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TECHNICAL COMMISSION

Agenda Item 32: Air Navigation — Policy

DEVELOPMENT AND IMPLEMENTATION OF JAPANESE LONG-TERM VISION IN ALIGNMENT WITH THE GANP

(Presented by Japan)

EXECUTIVE SUMMARY

The 4th edition of the Global Air Navigation Plan (GANP) indicates the strategic direction of globally harmonized air navigation systems to promote safe, effective and efficient air traffic. The GANP also provides various measures and technology development in the form of successive timelines as Aviation Block Upgrades (ASBU) frameworks and technology roadmaps.

This paper introduces the Japanese long-term vision in alignment with the GANP, and some examples of these activities. This paper also describes important items for consideration and the implementation of ASBU modules based on the experiences of Japan.

Action: The Assembly is invited to:

a) encourage States to establish a group including service providers, airspace users and industry stakeholders for the consideration of ASBU modules; and
b) request ICAO to provide the State with supplementary information about all ASBU modules such as the elements of each module, the method of cost benefit analysis for each element and the method of monitoring of each element in a timely manner.

Strategic Objectives:	This working paper relates to the Safety and the Environmental Protection and Sustainable Development of Air Transport Strategic Objectives.
Financial implications:	None
References:	Doc 9750, *Global Air Navigation Plan*, (4th Edition, proposed to the Assembly) Doc10007, *Report of the Twelfth Air Navigation Conference*

1. INTRODUCTION

1.1 The 4th edition of the Global Air Navigation Plan (GANP) indicates the strategic direction of globally harmonized air navigation systems to promote safe, effective and efficient air traffic. The GANP also provides various measures and technology development in the form of successive timelines as Aviation Block Upgrades (ASBU) frameworks and technology roadmaps. States can consider the effectiveness of each measure and can decide priorities and establish plans in alignment with the GANP in accordance with their actual circumstances. The activities of the State are very practicable and certainly contribute to the advancement of the State's air navigation system.

1.2 The GANP helps States to recognize the overall picture of future air navigation systems by classifying various measures and technology in the air navigation fields and to judge which activities they should carry out. Because the long-term vision described in the GANP indicates the direction of technology development for research institutes and the direction of investment for industries, research institutes and industries carry out effective and efficient advancement. Since all concerned parties carry out activities based on the GANP, smooth adjustment and collaborative activities are expected. When such activities are conducted in all States, globally harmonized advancement will be promoted and, thereby, further growth in the air navigation field is expected.

2. THE LONG-TERM VISION FOR FUTURE AIR TRAFFIC SYSTEMS IN JAPAN (CARATS)

2.1 Japan developed “Collaborative Actions for Renovation of Air Traffic Systems” (CARATS) in 2010. CARATS is the Japanese long-term vision and describes the objectives, goals, directions and measures which Japan considers and implements step by step. ASBU and the technology roadmap of the GANP are analyzed carefully and reflected to CARATS if necessary. CARATS is actively promoted and the achievements of CARATS activities improve the Japanese air traffic system.

2.2 CARATS has seven objectives in order to establish future air traffic systems.

a) enhancing efficiency

b) responding to the increase in air traffic volume

c) improving user convenience

d) increasing operational efficiency

e) improving the productivity of air traffic services

f) enhancing the international presence of Japan in the aviation field

CARATS also has eight directions in order to overhaul the ATM operational concept and CNS technology.

a) realizing trajectory-based operation (TBO)

b) improving predictability in ATM operation

c) promoting performance-based operation (PBO)

d) realizing satellite-based navigation for all flight phases

e) enhancing situational awareness on the ground and in the air

f) making maximum use of the capability of humans and machines

g) adequate information-sharing and collaborative decision making

h) realizing high-density operation in congested airports and airspace

2.3 In order to build future air traffic systems based on CARATS, we need to implement short-term measures and promote research and development in a planned manner with regard to long-term measures. We have created roadmaps on which we described 55 specific measures. Roadmaps have 39 OIs (Operational Improvement) and 16 ENs (Enablers). Each measure has the duration of several years for preliminary activities such as research and development and for decision-making for introduction and preparation period for implementation. We have determined that the implementation phase of CARATS started in 2011, and are promoting the study and implementation of the measures.

3. EXAMPLE OF CARATS ACTIVITIES

3.1 We will introduce the example of continuous descent operation (CDO) as one of the CARATS activities. We introduced Initial CDO which means CDO with radio communication at Kansai International Airport and evaluated the outcome in January this year. As a result, we realized that fuel consumption in aircraft that carried out CDO is less than that of aircraft that did not carry out CDO by about 500 lbs. We also realized that air traffic controllers need to control the speed of each aircraft in the airspace because the speeds of aircraft that carried out/did not carry out CDO are mixed. Based on these results, we decided to amend the air traffic controller manual so that it pays attention to such things and so that it deploys Initial CDO. We also considered 2nd-stage CDO which means CDO realized by the uplink of a 3D trajectory from the ATC system. As we conducted a cost benefit analysis and checked that it was effective, we decided to implement 2nd-stage CDO in 2017.

3.2 When considering the appropriate navigation system, we promoted the deployment of a performance-based navigation system to airspace and airports where the necessity and effectiveness of introduction are high. The RNP AR approach is typical as a part of PBN deployment. The RNP AR approach was introduced and started operation at nine airports and we evaluated the outcome. As a result, we recognized that the track mile became shorter and consequently fuel consumption was reduced. In the case of Odate-Noshiro airport, for example, the track mile of RNP AR approach became 26.8NM shorter than that of ILS approach and fuel consumption was reduced by 385lbs. The RNP AR approach was rated highly by pilots because it reduced pilot workload. Based on these results, we will progress to the deployment of PBN including the RNP AR approach.

3.3 In addition, it was decided that the following measures would be implemented in consideration of the cost benefit analysis.

a) time-based management by initial CFDT to avoid concentration of air traffic

b) new RNAV/RNP routes in low altitude airspace for helicopters and small aircraft

3.4 GIS database and providing terrain and obstacle data on-board.

4. KEY POINTS IN ORDER TO PROMOTE CARATS

4.1 The most important thing in promoting CARATS is building appropriate groups for consideration. When introducing a measure such as the ASBU module, some measures are able to be implemented by the State only but many measures require users to pay, for example, on-board system equipment, and technology development by industries. Therefore, it is important that the introduction of a measure is considered and decided by a group which consists of State, service providers, airspace users and industry stakeholders. In Japan, CARATS is managed by the “Committee for Promoting Renovation of the Air Traffic Systems” which consists of representatives from industry, academia and government including academic experts, research institutes, airlines, manufacturers, relevant associations and JCAB. We have useful discussions and implementation is effective because CARATS activities are carried out collaboratively by all members.

4.2 It is also important to divide a module into appropriate elements for discussion and to obtain agreement about a method of cost benefit analysis and a method of monitoring each element. In CARATS activities, we made roadmaps for every measure and set up deadlines for deciding whether measures would be introduced. If the measure included several elements, the discussion took a lot of time to reach a common understanding on each element and we revised the roadmaps in consideration of each element. Moreover, since there were various stakeholders, we had sufficient discussion to agree about the method of cost benefit analysis and the methods of monitoring. We were able to realize some measures through this process. Guidance information on the above-mentioned items helps the State to consider ASBU modules smoothly and guidance about Block 0 is provided.

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