International Civil Aviation Organization

WORKING PAPER

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THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 1: Air navigation global strategy
1.1: Vision and overview of the sixth edition of the GANP

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

(Presented by Japan)

EXECUTIVE 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".

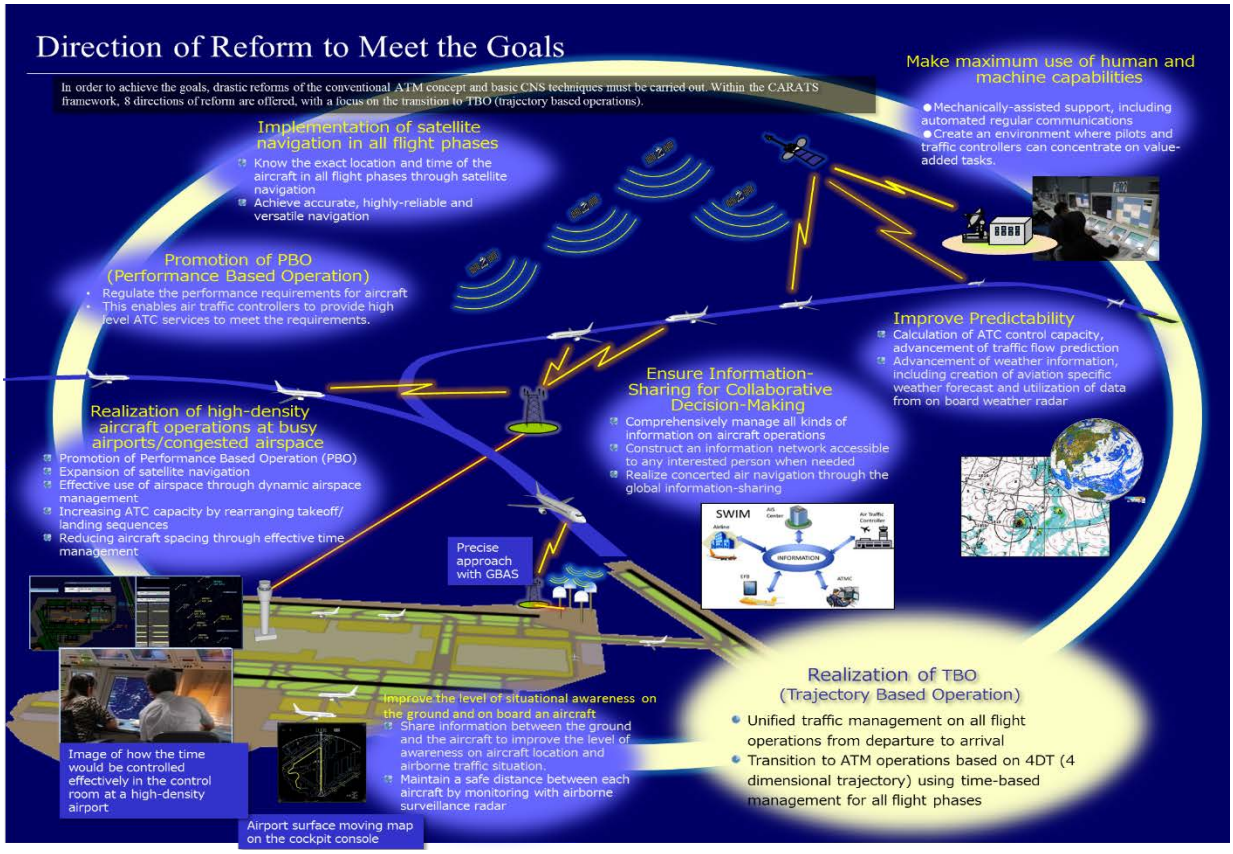
1. INTRODUCTION

1.1 The Global Air Navigation Plan (GANP) indicates comprehensive direction for the globally harmonized air navigation systems with safe, effective and efficient air traffic. The 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 safe, sustained growth, increased efficiency and responsible environmental stewardship that societies and economies globally now require.

2. DISCUSSION

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

2.1.1 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

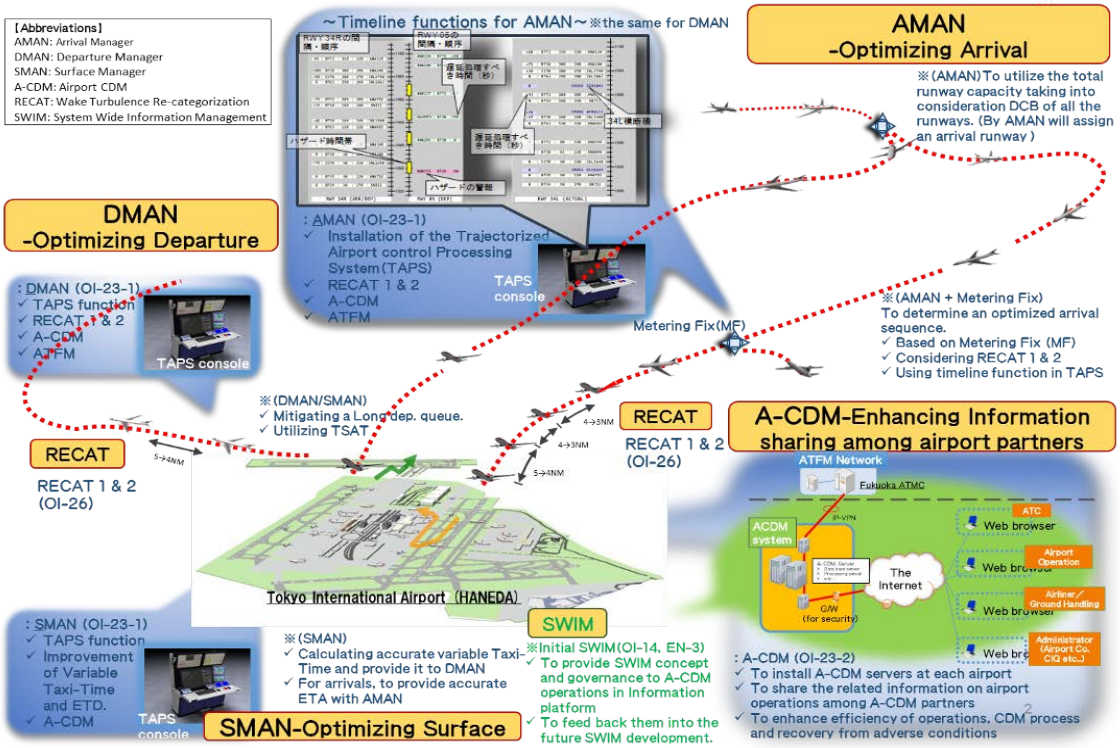
2.1.2 CARATS is also consistent with the ASBU methodology. Japan has mapped its planning to respective Block Upgrade Modules in order to ensure the near- and longer-term global interoperability of their air navigation solutions.

2.2 The main measures in CARATS

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

2.2.1 With arrival management (AMAN), departure management (DMAN) and surface management (SMAN) coordination, Japan Civil Aviation Bureau (JCAB) controls traffic flows effectively at airports including the Tokyo Haneda and the Tokyo Narita airports where airport surface operations are difficult and complicated. This enables the airports to maximize the use of its available resources including runways, and thus increases airport capacity to meet the ever-growing demand in air traffic in the Tokyo metropolitan area.

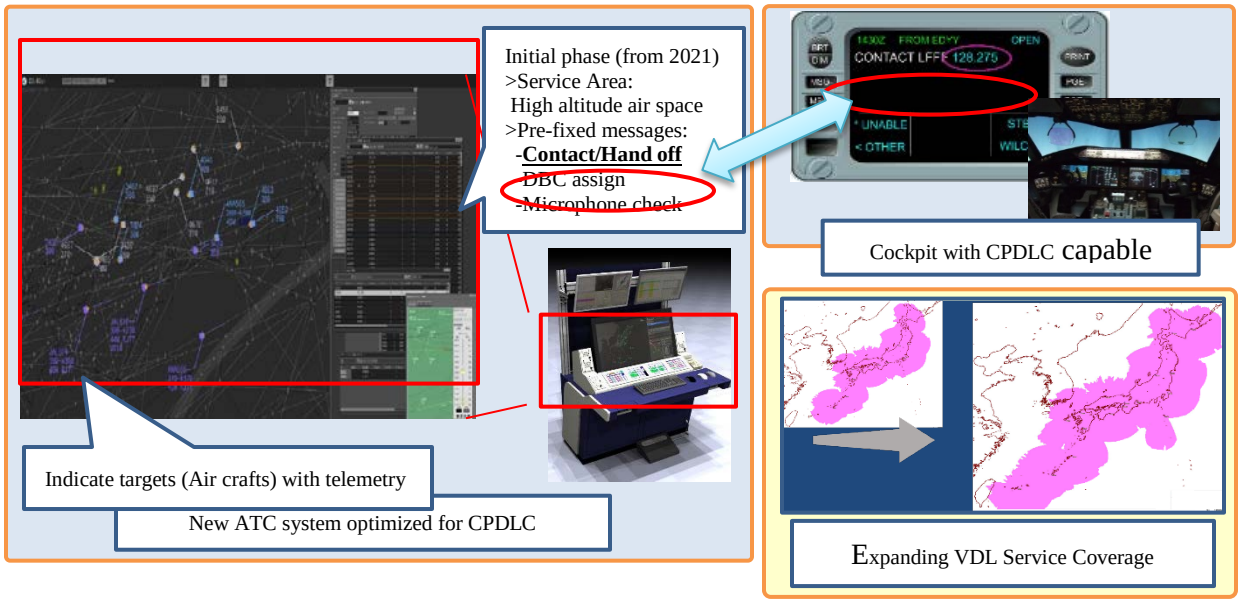
2.2.2 Besides, a couple of air traffic management (ATM) CARATS measures are implemented to improve operations for the Metropolitan airports, which are time-based metering at merging points, improved efficiency of aerodrome operations (AMAN/DMAN/SMAN), airport collaborative decision-making (A-CDM), reduced wake turbulence separation minima (RECAT: Recategorization) etc. Each measure will also start the operation from around 2019 before when the Olympic and Paralympic games held in Tokyo in 2020, in a phased manner where necessary.



CARATS challenge for 2020 in Metropolitan Airports (For the Tokyo Haneda Airport)

Enhancement of ATC capacity by continental controller-pilot data link communications (Continental CPDLC)

2.2.3 In order to improve ATC capacity and safety, Continental CPDLC by FANS with VDL is also going to introduce from 2021. The introduction will be made in phased manner. In initial phase, by transmitting non-time-critical ATC instruction (transfer of communication, microphone check, DBC assignment) as pre-fixed format through the data link in the domestic en-route airspace, we expect that ATC capacity will be increased and human error risk will be reduced.



Continental controller-pilot data link communication (Continental CPDLC)

Information-sharing infrastructure (SWIM: System Wide Information Management)

2.2.4 In order to promote the SWIM construction and the flight and flow information for a collaborative environment (FF-ICE) implementation in Japan, JCAB joined the International Interoperability, Harmonization and Validation (IIH&V) project which was led by the Federal Aviation Administration (FAA) from January 2017. As a technical supporter of JCAB, the Electronic Navigation Research Institute (ENRI) developed a test system for validation and participated lab exercises of Validation 1 that was focused on FF-ICE Planning and Validation 2/3 that was for FF-ICE execution in collaboration with manufacturers and airlines .

2.3 Decision-making and arrangement in the last fiscal year

2.3.1 In consideration of the various social situation and recent ICAO activities, last fiscal year, JCAB made decisions to implement following measures under the collaborative framework with industry, academia and government:

a) OIs: Operational Improvements

1) Introduce LPV/LPV procedure

2) **Collaborative coordination of trajectories prior to the flight operations**

b) ENs: Enablers

1) 4D trajectory calculation

2) Sharing and coordination capability of 4D trajectory

3) Integration of observation data for airport and airspace (Use of 4D weather database)

4) Utilization of weather data observed by aircraft

5) Quantification of weather forecast error

6) LP/LPV utilizing SBAS

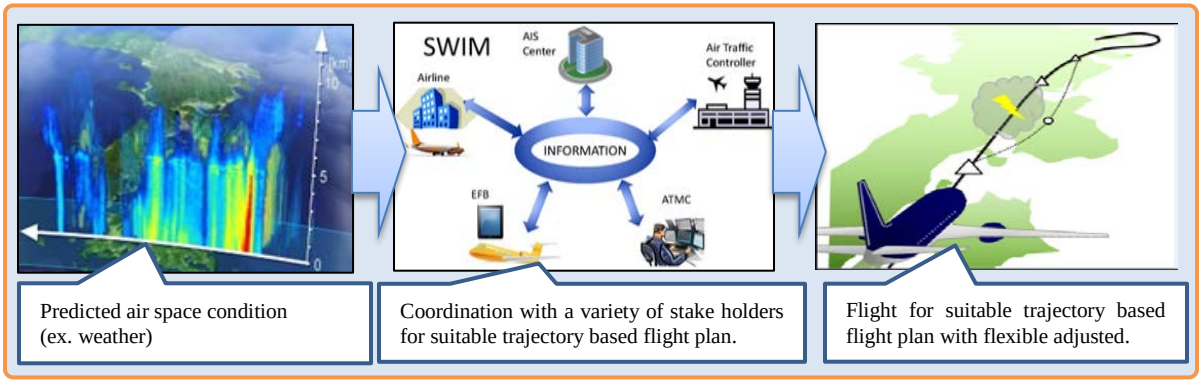
7) WAM(Terminal operation)

8) DAPs for WAM

9) Wind vector calculation function using DAPS telemetries

2.3.2 Regarding of these, “collaborative coordination of trajectories prior to the flight operations”, it is an essential key measure for realizing of trajectory-based operation (TBO).

2.3.3 This OI is improved flight plan making and coordination, prior to the actual flight operation, a variety of stakeholders not only air navigation services providers but also operators have collaborated decision for suitable trajectory-based flight plan in a timely manner for utilizing predicted air space condition such as bad weather, congestion, etc.



Collaborative coordination of trajectories prior to the flight operations

3. CONCLUSION

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate.

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