



ICAO

*International Civil Aviation Organization***Twenty Fifth Meeting of the Communications/  
Navigation and Surveillance Sub-group (CNS SG/25) of  
APANPIRG**

Web-conference, 18 October – 22 October 2021

**Agenda Item 8:** Review and updates

- 8.1 Seamless ATM Reporting Process including the ASBU regional performance dashboard/implementation plan

**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, called “CARATS: Collaborative Actions for Renovation of Air Traffic Systems”. Japan is renovating CARATS through updating the roadmap, restructure of promotion system and is working on projects related to reduction of CO2 emission and digital transformation.

**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. 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**

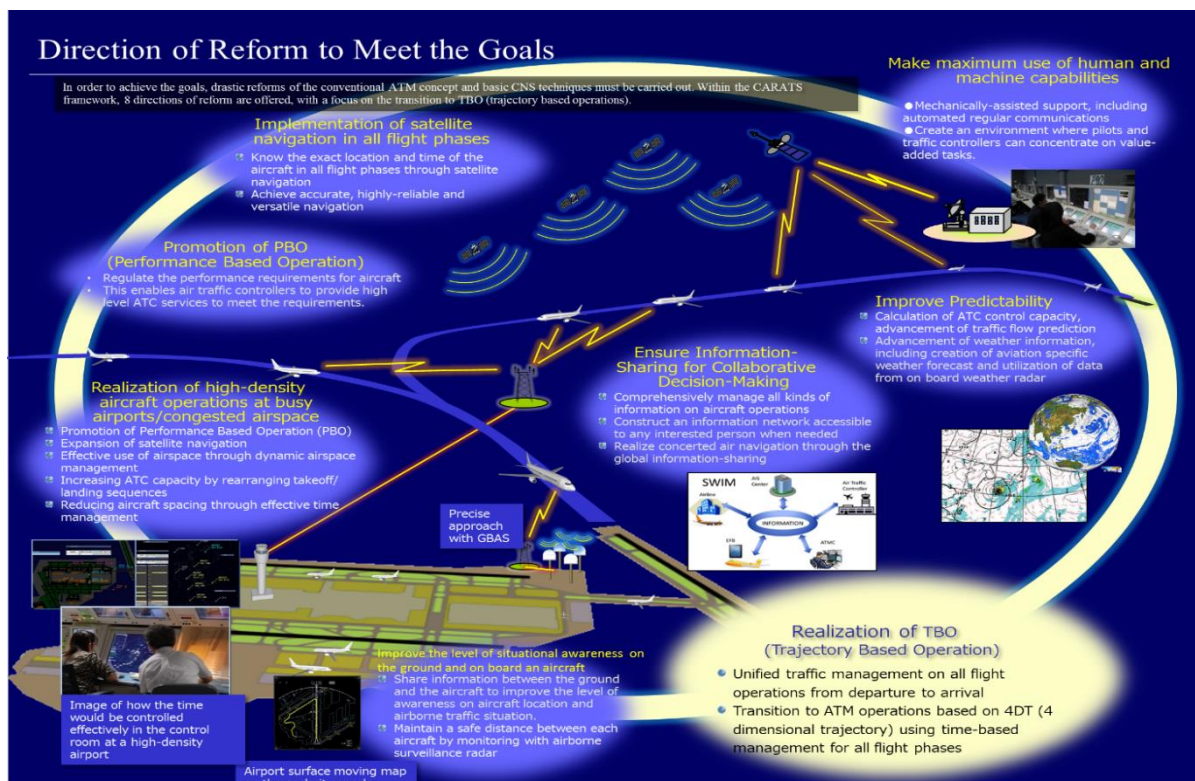
2.1.1 The first GBAS intended for operation has been installed at Tokyo Haneda. The system was manufactured by NEC Corporation and has been delivered in March 2020.

2.1.2 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 had been examined from various angles and also based on global trends. In 2010, "The long-term vision for the future air traffic systems (CARATS: Collaborative Actions for Renovation of Air Traffic Systems)" had been introduced and it sets various goals aiming

**Agenda Item 8.1**

18-22/10/21

for the skies of Japan in 2025, associated with measures called Operation Improvements and Enablers, which brings the realization of CARATS goal. 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 CARATS is also consistent with the ASBU Methodology. Japan has been 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 renovation of CARATS roadmap and its promotion system

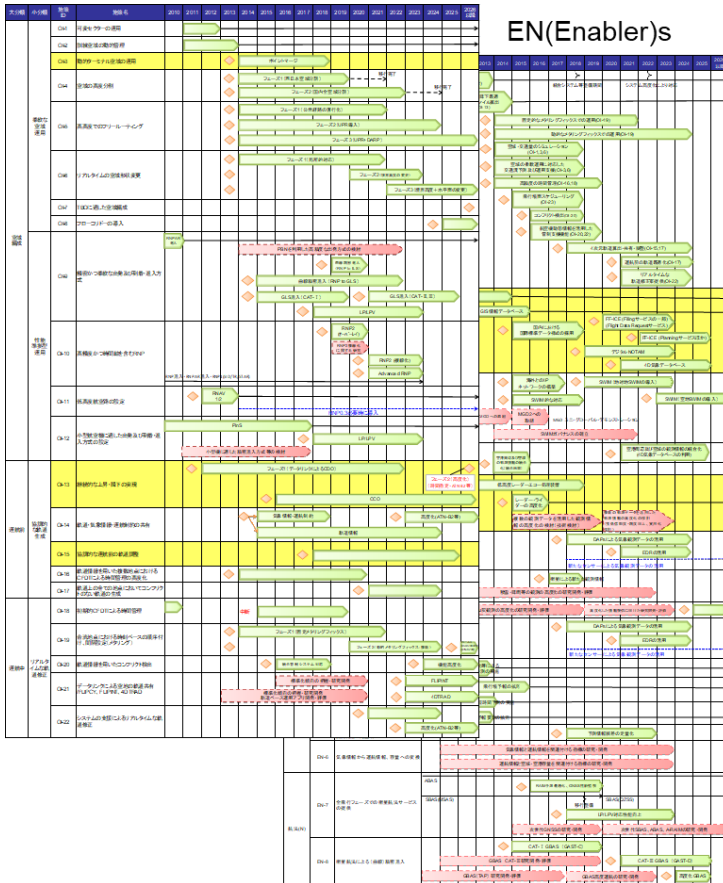
2.2.1 Since the foundation of CARATS in 2010, the project had introduced various measures contributing evolution of skies in Japan. Yet, realizing its ultimate goal TBO has not been accomplished or expected to be so in near term.

2.2.2 After introduction of GANP Edition 6, CARATS had conducted renovation of its structure and roadmap. The key concept of the renovations are as follows.

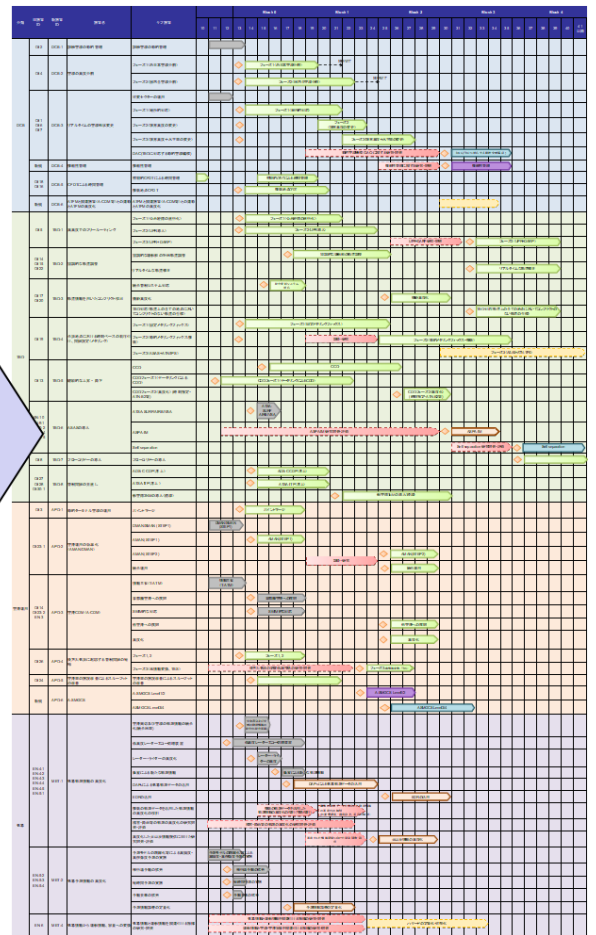
- ✓ The planning horizon of the roadmap had been expanded to 2040
- ✓ OI(Operational improvement)s and EN(Enabler)s are combined together as necessary and recategorized into 8 groups depending on the domain of measure.  
**DCB** (Demand and Capacity Balancing), **TBO** (Trajectory Based Operations), **APO** (Airport Operations), **MET** (Meteorological Information), **INF** (Information Management), **NAV** (Navigation), **SUR** (Surveillance), **COM** (Communication)
- ✓ Restructure working groups, sub-groups ad ad-hocs so that they correspond to current key issues.

### CARATS Roadmap Renovation

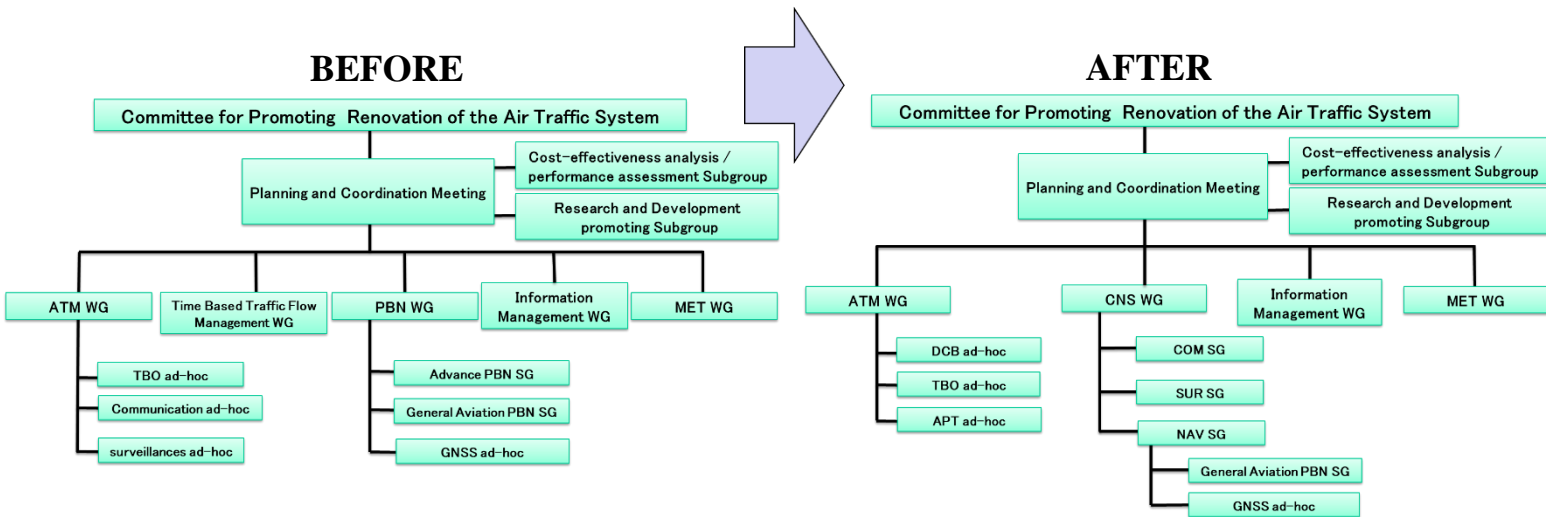
#### OI(Operational improvement)s



#### EN(Enabler)s



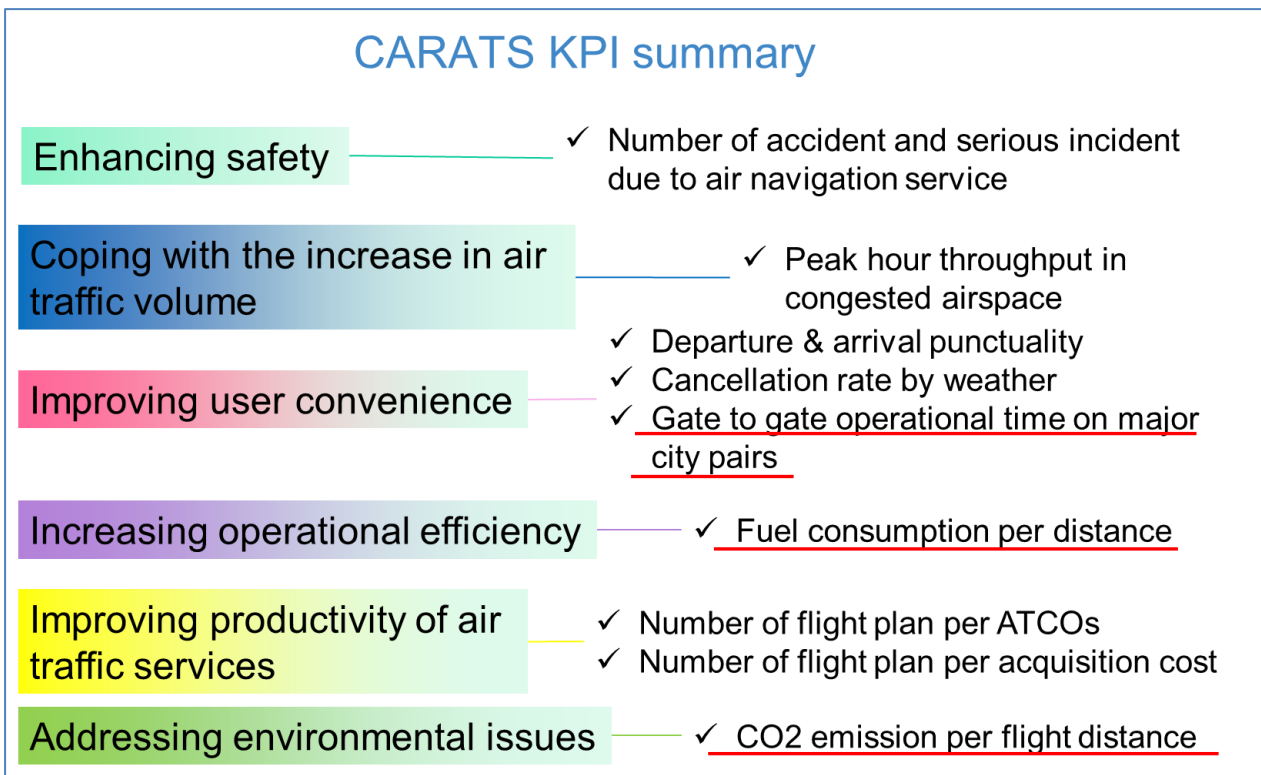
Restructure of working groups



2.3 New Phase of CARATS and its aim

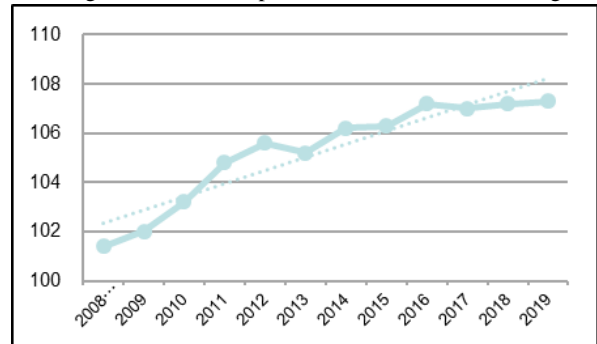
a) CARATS KPIs and increasing needs for reduction of CO2 emission by air traffic

2.3.1 Since its foundation, CARATS sets various KPIs, and some of them relates to environmental issues, or simply CO2 emissions by air traffic. Refer following summary and especially ones with red lines.

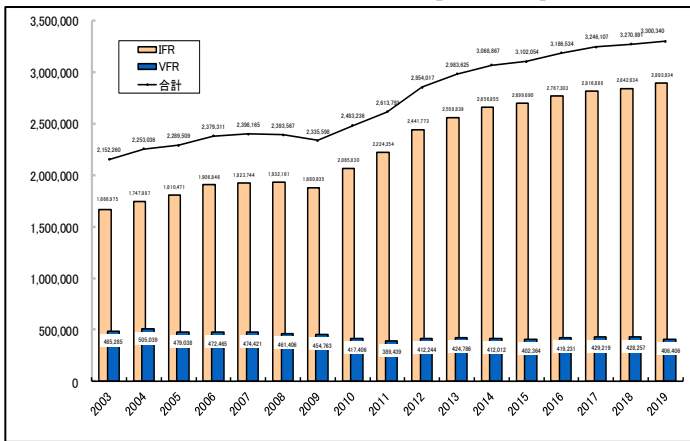


2.3.2 The traffic volume in Japanese airspace had been kept increasing successfully as desired by public demand. Yet, despite the efforts been put in CARATS, those KPIs relating CO2 emissions had shown unpleasant results.

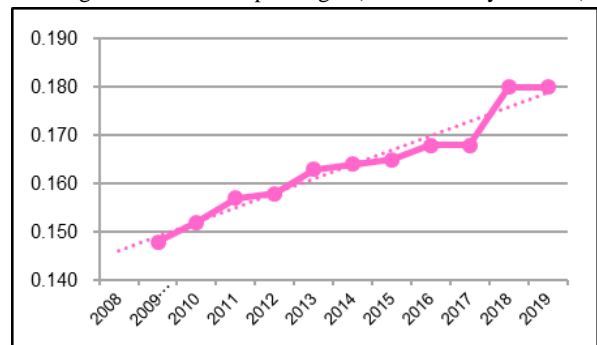
Average Gate to Gate Operation Time of Domestic Flight



Number of Aircraft Controlled in Japanese Airports



Average CO2 Emission per Flight (777-200 Tokyo-Osaka)



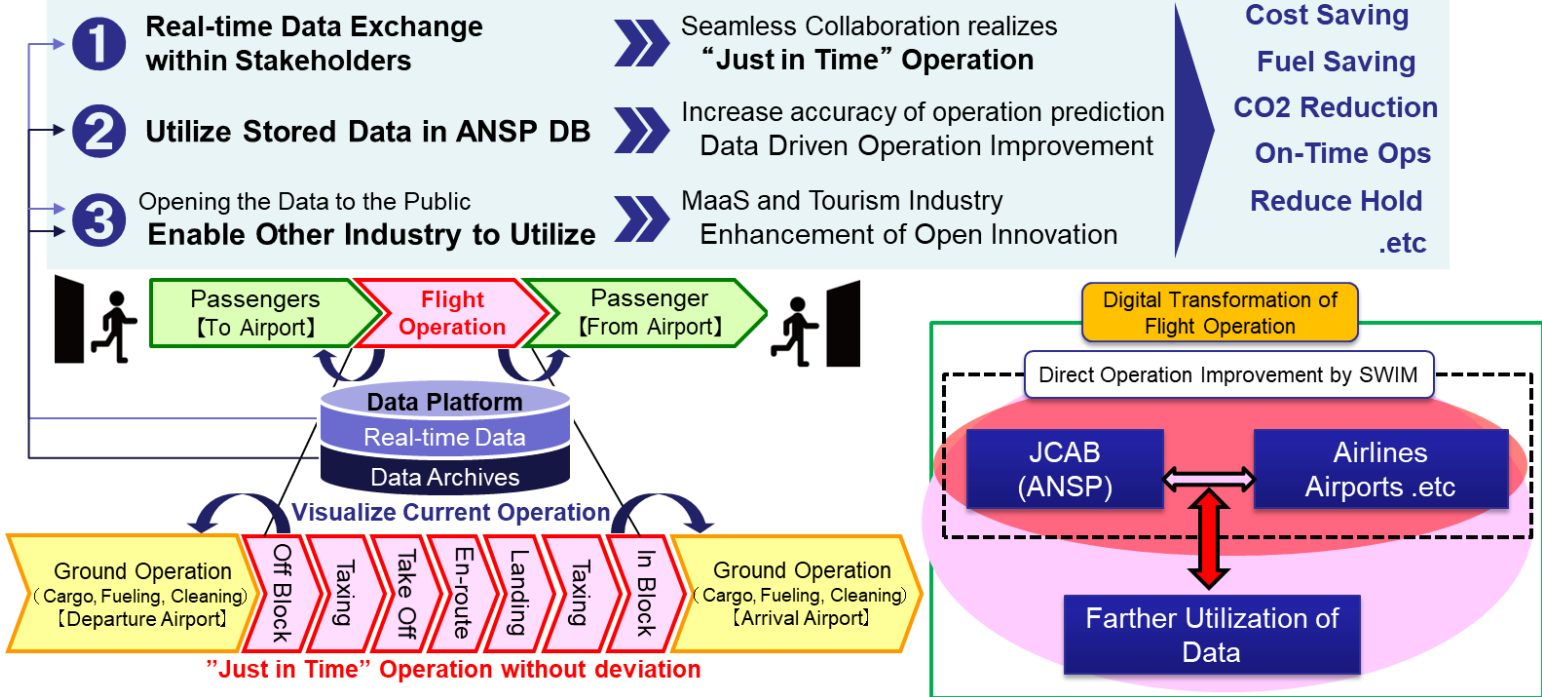
2.3.3 CARATS promotion team is currently discussing followings to tackle this issue.

- ✓ Refurbish CARATS KPIs especially those relating CO2 emissions.
- ✓ Enhance CARATS measures especially those contribute for reduction of CO2 emission.

b) Digital Transformation through SWIM

2.3.4 One of the key projects within CARATS is implementation of SWIM in 2024. CARATS is focusing its effort to accomplish this mission and at same time, seeking for more ways to maximize SWIM’s potential and bring benefits to every stakeholders even beyond aviation industry.

**Increase Productivity and Convenience by utilizing of ATM / Flight Operation Data**



2.3.5 CARATS and its spin-off project is currently conducting follow activities.

- ✓ Hosting several conference involving many stakeholders from inside and outside of aviation industry.
- ✓ Discuss and share visions and ambitions among every stakeholders seeking for maximum use of operations data and realizing each industries goal.

**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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