

APAC Trajectory-Based Operations (TBO) Pathfinder

Initiative under APAC ANSP Committee (AAC)

Working Paper 16
Progress of TBO Pathfinder Development in the Asia/Pacific Region



APAC TBO Pathfinder

.... collaborative project to:
define, demonstrate and develop the ConOps and requirements for TBO in the APAC region

Define

Define ConOps for TBO in APAC



Demonstrate

Demonstrate TBO scenarios and validate operational workflows and processes by utilising the key TBO building blocks

Develop

Develop TBO requirements and roadmap for APAC



Oct 2023
Letter of Intent (LOI) for APAC TBO Pathfinder project



Apr 2024
Kick-off meeting; Goals finalized



Jan 2025
2nd Project Meeting; Progressed on deliverables



Feb 2026
3rd Meeting; Conducted R2 TTX#1

Key Updates (as of July 2026)

DELIVERABLE A - AWARENESS OF ICAO GLOBAL TBO CONCEPT



Exchange with ATM stakeholders at VATM (22 July 2025)



Comms Brochure – TBO in the Asia Pacific Region (1st edition)



Exchange with ATM stakeholders at CAAP (22 June 2026)

DELIVERABLE B - TRIALS AND CAPABILITIES BUILD-UP



FF-ICE/R1 Lab Demonstration in Hanoi (22 to 24 July 2025)

Collaborating on Operational Scenarios in preparation of FF-ICE/R2 Lab Demo



FF-ICE/R2 TIM#1 hosted by AEROTHAI

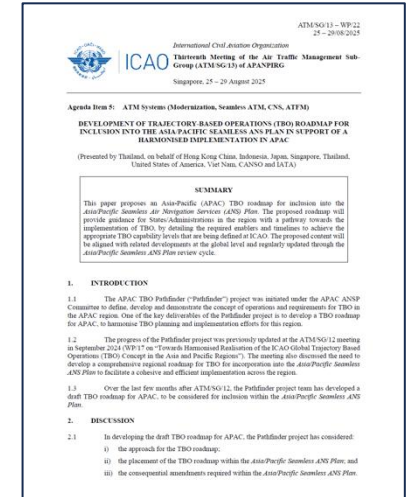


FF-ICE/R2 TTX#1 hosted by JCAB



FF-ICE/R2 TTX#2 and TIM#1 hosted by CAAP

DELIVERABLE C - ROADMAP



TBO Roadmap for Asia Pacific Seamless ANS Plan

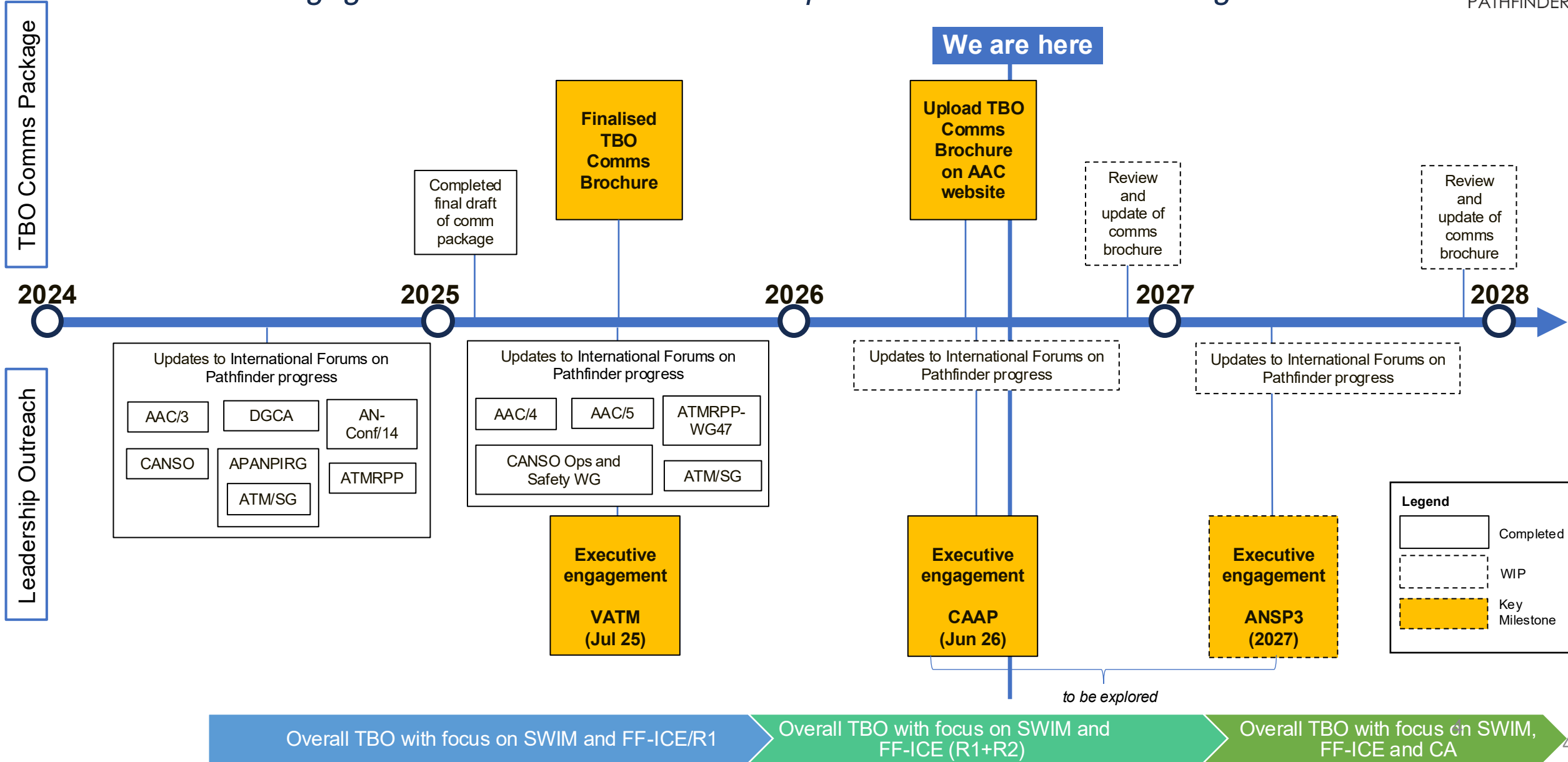
Conclusion ATM/SG/13-6: TBO RELATED REVISIONS FOR THE ASIA/PACIFIC SEAMLESS ANS PLAN

What: That, noting the need for harmonised implementation planning of Trajectory-based Operations (TBO) to guide States/Administrations in this region, that:		Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
1) the TBO roadmap (as per ATM/SG/13 WP/22 Appendices A to E) be incorporated into the 2026 revision of the Asia/Pacific Seamless ANS Plan; and 2) a new Phase VI be included in the Asia/Pacific Seamless ANS Plan to enable reference to the TBO levels.		
Why: harmonisation of TBO and guide States/Administrations on implementation planning	To ensure regional implementation planning	Follow-up: ☐ Required from States
When: 29-Aug-25		Status: Adopted by Subgroup
Who:	☒ Sub groups ☒ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other:	

Conclusion ATM/SG/13-6 (2025)

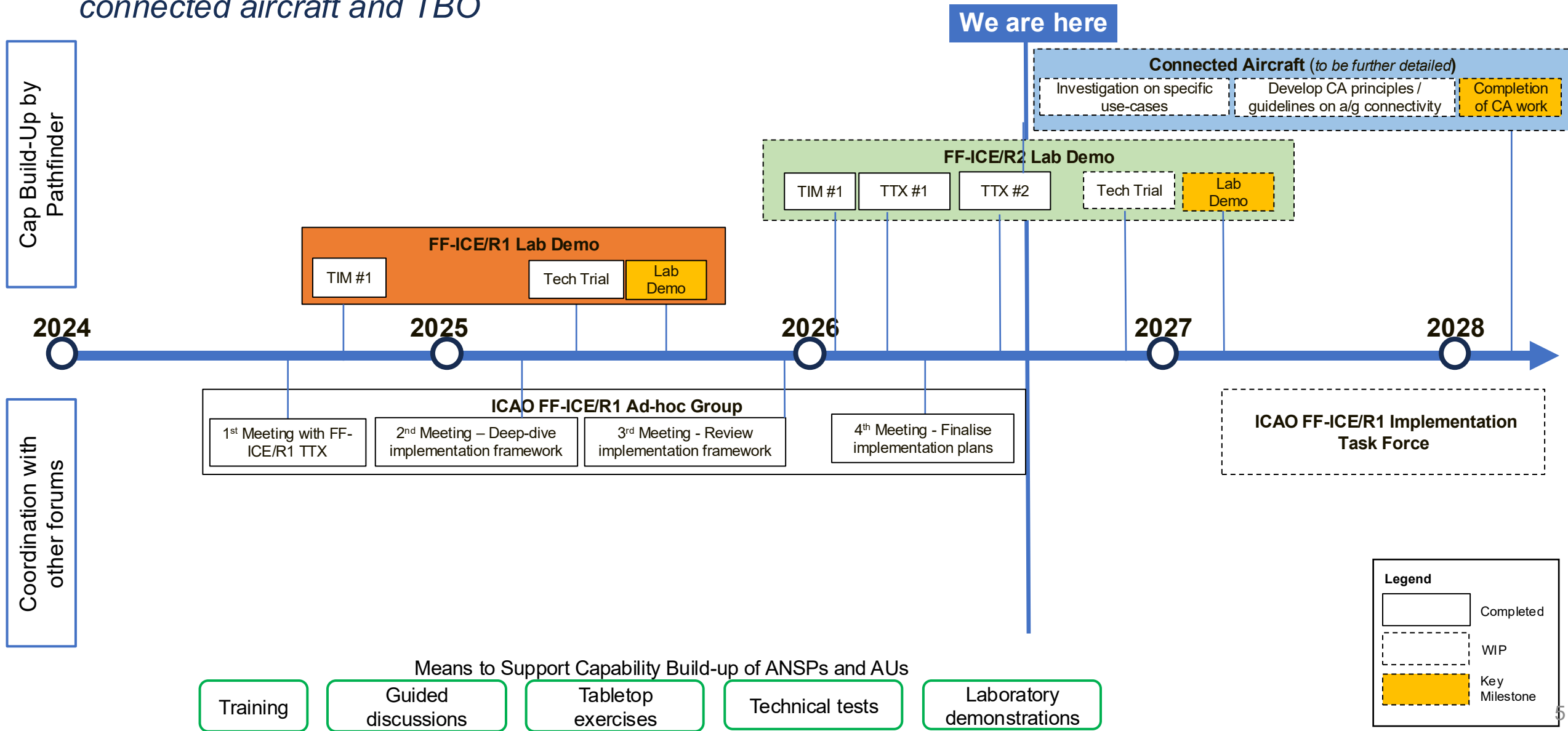
WG1 – Learning and Advocacy

Deliverables: Engagement sessions with leaderships with TBO Comms Package



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



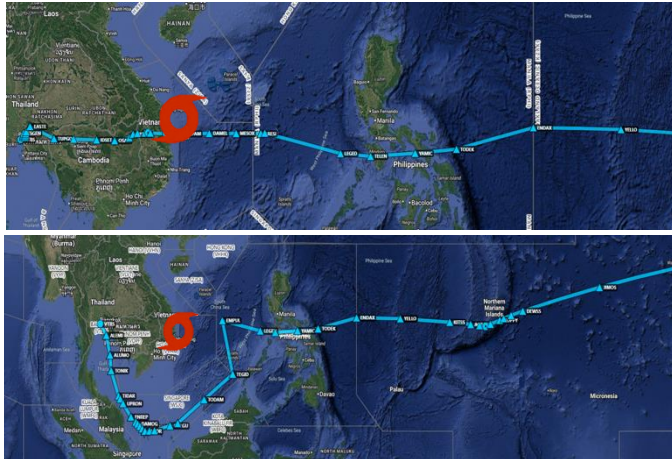
WG2 – Ops Scenarios and Ops Value

(FF-ICE/R2 Lab Demo)

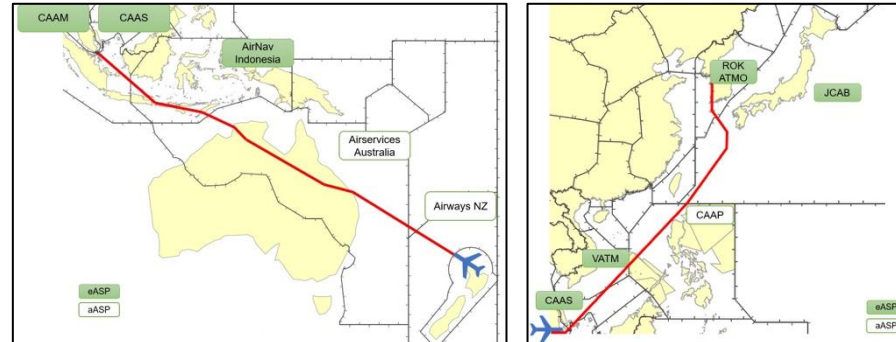
Developed 3 **ops scenarios** for FF-ICE/R2 Lab Demo:

- 1) Honolulu → Bangkok (with diversion to Singapore): showcasing the **key differences between a full FF-ICE/R2 and today's tactical 'in flight' planning processes** in revising airborne trajectory, in response to weather constraints
- 2) Auckland → Singapore via Jakarta (1st leg); Singapore → Republic of Korea (with diversion to Fukuoka) (2nd leg): Showcasing the coordination of **airborne trajectory revisions** and **management of delays** across multi-leg operations due to volcanic eruption and ATFM constraints, with both FF-ICE/R1 and FF-ICE/R2 services
- 3) Bangkok / Singapore → Tokyo : Showcasing **strategic in-flight trajectory negotiation** to facilitate early compliance with ATFM measures between two flights departing from different aerodromes but operating on the same route, within the same timeframe

Scenario 1



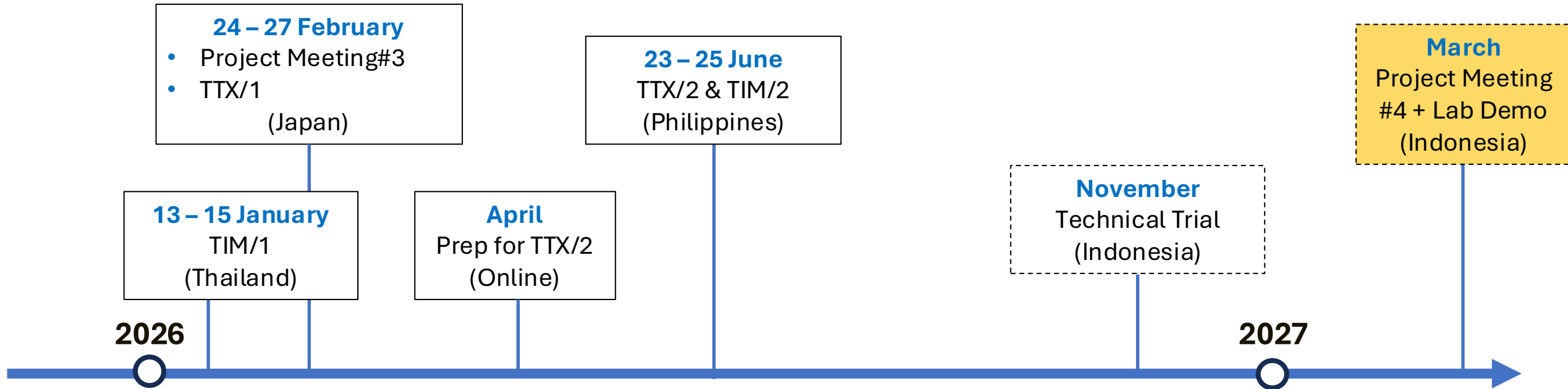
Scenario 2



Scenario 3

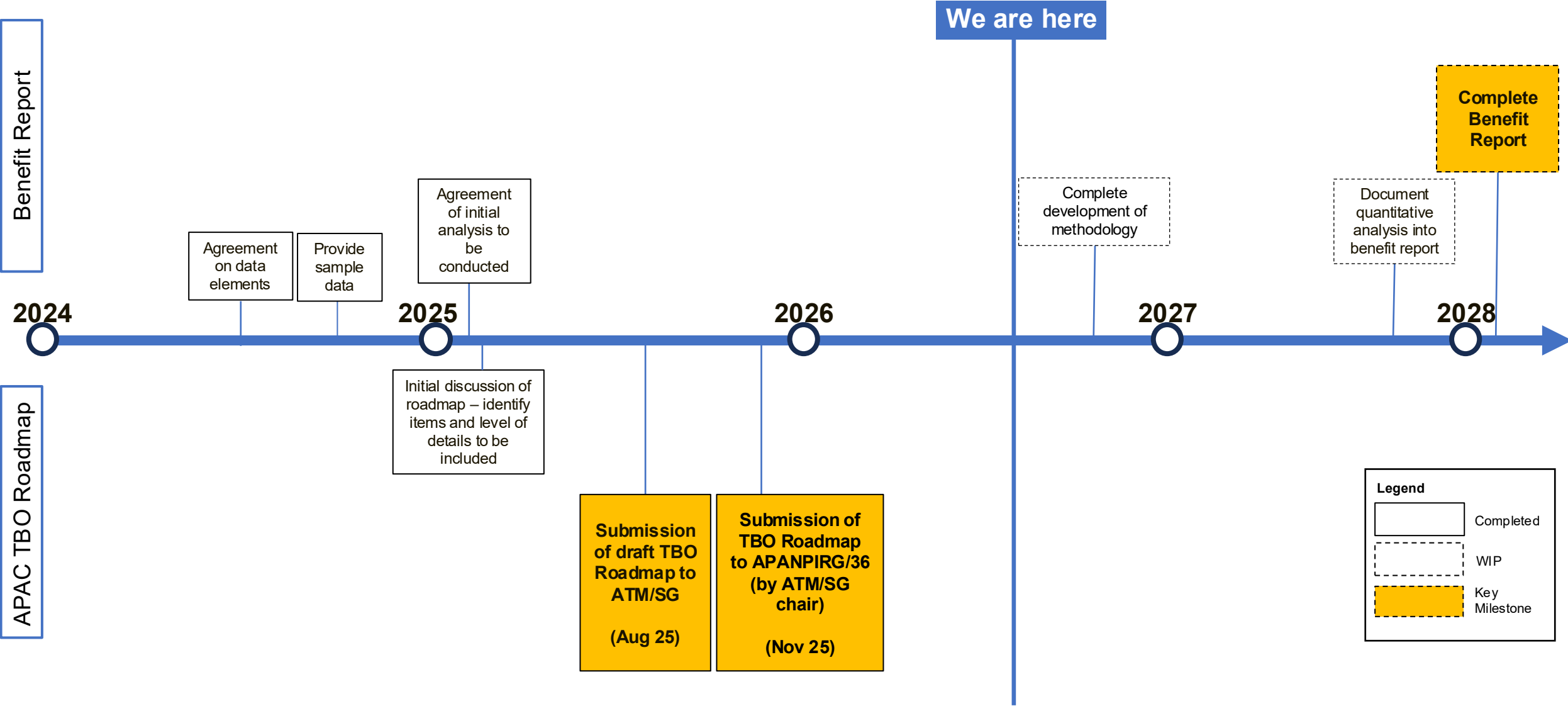


Activity Timelines towards FF-ICE/R2 Lab Demo



WG3 – Benefit Analysis and TBO Roadmap

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



Conclusion

- APAC TBO Pathfinder creates the opportunity for APAC ANSPs and ATM stakeholders to **collaboratively evolve the region towards TBO**
- Critical to the success of this phase is wider **stakeholder engagement and involvement**
 - Raise awareness on operational benefits of TBO in the region
 - Work towards regional deployment of SWIM by 2030 and FF-ICE/R1 by 2032

Thank you