, JCAB is introducing more efficient air navigation systems for take-offs and landings. RNP to ILS enables curved routes and approach routes are assumed to be shortened. So, it will be effective for decarburization as well as improvement of safety and operational efficiency. Ground Based Augmentation System (GBAS), which JCAB plans to introduce shortly, is assumed to enhance navigation accuracy more. JCAB will keep taking part in the discussion in ICAO.

2.9 Continuous Descent Operation (CDO) is the operational procedure with minimum engine thrust in the approach phase and reduces CO2 emission as well as noise. JCAB has introduced this operation to three airports (including experimental operation) and will increase the number of airports that support this procedure.

2.10 As CARATS, JCAB is promoting international cooperation as well. A live flight demonstration of TBO, called Multi-Regional Trajectory-Based Operations (MR-TBO) project, successfully completed in this June with partners, Singapore, Thailand, and the U.S. In this project, key TBO capabilities and operational values had been validated. Through these kinds of CARATS activities, JCAB will realize long-term vison for the future air traffic system.

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 matters as appropriate.

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