



ICAO

International Civil Aviation Organization

First Meeting of the APAC ANSP Committee (AAC/1)

Bangkok, Thailand, 17 – 18 April 2023

Agenda Item 2: Presentation on the key ANS implementation challenges in APAC

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

(Presented by JAPAN)

SUMMARY

This paper introduces the long-term vision for the future air traffic system in Japan, namely “CARATS: Collaborative Actions for Renovation of Air Traffic Systems”. Furthermore, this paper also suggests positive collaboration among states about the development of technologies necessary for promotion of the GANP. In order to promote the GANP policy, it needs development of globally utilized technologies because it is difficult to correspond to the development only by national technical means.

1. INTRODUCTION

The Global Air Navigation Plan (GANP) indicates comprehensive direction for the globally harmonized air navigation systems with safe, effective and efficient air traffic. GANP also provides the various measures and technology development, in form of time series block, as Aviation System Block Upgrades (ASBUs) and Technology Roadmaps. This will allow States and stakeholders to realize the safety, sustainable growth, increased efficiency and responsible environmental stewardship that global societies and economies demand.

2. DISCUSSION

2.1 The long-term vision for the future air traffic systems in Japan

2.1.1 In Japan, the CARATS was established 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 has been examined from various angles and also based on global trends, in 2010. At the time, it had defined goals and directions for renovation towards 2025, such as improving safety, meeting the increasing global aviation demand, increasing convenience, and improving operational efficiency. With the update of the 6th edition of the GANP, the planning horizon of the roadmap had been extended to 2040.

2.1.2 The CARATS identifies the following eight directions of renovation to achieve the goals, with having its core goal "Trajectory Based Operations (TBO)"

- Realization of TBO
- Improvement of predictability

- Ensuring information sharing for collaborative decision-making
- Promotion of Performance Based Operation
- Implementation of satellite navigation in all flight phases
- Improvement of situational awareness on the ground and on board an aircraft
- Maximum utilization of human and machine capability
- Realization of high-density aircraft operations at busy airports and congested airspace

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

2.2 Significant measures to realize TBO

To realize of TBO, CARATS sets some significant measures.

2.2.1 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. Typical examples are shown below.

2.2.2 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 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.

2.2.3 SWIM provides the environment where the relevant actors can access the information on aircraft operations any time. Furthermore, it ensures the reliability of data in order to maintain the trustworthiness of information for CDM.

2.2.4 A demonstration project of TBO concept, called Multi-Regional Trajectory-Based Operations (MR-TBO) project, has started and Japan participates in it (with Canada, Singapore, Thailand and U.S.A.) In this project, key TBO capabilities have been validated in the simulated environment using some operational scenarios. Japan will keep cooperating for the next step of this project.

2.3 Improved efficiency in ATC operations

2.3.1 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.

2.3.2 In addition, CPDLC was introduced in the new high altitude sector. The operation started in domestic high-altitude airspace in March this year. Although the operational messages are limited at first, such as communication transfer, the application will be expanded to directions such as route

changes (taking time and effort by voice communication) in the future. This will lead to seamless operation and connecting to oceanic airspace, where CPDLC is already mainly used, and realize free routes (UPR, DARP) at high altitudes, and is ready for seamless operations to the Asian Pacific region in the future.

2.3.3 At the same time, in the oceanic airspace, JCAB will introduce the more efficient operation of Fukuoka FIR by such means as reviewing the airspace and route redesign. These initiatives allow airspace users to reduce flight time and facilitate to access to the optimum altitude, and will contribute to the acceleration of decarbonization and provide efficient operation between APAC region and North America.

2.3.4 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 decarbonization as well as improvement of safety and operational efficiency. Ground Based Augmentation System (GBAS), which JCAB plans to introduce, is assumed to enhance navigation accuracy more. JCAB will keep taking part in the discussion in ICAO.

2.4 Collaboration to promote the GANP

2.4.1 In order to promote the GANP policy, it needs development of globally utilized technologies, bearing in mind harmonization with adjacent states. However, it is difficult to correspond to the development only by national technical means.

2.4.2 The CARATS has been able to achieve the improvement of air navigation services, resolving many technical subjects in cooperation with not only domestic organizations but also overseas organizations. Even though the CARATS still has some unsolved technical subjects for future TBO, it is steadily progressing the policy in alignment with the GANP, in accordance with their actual circumstances.

2.4.3 Through the Asia-Pacific Seamless ANS Plan, international collaborative activities among states and harmonious development in the APAC region are expected to further advance the field of air navigation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) recognize the importance of further developing the field of air navigation by conducting international cooperation activities among states and promoting harmonious development in the APAC region, and
- b) discuss any relevant matters as appropriate.

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