



WORKING PAPER

ASSEMBLY — 39TH SESSION

TECHNICAL COMMISSION

Agenda Item 36: Aviation safety and air navigation implementation support

SUGGESTION TO PROMOTE THE GANP FROM THE EXPERIENCES OF THE CARATS

(Presented by Japan)

EXECUTIVE SUMMARY

This paper firstly introduces the status of the long-term vision for the future air traffic system in Japan, namely “CARATS: Collaborative Actions for Renovation of Air Traffic Systems”. Information on the CARATS can be also obtained from the following website:

<http://www.mlit.go.jp/common/000128185.pdf>.

Furthermore, this paper also suggests positive collaboration among states about the development of technologies necessary for promotion of the Global Air Navigation Plan (GANP). In order to promote the GANP policy, it needs development of globally utilized technologies. However, it is difficult to correspond to the development only by national technical means.

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 trajectory based operation, the CARATS is steadily progressing the policy in alignment with the GANP in accordance with their actual circumstances. When such international collaboration activities are conducted among states, globally harmonized advancement will be promoted and thereby further growth in the air navigation field is expected.

Action: The Assembly is invited to encourage States to collaborate positively among them for the research and development of technologies necessary for activities based on the GANP as appropriate.

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| <i>Strategic Objectives:</i> | This working paper relates to the Safety, Environment Protection and Sustainable Development of Air Transport Strategic Objectives. |
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| <i>Financial implications:</i> | None |
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| <i>References:</i> | Doc 9750, <i>Global Air Navigation Plan, (A39-WP/39-TE/9)</i> Doc10007, <i>Report of the Twelfth Air Navigation Conference</i> |
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1. INTRODUCTION

1.1 The 4th edition of 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. States can consider the effectiveness of each measure, decide priorities and establish the national plan for improvement of air navigation services in accordance with their local circumstance.

2. DISCUSSION

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

2.2 In Japan, 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. In 2010, JAPAN established "The long-term vision for the future air traffic systems (CARATS: Collaborative Actions for Renovation of Air Traffic Systems)" which describes goals aimed at for 2025, directions of renovation, etc. CARATS sets goals like improvement of safety, correspondence to the growth in global air traffic demand, improvement of user-friendliness, improvement of operational efficiency, etc. CARATS also identifies the following eight directions of renovation to achieve the goals, with a core of the "Trajectory Based Operations (TBO)":

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

2.3 Furthermore, JAPAN has scrutinized GANP policy, the ASBUs and Technology Roadmap, and reviewed CARATS roadmap, if necessary, for harmonized deployment along with global trend.

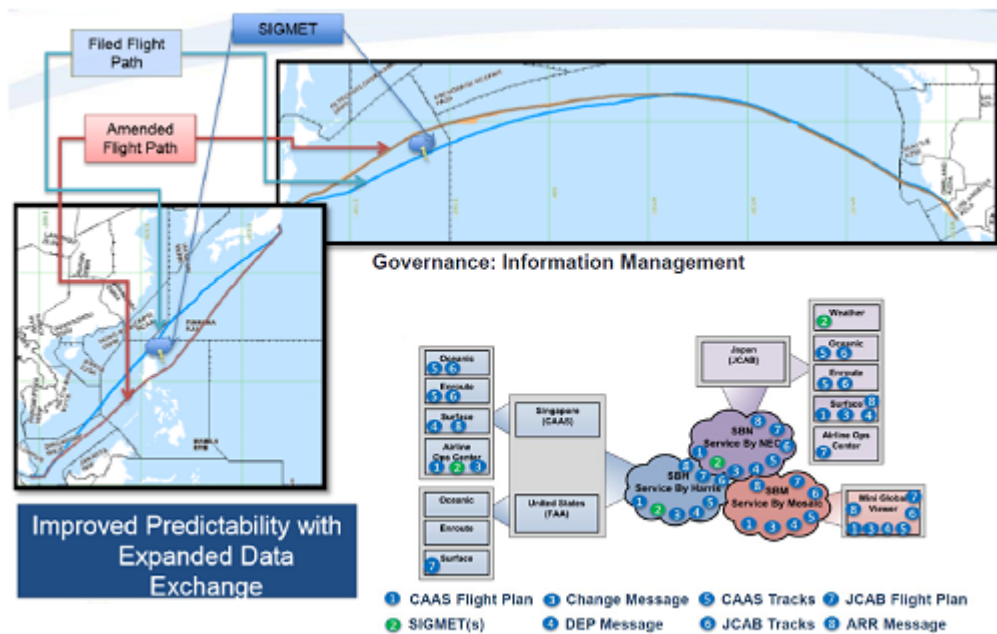
2.4 The main measures in CARATS

2.4.1 Improved efficiency in ATC operations of take-offs, Landings and surface

to build the systems and circuits and do the test. Therefore, the cost-effectiveness new information sharing system, SWIM has been invented.

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

2.4.2.3 The implementation of SWIM also aims to improve interoperability with surrounding States, and Mini-Global Demonstration II has been conducted to build the comprehensive information management system for the next generation. Japan, USA, Canada, Singapore, Thailand, UAE, Brazil and others have participated in Mini Global Demonstration to share air traffic management information to demonstrate flexible and effective aircraft operations in various situations.



Scenario for Trans-Pacific Operations (SIN-NRT-LAX) in Mini Global Demonstration II

2.4.3 Facilitation of satellite-based navigation for all flight phases

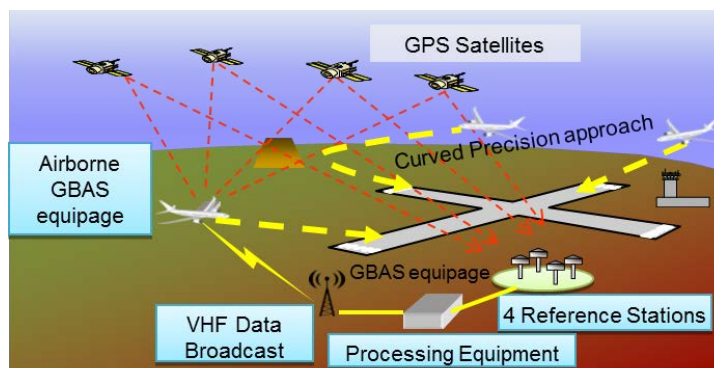
2.4.3.1 JCAB has decided to implement the GNSS augmentation system utilizing satellite navigation, satellite-based augmentation system (SBAS) and ground-based augmentation system (GBAS), and revised CARATS roadmap in FY2014.

2.4.3.2 Regarding GBAS, the implementation decision was done in the background of positive R&D activities on GBAS conducted by Electronic Navigation Research Institute (ENRI), and also in consideration of worldwide implementation of GBAS and on the basis of business case study results.

2.4.3.3 Since compatibility with Japanese ionospheric conditions is necessary for GBAS operation, its design has to be able to mitigate Japanese ionospheric threat, and Japanese certification is required for GBAS system. Japanese ionospheric threat model is defined under cooperation by ENRI.

2.4.3.4 ENRI has participated in ICAO ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG) Ionospheric Studies Task Force and leads their collaboration activities for collecting and sharing ionospheric data by acting as the chair.

2.4.3.5 JCAB decided to install Category-I GBAS in the Tokyo Haneda airport as the first GBAS implementing airport in Japan. After the completion of installation by the end of March in 2019, the evaluation operation will be conducted, then the start of CAT-I operation is planned before the end of March in 2021.



Ground Based Augmentation System (GBAS)

2.4.4 Foreign Object Debris detection system

2.4.4.1 Introduction of a system to detect foreign objects on the runway is expected to contribute to avoid aircraft accidents, it will reduce searching time of foreign objects and consequent runway-close time. ENRI has conducted demonstrations of the Foreign Object Debris (FOD) detection system since last December and could confirm the status of the runway in detail. Furthermore, at night experiments, the FOD detection system could detect approximately 1 inch diameter × 1 inch height metal cylinder placed 450 meters distance away.

2.4.4.2 For this achievement, ENRI collaborated with University of Nice Sophia Antipolis, France and Vietnam National University, Ho Chi Minh City, Vietnam.

3. SUGGESTION TO PROMOTE THE GANP FROM THE EXPERIENCES OF THE CARATS

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

3.2 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 trajectory based operation, the CARATS is steadily progressing the policy in alignment with the GANP in accordance with their actual circumstances. Above-mentioned SWIM and GBAS relevant activities are good examples of such international collaboration activities. When such international collaboration

activities are conducted among states, globally harmonized advancement will be promoted and thereby further growth in the air navigation field is expected.

3.3 Therefore, the Assembly is invited to encourage States to collaborate positively among them about the research and development of technologies necessary for activities based on the GANP as appropriate.

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