

Work Stream 2

**Accelerate the development and implementation of Seamless ANS
and collaborate on green initiatives to enhance ANS sustainability**

Report to AAC/4

Leads: Hong Kong China, Singapore, Thailand, USA

Members: Cambodia, China, India, Malaysia, New Zealand, Viet Nam, ACI, CANSO

Work Stream 2 – Tasks Recap

- Task 1: **Review current situations** including existing processes and seek ways to make ANS implementation easier
- Task 2: Collaborate on establishing the key **Trajectory Based Operations (TBO)** building blocks, including SWIM and FF-ICE, to support the development and realization of TBO in APAC
- Task 3: Collaborate on the implementation of initiatives such as remote towers, **user-preferred route**, and **free route airspace**
- Task 4: Assist APAC ANSPs with enhancing their **ATFM capabilities** so that all APAC ANSPs can achieve higher levels of participation in APAC Cross-Border Multi-Nodal ATFM Collaboration (AMNAC) in alignment with ICAO *No Country Left Behind* Principle

Work Stream 2 – Tasks Recap

- **New initiatives** C
Task 1: Review current situation including existing processes and seek ways to make ANS implementation easier *(to be proposed)*
- **Asia-Pacific TBO Pathfinder Project** A
Task 2: Collaborate on establishing the key Temporary Based Operations (TBO) building blocks, including SWIM and FF-ICE, to support the development and realization of TBO in APAC *(ongoing)*
- **Support WS4 on FRT0 initiative**
Task 3: Collaborate on implementing existing initiatives such as route towers, user-preferred route, and free route airspace *(ongoing)*
- **ATFM activities - sharing** B
Task 4: Assist APAC ANSPs with enhancing their ATFM capabilities so that all APAC ANSPs can achieve high performance in the Border Multi-Nodal ATFM Collaboration (AMNAC) in alignment with ICAO No Country Left Behind Principle *(ongoing)*



Task 2

To update AAC/4 on the progress of APAC TBO
Pathfinder Project (“Pathfinder”)

Scope

APAC TBO Pathfinder Project is an initiative to define, develop and demonstrate the ConOps and requirements for TBO in the APAC region

Define

- ✓ What ICAO global TBO concept is for APAC
- ✓ What will be APAC realisation roadmap

Develop

- ✓ Priority TBO scenarios for APAC

Demonstrate

- ✓ TBO processes
- ✓ Stakeholder interactions in APAC TBO scenarios

Participants

Members: 12 ANSPs, CANSO, IATA

1 Observer



Goals and Key Deliverables

Define

- ✓ What ICAO global TBO concept is for APAC
- ✓ What will be APAC realisation roadmap

Develop

- ✓ Priority TBO scenarios for APAC

Demonstrate

- ✓ TBO processes
- ✓ Stakeholder interactions in APAC TBO scenarios

Goals of Workgroup (WG)

WG1 - Learning and Advocacy

- **Common understanding** of ICAO Global TBO Concept for project participants and stakeholders

WG2 - TBO Trials and Capabilities Build-Up

- Recognised **operational values** arising from demonstrating regional TBO scenarios
- Utilised **SWIM and initial FF-ICE/R1 services** for trials

WG3 - Benefit Analysis and TBO Roadmap

- Determined **benefits** of regional TBO scenarios
- Developed **TBO Roadmap** in line with regional needs and ICAO global developments

Deliverables

D1: Engagement sessions with executives and technical leaders with TBO communications package

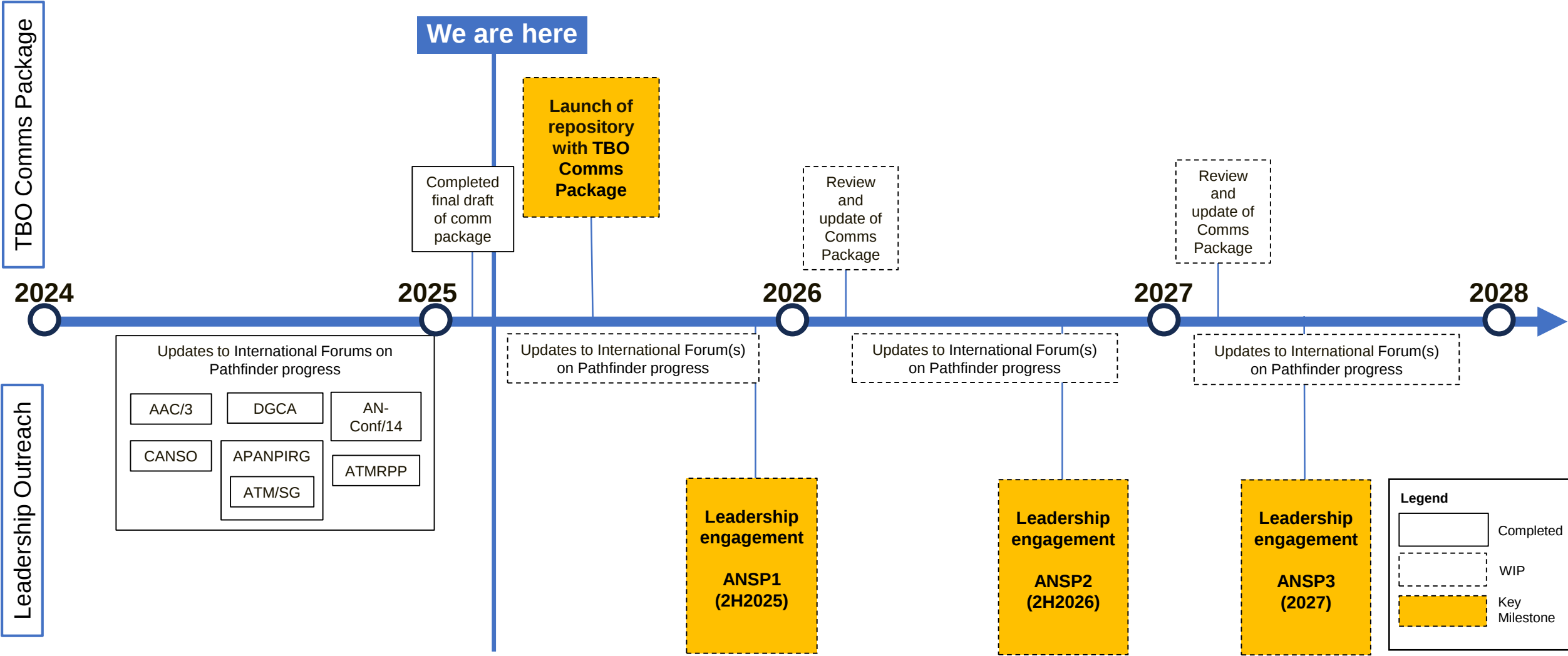
D2: Report with priority ops value documented for APAC from demos for FF-ICE, connected aircraft and TBO

D3.1: Benefits Analysis Report

D3.2: TBO Roadmap for APAC Seamless ANS Plan

WG1 – Learning and Advocacy

Deliverables: Engagement sessions with leaderships with TBO Comms Package



WG1 – TBO Comms Package (*outline*)

Executive Summary

- State the need for TBO in APAC, requirements for deployment and the Pathfinder's ongoing efforts to propose a TBO roadmap for the region

Comms Package

- Put on a web-portal repository for APAC stakeholders. See outline below:

A. Introduction

- Purpose, background and ICAO global TBO concept to address gaps identified in the current ATM system

B. Requirements of TBO

- Three key building blocks of TBO: SWIM, FF-ICE and Connected Aircraft (CA)

C. Benefits of TBO

- Key benefits of TBO for a safer, more efficient and sustainable future for the aviation industry

D. Key Aviation Stakeholders

- Key stakeholders facilitated or impacted by TBO

E. Perspective of Airspace User on TBO

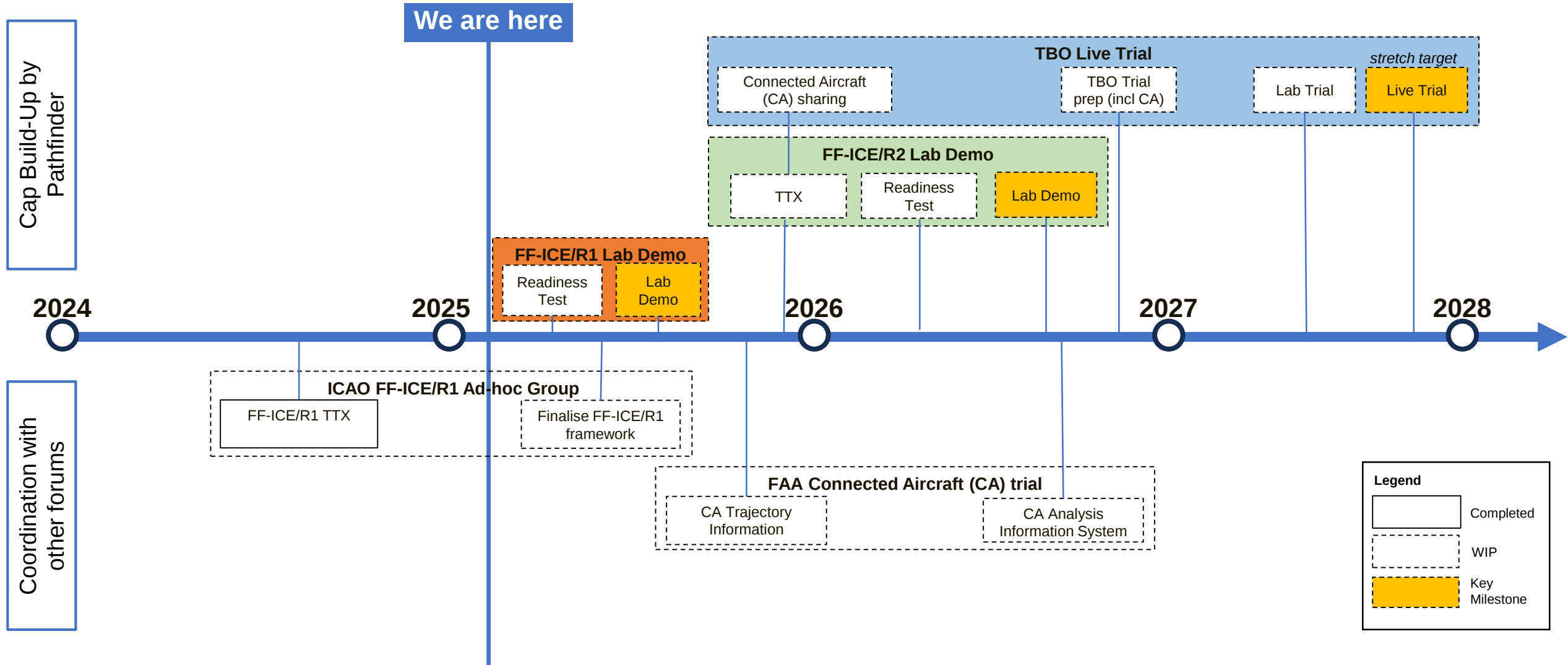
- Benefits airlines seek and challenges in implementation; need for stakeholder engagement and consultation

F. Summary of Past TBO Trials

- Information on past TBO trials and a summary of the lessons learnt

WG2 – TBO Trials and Capabilities Build-Up

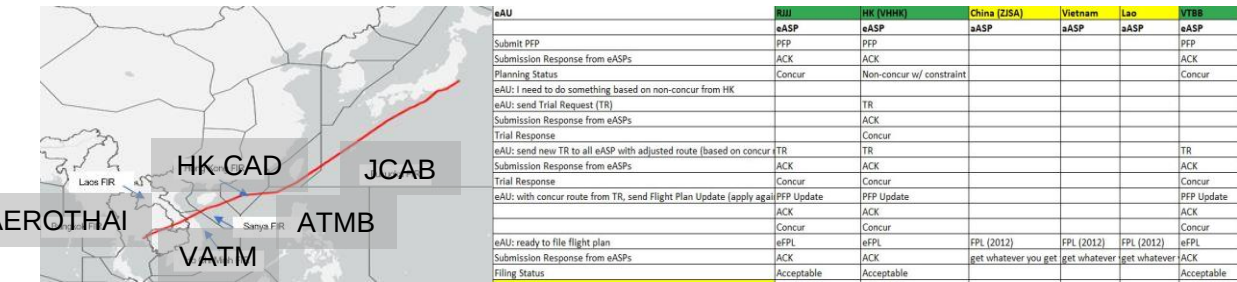
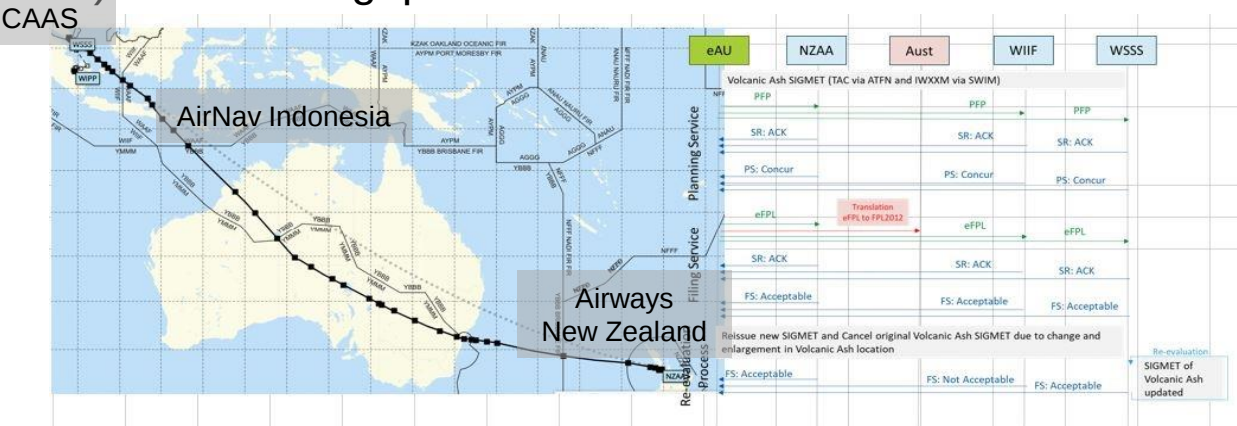
Deliverables: Report with priority ops value documented for APAC from demos for FF-ICE, connected aircraft and TBO



WG2 – Ops Scenarios and Ops Value

Developed 5 ops scenarios for FF-ICE/R1 Lab Demo:

- 1) Guam → Bangkok
- 2) Tokyo → Bangkok
- 3) Bali → Bangkok
- 4) Auckland → Singapore
- 5) Bali → Singapore



Item	Detail	Scenario Step	eAU	KZAK	RPHI	VVHM	VDPF	VTBB
Scenario Name	PGUM-VTBB							
Operational Values	Ops Value: Increase Strategic Planning and Enhanced Predictability							
Synopsis	See scenario steps							
Assumption of Environment	3 eASP/2 aASP							
FF-ICE/R1 Services	Planning service Trial service Filing service Notification service							
Trajectory	PGUM PULEE G467 ENDAX/N0524F360 P515							
Participated Organizations	KZAK, RPHI, VVHM, VDPF, VTBB							
Actions by eASP	See scenario steps							
Information Exchange Models	See scenario steps							
Information Exchange Model Version								
Data Flow Diagram								
Sequence Diagram								
Scenario Steps								

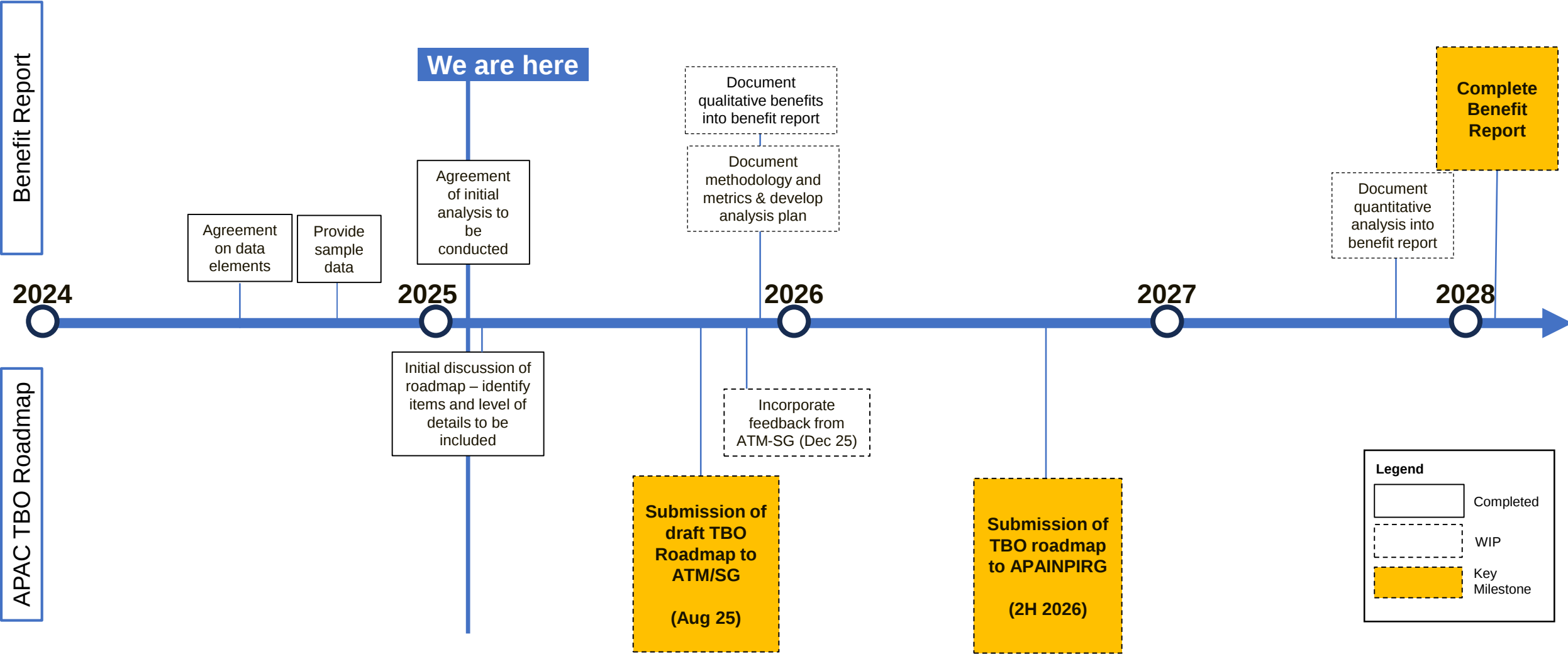


Associated Ops value to be evaluated:

- Improved Strategic Planning
- Alignment of strategic plans and tactical actions
- Enhanced Predictability
- Decreased Uncertainty

WG3 – Benefit Analysis and TBO Roadmap

Deliverables: Benefit Analysis Report and TBO Roadmap for APAC Seamless ANS Plan



WG3 – APAC TBO Roadmap

- **Target is to integrate an initial version of APAC TBO Roadmap into the next version of APAC Seamless ANS Plan**
 - Draft roadmap will be submitted to ATM/SG/13 (August 2025) for feedback
- **APAC TBO roadmap will be aligned with TBO Levels being defined by ICAO ATM Requirements and Performance Panel (ATMRPP) (*WIP, to be incorporated in an ICAO TBO guidance document in future*)**
- **Components for each TBO level (*WIP, being reviewed by Pathfinder members*):**
 - TBO capabilities (and potential use cases) for each level
 - Relevant ASBU Blocks/Elements & ICAO Docs
 - Relevant APAC Forums / works
 - Indicative timeline for APAC

Other Notable Progress

- **Expanded representation** AAI, Hong Kong CAD, Republic of Korea and VATM have joined as new members since the announcement of the project in October 2023
- **Close coordination with ICAO** APANPIRG has noted the work of Pathfinder including the development of a regional TBO roadmap
- **Capabilities Build-Up** Some participants of Pathfinder are building their own system prototypes or considering the use of industry solutions, to participate in demonstrations for a deeper understanding of TBO building blocks

WG Leads and Members

WG1 Learning and Advocacy

Leads

- Airway New Zealand
- CAA Singapore

Members

- Airports Authority of India
- AirNav Indonesia
- CAA Philippines
- Republic of Korea
- Viet Nam ATM Corporation
- CANSO
- IATA

WG2 TBO Trials and Capabilities Build-Up

Leads

- AEROTHAI
- CAA Singapore
- Federal Aviation Administration

Members

- Airports Authority of India
- AirNav Indonesia
- Airways New Zealand
- ATM Bureau of CAA China
- Hong Kong CAD
- Japan Civil Aviation Bureau
- Viet Nam ATM Corporation
- IATA

WG3 Benefit Analysis and TBO Roadmap

Leads

- AirNav Indonesia
- ATM Bureau of CAA China
- CAA Singapore
- Federal Aviation Administration

Members

- Viet Nam ATM Corporation
- AEROTHAI

Task 4

Sharing of ATFM activities in the Asia Pacific region (2025)

- **ICAO ATFM and related meetings**
 - APAC/MID ATFM TF/9 and FF-ICE Seminar 2025 (Dubai, 23-27 Feb 2025)
 - MET/ATM Seminar and ATFM/SG/15 (Bangkok, 28 Apr – 2 May 2025)
- **APAC Multi-Nodal ATFM Collaboration**
 - AMNAC/23 (Hong Kong China, 24-28 Mar 2025)
 - AMNAC/24 (China, Oct 2025)
- **Special Topic Meeting on the future of ATFM (Bangkok, 13-14 Mar 2025)**
 - To discuss improving existing regional ATFM operations with technological advancements and new concepts (e.g. FF-ICE, TBO)

Task 1

New initiatives

- **Two AAC/4 Working Papers were presented by members at WS2 meeting**
 - *WP7 - Setting up Working Group to Develop Principles, Rules and Concept of Operations for Next Generation Air Traffic Flow Management to Support Regional Air Traffic Management*
 - *WP8 - Driving ATM Performance at the AAC*
- **WS2 members discussed and exchanged views**
 - *As the WPs will be presented under AAC Agenda Item 4 – Discussion on WPs, we will defer sharing of views to the next agenda item*

Work Stream 2 – Membership

- **China has volunteered to be a lead of Work Stream 2**
 - At the same time, China will also contribute an expert to Work Stream 2 for the relevant task

End of Report