International Civil Aviation Organization

WORKING PAPER

ICAO Asia and Pacific (APAC)
Twenty-Seventh Meeting of the Meteorology Sub-Group (MET SG/27)

Bangkok, Thailand, 04 to 08 September 2023

Agenda Item 2: Review outcomes from previous meetings

OUTCOMES OF THE TWENTY SEVENTH MEETING OF COMMUNICATION NAVIGATION AND SURVEILLANCE SUB GROUP

(Presented by Secretariat)

SUMMARY

This paper summarized the relevant outcomes from the twenty-seventh Meeting of the CNS Sub-group for MET SG/27 information.

1. INTRODUCTION

1.1 The Twenty Seventh Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/27) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at ICAO APAC Regional Office, Bangkok, Thailand, from 28 August to 1 September 2023. The Meeting was attended by 108 participants (94 In-person + 14 virtual) from 24 States/Administrations, 3 International Organizations and 6 industry partners. The Meeting resources can be accessed by this link.

1.2 This paper shared relevant outcomes of the CNS SG/27 Meeting for MET SG/27 information.

2. DISCUSSION

Review Relevant Outcomes of the MET SG – Sec (WP/06)

2.1 The paper presented relevant outcomes from the Meteorology Sub-Group (MET SG), in particular its contributory body, the Meteorological Information Exchange Working Group (MET/IE WG). The MET/IE WG proposed action to facilitate the implementation of the communication network

connections needed to support the required global dissemination of meteorological information in the IWXXM form. The paper highlighted the Draft Conclusion MET/IE WG/21-01: *IWXXM Version Compatibility*, which proposed that States ensure systems are upgraded to support the IWXXM version which complies with the latest amendment to Annex 3, and Draft Conclusion MET/IE WG/21-03: *Global Exchange of IWXXM*, which proposed that the ACSICG prioritizes implementation of network circuits necessary to support the global exchange of meteorological information in IWXXM form. Both conclusions would be presented to MET SG/27 to be held from 04-09 September 2023 in Bangkok, Thailand.

2.2 The Meeting noted that MET/IE WG/21 is conducting a conjoint Meeting session with ACSICG/11 in 2024 to facilitate further regional discussion and progress on the abovementioned matters.

2.3 In response to a query, the Meeting was informed that States are recommended to disseminate MET information in only one version of IWXXM. In addition, States should implement or upgrade the systems for generating, exchanging and consuming IWXXM reports to support the IWXXM version, which complies with the latest amendment to Annex 3 (as stated in the IWXXM compatibility table: https://github.com/wmo-im/iwxxm/wiki/Package-Compatibility).

Review the Report of the Tenth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/10) - Sec (WP/07)

2.4 The paper presented the discussions and relevant outcomes of the Tenth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/10) held at the ICAO APAC Regional Office, Bangkok, Thailand, from 24 to 26 May 2023, along with key outcomes of the ICAO Asia Pacific Idea Generation Workshop: CRV Governance held at the ICAO APAC Office, Bangkok, Thailand, on 31 January 2023 and the Eleventh Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/11) held at the ICAO APAC Office, Bangkok, Thailand from 1 to 3 February 2023.

2.5 The Twenty-first Meeting of the ICAO APAC Meteorological Information Exchange Working Group (MET/IE WG/21) noted that the capability for inter-regional exchange presented a significant obstacle in progressing the global availability of IWXXM. The lack of global availability of OPMET in IWXXM form is inhibiting system suppliers and users from switching to IWXXM and, therefore, delaying the realization of benefits from implementing IWXXM. MET/IE WG/21 also identified the need for the establishment of inter-regional IWXXM exchange with the MID and AFI regions, alternate (secondary) paths to each region, adequate capacity and bandwidth to support IWXXM exchange, and interconnecting of the CRV with future equivalents in the MID and AFI regions for the global IWXXM exchange to succeed. The ACSICG/10 Meeting supported the MET/IE WG/21 proposal for action on the global dissemination of meteorological information in IWXXM form and formulated and modified the Draft Conclusion CNS SG/27/03 (ACSICG/10/05)- *Global Dissemination of IWXXM*, which was a modification of the proposal by MET/IE WG/21, for further endorsement by CNS SG/27.

2.6 The CNS SG/27 shared its support for the global dissemination of meteorological information in IWXXM format by prioritizing the implementation of intra and inter-regional

aeronautical communication services and network circuits, including support for the implementation of AMHS with File Transfer Body Part (FTBP) and Interpersonal Message Heading Extension (IHE), and facilitating, through inter-regional consultation, the enhancement of inter-regional network redundancy (i.e., primary circuits and backup paths). Yet, the CNS SG/27 observed that a similar titled draft conclusion, with slightly different contents, will also be considered by MET SG/27 for endorsement and further adoption by APANPIRG/34. As the IWXXM dissemination-related Conclusion is more relevant to MET SG and to avoid confusion caused by submitting two draft conclusions, with the same title but different contents, to APANPIRG, the Meeting agreed that the proposed draft Conclusion CNS SG/27/03 (ACSICG/10/05) - Global Dissemination of IWXXM should be withdrawn. The ICAO Secretariat would forward the CNS SG's support to MET SG/27 for further follow-up. The Member States were requested to enhance network capabilities to support these requirements. **ACTION ITEM 27-3**

Challenges and Requirements for IPS Environment – USA (WP/29)

2.7 The paper addressed challenges and requirements for supporting future services, including SWIM, in an Internet Protocol Suite (IPS) environment. The requirements were suggested from ICAO, network, and user perspectives.

2.8 The challenges shared with the Meeting were as follows:

- Which body will provide support for the management of the IPv6 address space and DNS namespace;
- Which entities should enter into such an agreement, execute governance and oversee the service provision;
- How should competing EMSs within a region be selected and authorized, and;
- Guidelines for sensible use of the ATN and the Internet for SWIM information are needed.

2.9 The ICAO Secretariat informed that the appropriate number of EMSs for regional SWIM is being discussed at the SWIM TF. The selection and authorization of EMS within the region will be the next step after the EMS performance requirements are identified. Additionally, whether SWIM TF should select and authorize EMS within the region would need further deliberation in SWIM TF. ICAO Secretariat will share the request shared by the paper with SWIM TF. **ACTION ITEM 27-7**

2.10 Furthermore, the Meeting noted that CRV OG is already deliberating on the way forward to efficiently utilize available CRV bandwidth to disseminate obligatory critical aeronautical messages. Further guidelines related to this aspect may be prepared by CRV OG for ACSICG consideration and adoption by CNS SG. The ICAO Secretariat will share the pertinent information mentioned in the paper with CRV OG for further action. **ACTION ITEM 27-8**

2.11 Regarding the ICAO requirements mentioned in section 3.1 of the paper, the ICAO Secretariat informed that after CNS SG/25, similar action items were initiated for which the ICAO Secretariat coordinated with ICAO HQ relevant panels. ICAO HQ informed about creating a new inter-panel task force to address the IPV6 and other related mutual concerns. This may include the global

guidelines for IPv6 dedicated address block for fixed service and A/G mobile service. ICAO Secretariat will further coordinate with appropriate ICAO HQ panels to update on the latest developments. **ACTION ITEM 27-9** Additionally, a discussion for managing the IPv6 address space and DNS namespace could be initiated at the ACSICG and SWIM TF Meetings in the future. **ACTION ITEM 27-10** It was anticipated that SWIM TF may consider providing DNS to SWIM subscribers and the possibility of managing their own IPv6 address as SWIM will connect to other IP networks in addition to CRV.

Distribution of XML Based Messages in AMHS and SWIM Environment – USA (IP/14)

2.11 The FAA informed about its plan to support the distribution of Extensible Markup Language (XML) based information using AMHS messaging as an interim step towards transition to a SWIM environment. This effort should support the exchange of XML-based messages such as FIXM and IWXXM. Other plans related to IWXXM-formatted data and a smooth transition to direct SWIM-SWIM exchanges were shared with the Meeting.

Review Report of SWIM TF/7 - Sec (WP/08)

2.12 The paper presented the report of the Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7), held from 09-12 May 2023, for review and action. The SWIM TF/7 was attended by **73** participants from **16** States/Administrations, **2** International Organizations and **1** telecommunication service provider. The SWIM TF/7 Meeting report, working papers, information papers, and other resources can be accessed by this link

2.13 The SWIM TF/7 adopted the **Decision SWIM/TF/07/01** – *Formation of an Editorial Task Ad-Hoc Group for the Asia/Pacific SWIM Implementation Guidance Documentation* was adopted by the SWIM TF/7 Meeting. **China, Hong Kong China, India, Singapore, Thailand, and the USA** volunteered to participate in the Task Group. It was agreed that the editorial task ad-hoc group, led by Thailand, would complete the task in the ***one-year*** timeline.

2.14 To review the draft guidance materials prepared by the Editorial Task Ad-Hoc Group and provide immediate feedback before presenting final draft materials for the review and adoption of the SWIM TF Meeting in 2024, SWIM TF/7 adopted the **Decision SWIM/TF/07/02 -** *Additional SWIM TF Plenary Meeting in the 2nd Half of 2023*. The SWIM TF/7 Meeting arranged that the **SWIM TF/8** would be conducted for **Three (3)** days instead of full plenary with restricted agenda items focused on the drafting of Asia/Pacific regional SWIM implementation guidance documents in continuation to **SWIM Business Requirement Brainstorming Working Session** for **Two (2)** days in November 2023. The agreed dates of the Meeting were **6-10 November 2023**.

2.15 China, Japan, Singapore, and Thailand jointly proposed establishing a **SWIM Implementation Pioneer Group under the SWIM TF** to kick-start the Asia/Pacific regional SWIM implementation based on the SWIM architecture discussed at the SWIM TF/2 Meeting. The SWIM TF/7 Meeting adopted the **Decision SWIM/TF/07/03** – *Formation of the SWIM Implementation Pioneer Ad-hoc Group* with deliverables outlined in its Terms of Reference (ToR). **Australia, Hong**

Kong China, Japan, Malaysia, Republic of Korea, Singapore, Thailand, and IATA volunteered to join the group.

2.16 Japan presented overviews of the content list of the draft APAC SWIM Technical Infrastructure Profiles document. The SWIM TF/7 Meeting requested Member States and Task 3, 5, and 6 leads to review the *APAC SWIM Technical Infrastructure Profiles- Draft Version* and provide comments/feedback to the Task 2 lead **by 31 August, 2023**. The Task 2 lead will compile and review all comments and feedback and submit the revised draft document to the **SWIM TF/8** Meeting to be held from 8-10 November 2023. ICAO Secretariat will share *APAC SWIM Technical Infrastructure Profiles- Draft Version* with CRV OG and ACSICG for their feedback and provide feedback to the Task 2 Lead.

2.17 AMHS/SWIM Gateway Study Group (SWAMWAY SG) presented a draft of AMHS/SWIM Gateway technical specifications in the SWIM TF/7 Meeting.

2.18 The SWIM TF/7 Meeting formulated the following draft Conclusion that was endorsed by CNS SG/27 for APANPIRG/34 adoption.

<table>
<tr><td colspan="2">Draft Conclusion CNS SG/27/04 (SWIM/TF/07/04) – Asia/Pacific Regional FIXM version 4.2 Extension</td></tr>
<tr><td>What: The FIXM version 4.2 Extension provided in Appendix A to the paper be:
a) adopted as the Asia/Pacific FIXM version 4.2 Extension;
b) uploaded to the ICAO Asia/Pacific Regional Office website for immediate use by Asia/Pacific Administrations, where the capability to do so exists, for cross-border ATFM information exchange and to support ATFM/A-CDM integration; and
c) presented to the FIXM CCB for review and publication on the FIXM official website.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide the information exchange model necessary to support cross-border ATFM and ATFM/A-CDM integration in the Asia/Pacific Region, in order to support the implementation of performance objectives of the Asia/Pacific Regional Framework for Collaborative ATFM</td><td>Follow-up: ☐Required from States</td></tr>
<tr><td>When: 1-Sep-23</td><td>Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="2">Who:☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF, ATFM SG</td></tr>
</table>

2.19 ICAO Secretariat will take necessary action to upload FIXM version 4.2 Extension on the ICAO Asia/Pacific Regional Office website for immediate use by Asia/Pacific Administrations after the proposed draft conclusion adoption if adopted by CNS SG/27 and APANPIRG/34. USA also shared support to coordinate and present FIXM version 4.2 Extension to the FIXM CCB for review and publication on the FIXM official website after the proposed draft conclusion adoption, if adopted by CNS SG/27 and APANPIRG/34.

2.20 Hong Kong China presented the updates on the work of Task 6 to identify the catalog of basic data elements to be shared and exchanged via APAC Common SWIM Information Services based on operational needs in APAC. The proposed list of information to be exchanged via Common Flight Information Services, Common Aeronautical Information Services, Common Meteorological Information Services, and Common Surveillance Information Services in APAC was shared with the Meeting. The SWIM TF/7 Meeting noted that the terminology used in the paper to define different types of information services is not formulated by any ICAO panels. It was therefore recommended to name them **Common SWIM Flight Information Services, Common SWIM Aeronautical Information Services, Common SWIM Meteorological Information Services, and Common SWIM Surveillance Information Services** to emphasize that these are SWIM services.

2.21 The SWIM TF/7 Meeting was requested to review the proposed data catalog and provide suggestions on additional information that should be exchanged through APAC Common Information Services. ICAO Secretariat is coordinating with the Secretary of Metrology Sub Group (MET SG), Aerodromes Operations and Planning Sub-Group (AOP SG) and the ICAO Aeronautical Information Services- Aeronautical Information Management Implementation Task Force (AAITF) to request to nominate ATM, MET, and AGA Experts to prepare a comprehensive list of information for Common SWIM Flight Information Services, Common SWIM Aeronautical Information Services, Common SWIM Meteorological Information Services, and a Common SWIM Surveillance Information Services.

2.22 The SWIM TF/7 Meeting discussed the utilization of Mode S DAPs in developing an integrated SWIM service incorporating MET information derived from Mode S DAPs. It was informed that the detailed consideration of exchanging MET information derived from Mode S DAPs through IWXXM should be done in consultation with MET SG (MET/IE WG). ICAO Secretariat will coordinate with the Secretariat of MET SG (MET/IE) to explore options on this matter.

2.23 MET/R WG Ad-hoc Group presented the recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region in coordination with other working groups and provided an updated draft version of the regional document for consultation. The SWIM TF/7 Meeting shared that used cases could be potentially included in the Asia/Pacific regional SWIM implementation guidance material, which the Editorial Task Ad-hoc Group is drafting.

2.24 Hong Kong China shared its appreciation to SWIM TF for its significant achievements and commended two ad-hoc groups, *SWIM Implementation Pioneer Ad-hoc Group* and *Editorial Task Ad-Hoc Group for the Asia/Pacific SWIM Implementation Guidance Documentation,* for their contribution to enhancing support to APAC Member States for SWIM Implementation.

Multi-Regional TBO Demonstration - Japan, Singapore, Thailand, and USA (WP/32)

2.25 The joint paper presented an overview of the Multi-Regional TBO Demonstration, a collaborative project undertaken by Japan, Singapore, Thailand, USA, and Canada to validate the TBO concept as well as to showcase the TBO operational values and key capabilities, both operational and technical, required to support TBO. The CNS SG/27 Meeting was encouraged to provide guidance and collaborate on establishing the crucial TBO building blocks, i.e., SWIM and FF-ICE, to support the development and realization of TBO in Asia/Pacific.

2.26 In response to a query, Thailand informed that the MR TBO Demo has been concluded with the live-flight demonstration in June 2023, and at present, there is no plan to conduct any other phase of the MR TBO demonstration. However, another discussion in APAC SWIM TF among the MR TBO ANSP partners to conduct such a demo in Asia/Pacific in the future is going on.

2.27 The Meeting agreed to support the collaboration and coordination between the **SWIM TF** and **FF-ICE Operational Requirements Small Working Group (SWG)** under ATM SG as well as **Workstream 2 - Accelerate the Development and Implementation of Seamless ANS and Collaborate on Green Initiatives to Enhance ANS Sustainability** under Asia and Pacific ANSP Committee (AAC) in building the TBO enablers, i.e. SWIM and FF-ICE, in Asia/Pacific. The Meeting also requested SWIM TF to share with CNS SG the progress on this collaboration toward the goal of implementing TBO in the region.

Outcomes of System Wide Information Management Seminar – Sec (IP/17)

2.28 The paper presented the outcomes of the SWIM Seminar held on 8 May 2023 at the ICAO Asia and Pacific Regional Office, Bangkok, Thailand, for Meeting information. The Meeting noted that the theme of the Seminar was *Asia/Pacific SWIM: Where are We Now?* The Seminar focused on sharing SWIM implementation status across the Asia/Pacific region and aimed to foster the exchange of views on how the ICAO Asia/Pacific SWIM Task Force can best support the regional SWIM Implementation.

Asia/Pacific Seamless ANS Plan (the plan) Update – Sec (WP/28)

2.29 The paper presented the Seamless ANS Plan (the plan) related discussion outcomes from the APANPIRG/33 Meeting and a proposed update of the Asia/Pacific Seamless ANS Plan's Performance Improvement Plan for initial review by CNS SG. A draft proposal for revising the Seamless ANS Plan Section 7 – Performance Improvement Plan was shared for Meeting review. The Meeting noted that the draft Section 7 was presented to the Seventh Meeting of the AOP Sub-Group (AOP/SG/7, Bangkok, Thailand, 03 – 06 July 2023). The proposed revisions of all sections of the Plan will also be presented to the MET and ATM Sub-Groups of APANPIRG for discussion before being presented to APANPIRG/34 for approval under a formal Conclusion. The CNS SG/27 Meeting was invited to review and provide feedback to the Secretariat on the proposed revision of the Seamless ANS Plan, identify Priority 1 ASBU elements identified in the new performance expectations, and comment on a Secretariat proposal to revise the numbering format of performance expectations.

2.30 ICAO Secretariat informed that SWIM TF already shared the following SWIM related ASBUs to be included in the next edition of ICAO APAC Seamless ANS plan as per APANPIRG Conclusion APANPIRG/33/9 "The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan".

Functional Category	Element	Priority
Information	SWIM-B2/1- Information service provision: Requirements for an information service provider to make aviation-related information available as an information service.	2
	SWIM-B2/2- Information service consumption: Requirements for an information service consumer to discover and access aviation-related information provided via information services	2

2.31 ICAO Secretariat added that except SWIM related ASBUs, other ASBUs required Member State's observations, feedback, and consent before CNS SG agreed to incorporate them into the next version of the plan.

2.32 The Meeting appreciated the ICAO's effort in previewing the Seamless ANS Plan. The Meeting noted that proposed CNS related ASBUs for the next version of the Seamless ANS plan were not yet discussed or consulted with relevant Point of Contact / CNS contributory bodies as per the agreed process in APANPIRG/33 (refer to paragraph 2.14 of WP/28). Therefore, it was impractical for CNS SG to provide comments on proposed modifications related to CNS related ASBUs, new ASBUs to be added in phase 4, or which of the new block 2 ASBUs should be included in new phase 5.

2.33 As a way forward, the Meeting agreed to form a "**CNS related ASBUs review Ad-hoc Group for next edition of Seamless ANS Plan",** which will review the proposed ASBUs, prepare a list of CNS related ASBUs to include in the plan, share interim report to APANPIRG/34, and seek consent from CNS SG/28.

2.34 **Australia, China, Hong Kong China, India, Malaysia, New Zealand, Singapore, Thailand, and United States** volunteered to join the Ad-hoc Group. Other interested Member States can share email at snibhani@icao.int or ylou@icao.int to join the ad-hoc group.

2.35 The Meeting also requested all Member States to nominate Point of Contact (PoC) to review CNS related updates that will be proposed by Ad-hoc Group and share PoC information with ICAO Secretariat by email at yluo@icao.int or snibhani@icao.int **ACTION ITEM 27-12** Additionally, it was recommended to initiate **a** review of proposed draft version of ICAO APAC Seamless ANS Plan.

2.36 The Meeting agreed that the available timelines to complete the task are very difficult to accomplish. Therefore, an ad-hoc group will try its best to fulfill the expectations by preparing revised

content for providing an interim report to APANPIRG/34. The following high-level plan was prepared for further action:

SN	Task	Responsible Parties	Tentative Timelines (2023)
1.	ICAO Secretariat preliminary editorial review, and inclusion of new element	ICAO Secretariat	Completed
2.	Formation of **CNS related ASBUs review Ad-hoc Group for Next Edition of ICAO APAC Seamless ANS Plan**	CNS SG/27	1 September
3.	Issuing email to Member States to join the Ad-hoc Group, advise their PoC, and share commitment to update on Next Edition of Seamless ANS Plan	ICAO Secretariat	7 September
4.	Sharing brief information about To-do work by email	ICAO Secretariat	15 September
5.	Online Meeting to review the background and list of ASBUs to include in the Seamless ANS Plan	ICAO Secretariat CNS ASBUs review Ad-hoc Group	30 September
6.	Consolidate initial comments from Ad-hoc Group and preparation of the list of CNS related ASBUs	ICAO Secretariat	7 October
7.	Issuing State Letter to Member States for reviewing the list of CNS related ASBUs for Next Edition of Seamless ANS Plan	ICAO Secretariat	10 October (3 Weeks State Letter response time)
8.	Compilation of Member States' response and sharing with CNS ASBUs review Ad-hoc Group	ICAO Secretariat	17 November
9.	Online Meeting to review the initial list of ASBUs	ICAO Secretariat CNS ASBUs review Ad-hoc Group	25 November
10.	Prepare an interim updates to APANPIRG/34	ICAO Secretariat	APANPIRG/34 (11-13 December 2023)

Comments/Feedback on Asia Pacific Ministerial Declaration on Civil Aviation (Delhi) – Sec (WP/24)

2.37 The paper provided information about convening the Second Asia Pacific Ministerial Conference on Civil Aviation (APACMC/2) in Delhi, India, in 2024 and requested Member States to provide comments on the draft Asia Pacific Ministerial Declaration on Civil Aviation (Delhi). The Meeting noted that the Draft Asia Pacific Ministerial Declaration on Civil Aviation (Delhi) prepared by the Asia Pacific Ministerial Conference Preparation Working Group (MCP WG was shared with the APAC Member States by ICAO State Letter Ref.: SN 4 – AP104/23 (RD) dated 23 June 2023 for comments/feedback before 15 September 2023. The APACMC/2 to be held in Delhi, India, has been postponed to 2024 and the ICAO APAC Office will share further updates about new dates and other relevant information in due course.

3. ACTION BY THE MEETING

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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FIXM version 4.2 Extension Data Attributes

Data Attribute	FIXM version 4.2
Originally included in the Asia/Pacific FIXM version 4.1 Extension	
ETO (Estimated Time Over)	Core
ELDT (Estimated Landing Time)	Core
CTOT (Calculated Take-Off Time)	Core
CTO (Calculated Time Over)	Core
CLDT (Calculated Landing Time)	Core
TOBT (Target Off-Block Time)	Extension
TSAT (Target Start-up Approval Time)	Extension
TTOT (Target Take-Off Time)	Extension
AOBT (Actual Off-Block Time)	Extension
ATO (Actual Time Over)	Extension
Trajectory • ATO • Flight level or Altitude • Position (Designator or Latitude/Longitude or Relative point)	Extension
Aircraft Track • Ground speed • Flight level or Altitude • Heading • Position (Designator or Latitude/Longitude or Relative point or NAVAID or Aerodrome) • Time over position (Report time)	Extension
Newly identified	
EIBT (Estimated In-Block Time)	Core
TIBT (Target In-Block Time)	Extension
TTO (Target Time Over)	Extension

APAC XSD Description

Namespace	Description
Apac	FIXM Extension containing data attributes to support cross-border Air Traffic Flow Management (ATFM) operations and the integration between ATFM and Airport-Collaborative Decision Making (A-CDM), in accordance with Distributed Multi-Nodal ATFM Network concept and the Airport-Collaborative Decision Making operations in the Asia/Pacific region.

Class	Definition	Reference/Remark
ApacDepartureType	Class containing ATFM data related to departure aerodrome	This class is to be included in extension field under Departure Type class.
Data Attribute	**Definition**	**Reference/Remark**
actualOffBlockTime	A time the aircraft is pushed back / vacates parking position (equivalent to airline/handlers ATD – Actual Time of Departure and ACARS=OUT)	ICAO Doc 9971 Manual on Collaborative ATFM, 3rd Edition, 2018
targetOffBlockTime	A time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready to receive start-up approval/push-back clearance	ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022
targetStartupApprovalTime	A time provided by ATC taking into account TOBT, CTOT, and/or the traffic situation that an aircraft can expect start-up/push back approval	ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022
targetedTakeOffTime	A time that an aircraft is targeted to be airborne, taking into account TOBT, TSAT, and other factors such as EXOT, wake turbulence, SID, etc.	● ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022 ● EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017

Class	Definition	Reference/Remark
ApacArrivalType	Class containing ATFM data related to destination aerodrome	This class is to be included in extension field under Arrival Type class.
Data Attribute	Definition	Reference/Remark
targetInBlockTime	A time, calculated by an automation system, that an aircraft is expected to be at its first parking position	This time value is not EIBT (Estimated In-Block Time) – The estimated time that an aircraft will arrive in blocks (Ref. EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017)

Class	Definition	Reference/Remark
ApacAircraftTrackType	Class containing aircraft track data	This class is to be included in extension field under Flight Type class.
Data Attribute	Definition	Reference/Remark
speed	Current aircraft speed	speed can be in the following forms, • Ground speed; and/or • Indicated airspeed
level	Current flight level	level can be in the following forms, • Flight level; or • Altitude.
heading	Current aircraft heading	
position	Current aircraft position	position can be in the following forms, • Designator; • Latitude/Longitude; • Relative point; • NAVAID; or • Aerodrome.
time	Time when all data in this class is reported	

Class	Definition	Reference/Remark
ApacActualTrajectoryType	Class containing all trajectory elements of a flight	This class is to be included in extension field under Flight Type class.
Data Attribute	Definition	Reference/Remark
element	A list of trajectory elements	

Class	Definition	Reference/Remark
ApacActualTrajectoryElementType	Class containing composition of each trajectory element(s) specified in ApacTrajectoryType	
Data Attribute	Definition	Reference/Remark

level	An estimated flight level of the aircraft at this trajectory element	level can be in the following forms, ● Flight level; or ● Altitude.
point	A specified position of this trajectory element	point can be in the following forms, ● Designator; ● Latitude/Longitude; or ● Relative point.
actualTimeOver	An actual time of the aircraft over routePoint	

Class	Definition	Reference/Remark
ApacRouteTrajectoryElementType	Class containing traffic synchronous information	
Data Attribute	Definition	Reference/Remark
targetTimeOver	A time, calculated and issued by an ATS unit, that an aircraft is requested to be over a fix, waypoint, or particular location	Use case: a time progressively calculated and issued by arrival management (AMAN) system

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FIXM version 4.2 Core Data Attributes to Support Cross-Border ATFM Information Exchange

Data Attribute	FIXM version 4.2 Core
ETO (Estimated Time Over)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (ETO) FlightType.routeTrajectoryGroup.filed.element.elementStartPoint = (point at which ETO is specified)
ELDT (Estimated Landing Time)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (ELDT) FlightType.routeTrajectoryGroup.filed.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.filed.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator
CTOT (Calculated Take-Off Time)	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTOT) FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_OFF FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.departure.aerodrome.locationIndicator
CTO (Calculated Time Over)	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTO) FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint = (point at which CTO is specified)
CLDT (Calculated Landing Time)	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CLDT) FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator
EIBT (Estimated In-Block Time)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (EIBT) FlightType.routeTrajectoryGroup.filed.element.point4D.pointProperty.propertyType = END_STAY FlightType.routeTrajectoryGroup.filed.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator

Part of FIXM version 4.2 Core Sample Messages

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
ETO (Estimated Time Over)	<fx:element seqNum="0"> <fx:elementStartPoint> <fb:designatedPoint> <fb:designator>KIGOB</fb:designator> </fb:designatedPoint> </fx:elementStartPoint> <fx:point4D> <fx:time> <fx:absoluteTime>2023-05-10T01:11:00Z</fx:absoluteTime> </fx:time> </fx:point4D> <fx:routeDesignatorToNextElement> <fx:routeDesignator>Y11</fx:routeDesignator> </fx:routeDesignatorToNextElement> </fx:element>
ELDT (Estimated Landing Time)	<fx:element seqNum="5"> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_ON</fx:propertyType> </fx:pointProperty> <fx:time> <fx:absoluteTime>2023-05-10T02:54:00Z</fx:absoluteTime> </fx:time> </fx:point4D> </fx:element>

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
CTOT (Calculated Take-Off Time)	<fx:element seqNum="0"> <fx:constraint> <fx:time> <fx:timeSpecification> <fb:timeValue>2023-05-10T01:15:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>VTBS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_OFF</fx:propertyType> </fx:pointProperty> </fx:point4D> </fx:element>
CTO (Calculated Time Over)	<fx:element seqNum="1"> <fx:constraint> <fx:time> <fx:timeSpecification>

	<fb:timeValue>2023-05-10T01:21:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:designatedPoint> <fb:designator>KIGOB</fb:designator> </fb:designatedPoint> </fx:elementStartPoint> </fx:element>

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
CLDT (Calculated Landing Time)	<fx:element seqNum="2"> <fx:constraint> <fx:time> <fx:timeSpecification> <fb:timeValue>2023-05-10T03:04:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_ON</fx:propertyType> </fx:pointProperty> </fx:point4D> </fx:element>
EIBT (Estimated In-Block Time)	<fx:element seqNum="6"> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>END_STAY</fx:propertyType> </fx:pointProperty> <fx:time> <fx:absoluteTime>2023-05-10T03:09:00Z</fx:absoluteTime> </fx:time> </fx:point4D> </fx:element>

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema targetNamespace="http://www.fixm.aero/ext/apac/4.2"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:apac="http://www.fixm.aero/ext/apac/4.2" xmlns:fb="http://www.fixm.aero/base/4.2"
xmlns:fx="http://www.fixm.aero/flight/4.2" elementFormDefault="qualified"
version="4.2.0">
	<xs:annotation>
		<xs:documentation>The Apac package contains information used in Asia
Pacific region.</xs:documentation>
	</xs:annotation>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\AeronauticalReference.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Base.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Extension.xsd"/>
	<xs:import namespace="http://www.fixm.aero/flight/4.2"
schemaLocation="..\..\core\flight\Flight.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Measures.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\RangesAndChoices.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Types.xsd"/>

	<xs:complexType name="ApacRouteTrajectoryElementType">
		<xs:annotation>
			<xs:documentation>Class containing traffic synchronous
information</xs:documentation>
		</xs:annotation>
		<xs:complexContent>
			<xs:extension base="fb:RouteTrajectoryElementExtensionType">
				<xs:sequence>
					<xs:element name="targetTimeOver"
type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
						<xs:annotation>
							<xs:documentation>A time, calculated
and issued by an ATS unit, that an aircraft is requested to be over a fix, waypoint, or
particular location [Use case: a time calculated by arrival management (AMAN)
system]</xs:documentation>
						</xs:annotation>
					</xs:element>
				</xs:sequence>
			</xs:extension>
		</xs:complexContent>
	</xs:complexType>

	<xs:complexType name="ApacDepartureType">
		<xs:annotation>
```

```
                <xs:documentation>Class containing ATFM data related to departure aerodrome. This class is to be included in extension field under DepartureType class</xs:documentation>
            </xs:annotation>
            <xs:complexContent>
                <xs:extension base="fb:DepartureExtensionType">
                    <xs:sequence>
                        <xs:element name="actualOffBlockTime" type="fb:TimeType" minOccurs="0" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>A time the aircraft is pushed back / vacates parking position (equivalent to airline/handlers ATD – Actual Time of Departure and ACARS=OUT) [ICAO Doc 9971 Manual on Collaborative ATFM, 3rd Edition, 2018]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetOffBlockTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>A time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready to receive start-up approval/push-back clearance [ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetStartupApprovalTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>A time provided by ATC taking into account TOBT, CTOT, and/or the traffic situation that an aircraft can expect start-up/push back approval [ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetTakeOffTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>A time that an aircraft is targeted to be airborne, taking into account TOBT, TSAT, and other factors such as EXOT, wake turbulence, SID, etc [ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022] [EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                    </xs:sequence>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>

        <xs:complexType name="ApacArrivalType">
```

```
            <xs:annotation>
                <xs:documentation>Class containing ATFM data related to destination aerodrome. This class is to be included in extension field under ArrivalType class.</xs:documentation>
            </xs:annotation>
            <xs:complexContent>
                <xs:extension base="fb:ArrivalExtensionType">
                    <xs:sequence>
                        <xs:element name="targetInBlockTime" type="fb:TimeType" minOccurs="0" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>A time, calculated by an automation system, that an aircraft is expected to be at its first parking position [This time value is not EIBT (Estimated In-Block Time) – The estimated time that an aircraft will arrive in blocks (Ref. EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017)]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                    </xs:sequence>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>

        <xs:complexType name="ApacActualTrajectoryType">
            <xs:annotation>
                <xs:documentation>Class containing all trajectory elements of a flight. This class is to be included in extension field under FlightType class.</xs:documentation>
            </xs:annotation>
            <xs:complexContent>
                <xs:extension base="fb:RouteTrajectoryGroupContainerExtensionType">
                    <xs:sequence>
                        <xs:element name="element" type="apac:ApacActualTrajectoryElementType" minOccurs="0" maxOccurs="2000"/>
                    </xs:sequence>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>
        <xs:complexType name="ApacActualTrajectoryElementType">
            <xs:annotation>
                <xs:documentation>Class containing composition of each trajectory element(s) specified in ApacTrajectoryType</xs:documentation>
            </xs:annotation>
            <xs:sequence>
                <xs:element name="actualTimeOver" type="fb:TimeType" minOccurs="1" maxOccurs="1">
                    <xs:annotation>
                        <xs:documentation>An actual time of the aircraft over routePoint</xs:documentation>
                    </xs:annotation>
```

```
                </xs:element>
                <xs:element name="level"
type="fb:FlightLevelOrAltitudeChoiceType" minOccurs="1" maxOccurs="1">
                    <xs:annotation>
                        <xs:documentation>An estimated flight level of the
aircraft at this trajectory element [level can be in the following forms, Flight level; or
Altitude.]</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:element name="point" type="fb:SignificantPointChoiceType"
minOccurs="1" maxOccurs="1">
                    <xs:annotation>
                        <xs:documentation>A specified position of this
trajectory element [point can be in the following forms, Designator; Latitude/Longitude; or
Relative point.]</xs:documentation>
                    </xs:annotation>
                </xs:element>
            </xs:sequence>
        </xs:complexType>

        <xs:complexType name="ApacAircraftTrackType">
            <xs:annotation>
                <xs:documentation>Class containing aircraft track data. This class is
to be included in extension field under FlightType class.</xs:documentation>
            </xs:annotation>
            <xs:complexContent>
                <xs:extension base="fb:FlightExtensionType">
                    <xs:sequence>
                        <xs:element name="heading" type="fb:BearingType"
minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current aircraft
heading</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="level"
type="fb:FlightLevelOrAltitudeChoiceType" minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current flight level
[level can be in the following forms, Flight level; or Altitude]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="position"
type="fb:SignificantPointChoiceType" minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current aircraft
position [position can be in the following forms, Designator; Latitude/Longitude; or Relative
point.]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
```

```
                                        <xs:element name="time" type="fb:TimeType"
minOccurs="1" maxOccurs="1">
                                                <xs:annotation>
                                                        <xs:documentation>Time when all data
in this class is reported</xs:documentation>
                                                </xs:annotation>
                                        </xs:element>
                                        <xs:element name="speed"
type="apac:ApacAircraftTrackSpeedChoiceType" minOccurs="1" maxOccurs="1"/>
                                </xs:sequence>
                        </xs:extension>
                </xs:complexContent>
        </xs:complexType>
        <xs:complexType name="ApacAircraftTrackSpeedChoiceType">
                <xs:choice>
                        <xs:element name="groundspeed" type="fb:GroundSpeedType"
minOccurs="1" maxOccurs="1"/>
                        <xs:sequence minOccurs="1" maxOccurs="1">
                                <xs:element name="airspeed"
type="fb:IndicatedAirspeedType" minOccurs="1" maxOccurs="1"/>
                                <xs:element name="groundspeed"
type="fb:GroundSpeedType" minOccurs="0" maxOccurs="1"/>
                        </xs:sequence>
                </xs:choice>
        </xs:complexType>

</xs:schema>
```