



ICAO

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## **Agenda Item 3: Work Programme**

### **ASIA-PACIFIC TRAJECTORY BASED OPERATIONS PATHFINDER PROJECT**

(Presented by China, Hong Kong China, Indonesia, Japan, New Zealand, Republic of Korea, Singapore, Thailand, United States of America, CANSO and IATA)

#### **SUMMARY**

This paper presents an update on the Asia-Pacific Trajectory Based Operations (APAC TBO) Pathfinder Project - a collaborative effort between Air Navigation Service Providers (ANSPs) from China, Indonesia, Japan, New Zealand, Philippines, Singapore, Thailand, United States of America and Viet Nam, and Ministry of Land, Infrastructure and Transport of the Republic of Korea, CANSO and IATA. Initiated under Workstream 2 of the APAC ANSP Committee (AAC), the Project aims to harmonise operationalisation of the ICAO global TBO concept in the APAC region. AAC is encouraged to continue the support of this project by ensuring availability of experts and other resources as needed to accelerate operationalisation of TBO in Asia-Pacific.

## **1. INTRODUCTION**

1.1 The Global Air Traffic Management Operational Concept (GATMOC), ICAO Doc 9854, presents the ICAO vision to achieve an interoperable global ATM system that accommodates all airspace users in all phases of flight, and does so in an economically viable manner that meets satisfactory levels of safety, ensures environmental sustainability, and meets national security requirements.

1.2 To achieve this vision, it is essential to ensure safe, secure and timely global information management and exchange between ATM stakeholders. This requires paradigm shift towards a holistic, dynamic and collaborative decision-making environment, within which the interests and expectations of various ATM stakeholders are considered and balanced. The envisioned ATM system will have to interact with other flights and hazards as it aims to achieve the optimum system outcome, with minimal deviation from the user requested flight trajectory, where possible. These provide the basis for Trajectory Based Operations (TBO).

1.3 The Asia-Pacific Trajectory Based Operations (APAC TBO) Pathfinder Project aims to harmonize and accelerate States' implementation of the ICAO global TBO concept. Through collaborative efforts to identify operational values and prioritisation of operational scenarios at the regional level, the Project will provide greater clarity on the expected benefits as well as feasible roadmaps to operationalise TBO in Asia-Pacific. In collaboration with CANSO and IATA, it allows ANSPs in the APAC region and airlines to harmonise their planning and modernisation efforts, and improve flight and overall air traffic management efficiency across the region.

## 2. DISCUSSION

### 2.1 Asia-Pacific Trajectory Based Operations (APAC TBO) Pathfinder Project

2.1.1 On 23 October 2023, under the auspices of the Workstream 2 of the Asia and Pacific ANSP Committee (AAC), CANSO, IATA and the Air Navigation Service Providers (ANSPs) from China, Indonesia, Japan, New Zealand, Philippines, Singapore, Thailand and United States of America committed to working together on deployment of TBO in the APAC region. This collaboration, titled the APAC TBO Pathfinder Project (Pathfinder), aims to identify feasible and harmonised roadmaps for realisation of the ICAO global TBO concept in the region. Subsequently, the Ministry of Land, Infrastructure and Transport of the Republic of Korea and ANSP from Viet Nam joined the project, while the ANSPs from Australia, Hong Kong, China and India will participate as observers.

2.1.2 Currently, building blocks for TBO are at various levels of maturity across the APAC region. While System Wide Information Management (SWIM) and Flight and Flow Information for a Collaborative Environment (FF-ICE) Release 1 (R1) are more mature and closer to being ready for deployment in several States, other TBO enablers are still under conceptualisation and development, including FF-ICE Release 2 (R2) and Connected Aircraft. The Pathfinder Project will build on the ongoing efforts in Asia-Pacific and other regions to advance the realisation of the ICAO global TBO concept in the APAC region, adopting a discovery approach through demonstrations and trials.

2.1.3 At the kick-off meeting of the Pathfinder Project on 3-5 April 2024, participants representing the ANSPs shared information about their TBO deployment plans and its enablers, including SWIM, FF-ICE and Connected Aircraft. IATA also shared airlines' perspectives and needs. These and numerous past virtual meetings and discussions over emails culminated into an agreement for a common vision and approach.

2.1.4 To facilitate effective project planning and execution going forward, three workgroups (WG) were formed with each focusing on goals agreed at the kick-off meeting (see Annex A for key milestones and timelines):

- i. Goal 1 (to be driven by WG1)  
Achieve a **common understanding of the ICAO global TBO concept, including its enablers and deployment timelines**, for project participants and for APAC ATM stakeholders
- ii. Goal 2 (to be driven by WG2)
  - a. Using identified TBO scenarios based on APAC city-pairs, recognise and assess operational values. Table-top exercises, lab demonstrations, and live flight demonstrations will be executed based on a tiered level of participation;
  - b. Implement **SWIM** for the first operational use case in the region; and
  - c. Implement **initial FF-ICE/R1 services** for the selected set of city-pairs under ii(a) and in conjunction with the work planned for under ICAO APAC FF-ICE Adhoc Group
- iii. Goal 3 (to be driven by WG3)  
Explore, agree on, and document metrics and evaluation methodologies in support of **benefit assessment** of regional TBO scenarios, and achieve **consensus** to operationalisation of TBO and its enablers in Asia-Pacific in alignment with regional needs and ICAO global plans.

### 2.2 WG1 – Learning and Advocacy

2.2.1 WG1 identified effective communication to TBO stakeholders' leadership and executives as a key priority supporting modernisation and harmonisation of air navigation planning and implementation in the APAC region, as it is critical to secure necessary resource commitments. WG1 will develop an outreach strategy and education framework to engage and inform technical, operational and executive leadership across ATM stakeholders about TBO concept and its importance to the region. A repository will also be established to support easy access to information and continuous learning by APAC ATM stakeholders.

2.3 WG 2 – Operational Scenarios and Trials; Deployment of Mature Enablers

2.3.1 TBO will enable significant improvements to predictability, flight efficiency, capacity utilisation, and flexibility in air traffic management. WG2 will categorise the operational values and prioritise specific ones to focus on. A tiered participation will be considered to allow greater participation. Based on the technical and operational readiness of the participating ANSPs and airlines, operational scenarios and city-pairs will be established to validate the operational values through the conduct of TBO trials and demonstrations.

2.3.2 To avoid duplication in the deployment of mature enablers, WG2 will coordinate and leverage the ongoing initiatives conducted by the ICAO APAC SWIM Task Force (SWIM TF) and ICAO APAC FF-ICE Adhoc Group, including training, table-top exercises and lab demonstrations.

2.4 WG 3 – Operational Benefits and Development of TBO Roadmap

2.4.1 The first priority of WG3 is to develop metrics and evaluation methodology to assess expected and achieved benefits through TBO operational scenarios executed at the city-pairs agreed by WG2. This would be iterated whenever there is an update from WG2 on the identified operational values and trial results. WG3 will also deliver an APAC TBO roadmap which would describe the steps and capabilities required by the APAC region to realise the global TBO concept including building blocks such as SWIM, FF-ICE and Connected Aircraft, to harmonise development in APAC.

**3. ACTION BY THE MEETING**

3.1 The AAC is invited to:

- a) Note the information in this paper;
- b) Share activities in support of the development and realisation of the ICAO global TBO concept in the APAC region and lessons learnt;
- c) Encourage participation in the APAC TBO Pathfinder Project and seek commitment to ensuring resources to deliver the outcomes of the project; and
- d) Discuss any relevant matters and provide guidance as appropriate.

— END —

**KEY MILESTONES AND TIMELINES**