



ICAO

International Civil Aviation Organization

The Tenth Meeting of the Aerodromes Operations and
Planning Sub-Group (AOP/SG/10)

Bangkok, Thailand, 10 to 14 August 2026

Agenda Item 2: Review of Outcomes of Relevant Meetings

OUTCOMES OF CNS SG/30

(Presented by the SECRETARIAT)

SUMMARY

This paper presents the relevant outcomes from the CNS SG/30 Meeting that may be of interest to the AOP Sub-group.

1. INTRODUCTION

1.1 The Thirtieth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/30) of APAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held from the afternoon of 6 July to 10 July 2026 at the ICAO APAC Regional Office, Bangkok, Thailand. The Meeting was attended by 96 participants from 21 Member States/Administrations, 2 International Organizations and 6 industry partners. More details for the meeting resources can be accessed by the following link:

<https://www.icao.int/APAC/meetingdocs?fid=87956>

1.2 The Eleventh Meeting of the System Wide Information Management Task Force (SWIM TF/11) was held from 25 – 29 May 2026 in the ICAO APAC Regional Office, Bangkok, Thailand. The Meeting was attended by 100 participants from 16 Member States/Administrations and 3 International Organizations. The Meeting report, working papers, information papers, and other resources can be accessed by the following link:

<https://www.icao.int/APAC/meetingdocs?fid=60144#block-icao-page-title>

1.3 This paper summarized relevant information and updates that may be of interest for the AOP SG Meeting.

2. DISCUSSION

Significance of Frangibility Requirements of Navigational Aids Installed on the Runway Strip and RESA – Nepal (WP/05)

2.1 This paper highlighted the significance of the frangibility requirements of navigational aids installed on runway strips and Runway End Safety Area (RESA). It was recalled that visual and non-visual aids (e.g., approach lighting supports, meteorological equipment and radio navigational aids) are required for the safe take-off and landing of aircraft. These navigational aids are often located near runways and taxiways, and if inappropriately installed, may present a significant hazard to aircraft in the event of aircraft undershooting, overshooting or veering off from the runway during landing, take-

off or ground maneuvering of aircraft. All such equipment and its support shall be frangible and mounted as low as possible. However, for unknown reasons, several pieces of equipment and installations at some airports are located on the runway strip or RESA, which may cause significant damage to aircraft, including severe injuries to passengers, in the event of a runway excursion if such installations are mounted without Meeting frangibility requirements.

2.2 The Meeting noted the sections of ICAO Annex 14, Volume I Aerodrome Design and Operations that include the SARPs for the objects on the runway strip. It was noted that ICAO Annex 14, Volume I, also provides SARPs for the siting of equipment and installations in operational areas, and that the Aerodrome Design Manual (Doc 9157), Part 6, includes considerations regarding the location of ILS/GPA systems. It was noted that the siting of the ILS/GPA cannot be made risk-free due to several airport constraints, such as Space Limitations, Topography, Runway Orientation and Layout and Financial and Resource Constraints, including Infrastructure Development Costs, etc. Therefore, when planning the installation of an ILS, the locations of the localizer and glide path transmitter housing should be carefully considered. Where practicable, the transmitter housing for the ILS glide path should be located outside the runway strip and RESA. Failure to meet the recommended placement guidelines for ILS transmitter housing typically results from a combination of space limitations, operational requirements, and financial constraints. Despite these challenges, airports should strive to minimize risks through compliance with ICAO Annex 14 SARPs wherever possible.

2.3 The Meeting was informed that AP-ADO/TF Task 6/4 at the Sixth Meeting of the APAC Aerodrome Design and Operation Task Force (AP-ADO/TF/6), held in Langkawi, Malaysia, from 18 to 21 February 2025, suggested to develop regional guidance to provide the interrelationship between ICAO Annex 10, Volume I; ICAO Annex 14, Volume I; and Aerodrome Design Manual (Doc 9157) Part 6 with respect to visual and non-visual aids installation on runway and taxiway strips and RESA.

2.4 The Meeting requested that all certified and registered aerodromes be encouraged to remove or correct the non-frangible hazards from the runway and taxiway strip and RESA. It was proposed to develop regional guidance to clarify the interrelationships among ICAO Annex 10, Volume I; ICAO Annex 14, Volume I; and Aerodrome Design Manual (Doc 9157), Part 6, with respect to the installation of visual and non-visual aids on runway and taxiway strips and RESA. In addition, States/Administrations were encouraged to share their best practices regarding the location of ILS/GPA and ILS/GP huts, including equipment.

Interrelationship between ICAO Annex 10, Volume I; ICAO Annex 14, Volume I; and Aerodrome Design Manual (Doc 9157) Part 6 for Visual and Non-Visual Aids Installation on Runway and Taxiway Strips and RESA – Nepal (WP/35)

2.5 This paper further elaborated information shared under WP/05 and presented information about the draft APAC regional guidance on installing visual and non-visual navigational aids on runway and taxiway strips and RESA, which is under development under AP-ADO/TF. It was added that the proposed guidance material will incorporate the reviewed provisions of ICAO Annex 10, Annex 14, Annex 3, and Doc 9157 Part 6, highlighting gaps in frangibility and siting requirements. The Meeting noted that a regional small working group under AP-ADO/TF is developing harmonized guidance that incorporates State practices to reduce the risk of runway excursions. States/Administrations were encouraged to share their national regulations/ guidance/ best practices regarding frangibility and siting of navigational aids in the operational areas.

2.6 The Meeting was informed that frangibility requirements for navigation systems are not currently specified in ICAO Annex 10, Volume I. The Meeting suggested seeking advice from the Navigation Systems Panel (NSP) on the need to incorporate the frangibility requirements described in this paper into the appropriate sections of ICAO Annex 10, Volume I. It was further suggested that, where the inclusion of additional details is not considered necessary, an appropriate reference to the

frangibility requirements contained in the ICAO Aerodrome Design Manual (Doc 9157) could be incorporated into ICAO Annex 10, Volume I. **ACTION ITEM 30-2**

2.7 Thailand shared its best practices in response to the paper. The Meeting was informed that, due to frequent rainfall and soil subsidence at airports in Thailand, elevated foundations are present around navigational aid installations. To mitigate this issue, soil is placed and graded around the foundation to provide a gradual slope, thereby eliminating abrupt level differences. Thailand further informed the Meeting that the use of underground shelters has been considered at certain locations; however, their implementation requires careful assessment due to potential challenges related to heavy rainfall and drainage.

2.8 Nepal requested contributions from CNS experts to support the small working group under the AP-ADO/TF that is developing draft APAC regional guidance on the installation of visual and non-visual navigational aids on runway and taxiway strips and within RESA. In response to a query about the development timeline for the proposed guidance document, the Meeting was informed that the draft guidance is expected to be completed by December 2027. Progress on the development of the guidance will be reported to the AP-ADO/TF at its next Meeting scheduled for February 2027. It was further noted that a subsequent Meeting to discuss the draft guidance document is planned for November 2026.

2.9 Recognizing that there is no dedicated contributory body under CNS SG in the APAC Region responsible for conventional navigation aids, the Meeting agreed that the ICAO Secretariat would circulate the request to all CNS focal points, inviting the nomination of relevant CNS experts to contribute to the drafting of the guidance material. The names of nominated experts will be shared with the AP-ADO/TF Secretariat. **ACTION ITEM 30-3**

Review Report of the Eleventh Meeting of System Wide Information Management Task Force (SWIM TF/11) – Sec (WP/18)

2.10 The SWIM TF/11 Meeting recalled that Decision 36/11 from APANPIRG/36 in November 2025, adopted the First Version of the Business Functionality for APAC Common SWIM Information Services. The document was further improved based on suggestions from different expert groups. The Meeting was informed of the detailed coordination process followed in drafting the second version of the APAC Common SWIM Information Services.

2.11 The SWIM TF/11 Meeting reviewed the draft Second Version of the APAC Common SWIM Information Services document and agreed that SWIM TF is best placed to determine the most appropriate Message Exchange Pattern for each defined Information Service proposed in the table of Business Functionalities for APAC Common SWIM Information Services.

2.12 It was agreed that the revised version template will incorporate all suggestions provided by different expert groups. In addition, all services containing some fields marked with “TBD” or “?” and not incorporated into the first version will be included in version 2.0 to avoid confusion within expert groups regarding the exclusion of information services for which the groups had previously provided inputs. It was added that new columns for which information is currently unavailable will be left blank, with all possible options available for further selection by relevant expert groups. These measures were intended to ensure that the APAC Common SWIM Information Services v2.0 document will be used by the relevant expert groups for regular review during their upcoming Meetings.

2.13 The Meeting agreed to publish the document as the second version and present the revised document for consideration by CNS SG/30 through the following Draft Decision and subsequent adoption by APANPIRG/37. This was endorsed by CNS SG/30 Meeting for APANPIRG/37 adoption:

Draft Decision CNS SG/30/13 (SWIM TF/11/04) - Adoption of APAC Common SWIM Information Services, v2.0	
What: The second version of APAC Common SWIM Information Services, provided in Appendix A , be adopted for immediate use by APAC States/Administrations. The set of APAC Common SWIM Information Services, and the associated performance of SWIM Technical Infrastructure underpinning these services, is not specified to support the provision of aircraft separation.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To assist APAC States/Administrations in planning and implementing their SWIM information services.	Follow-up: ☐ Required from States
When: 10-Jul-26	Status: Draft to be adopted by PIRG
Who: ☒ Sub groups ☐ APAC States ☐ ICAO APAC RO ☐ ICAO HQ ☐ Other: MET SG, ATM SG, AOP SG	

CNS Meeting Plan for 2027 – Sec (IP/04)

2.14 ICAO Secretariat shared the tentative schedule for the CNS contributory bodies' Meetings to be held in 2027 for Meeting information and action. It was added that the ICAO Secretariat will inform Member States about the exact dates, mode and venue of the Meeting while issuing invitation letters at least three months before the event.

No.	Name of Meeting	Dates (2027)	Mode of Meeting	Location
1.	PKI Implementation Workshop	25-26 January	In-Person	Bangkok
2.	ANSIA TF/02	27-29 January	In-Person	Bangkok
3.	Webinar on WRC27	February	Online	Bangkok/Online
4.	SRWG/11	24–26 February	In-Person	Bangkok
5.	CRV OG/16	02-05 March	In-Person	Bangkok
6.	SURICG/12	31 March – 2 April	In-Person	Bangkok
7.	SIPG WS/4	05 April – 09 April	In-Person	Singapore/Bangkok
8.	Workshop on new ATN provisions	19 to 20 April	In-Person	Bangkok
9.	ACSICG/14	21-23 April	In-Person	Bangkok
10	PBNICG/14	May	In-Person	Bangkok
11	One-day workshop on ATM automation system integration into a SWIM-enabled environment	01 June	In-Person	Bangkok
12	ATMAS CG /1	02-04 June	In-Person	Bangkok

No.	Name of Meeting	Dates (2027)	Mode of Meeting	Location
13	SWIM TF/12	07-11 June	In-Person	Bangkok
14	CNS/SG/31	21-25 June	In-Person	Bangkok

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review and endorse proposed Draft Decision CNS SG/30/13 (SWIM TF/11/04)
- Adoption of APAC Common SWIM Information Services, v2.0 for APANPIRG/37 adoption; and
- b) discuss any relevant matters as appropriate.

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Business Functionality of APAC Common SWIM Information Services
(Reviewed by FF-ICE/4, SURSG/5, SURICG/11, ATFM & A-CDM/SG/16, MET/IE WG/24, AAITF/21)

Second Version (May 2026)

Purpose.– This list of APAC Common SWIM Information Services, including associated priorities, provides States/Administrations with guidance on anticipated services to support their planning and implementation of SWIM.

Notes.– “Applicability”: expected to be implemented “region-wide” in order to achieve the anticipated benefits, vs. “as needed” to meet the needs for a subset of the region

– “Desired implementation timeframe”: Immediate (before 2030), Medium-term (2030-2035), Long-term (beyond 2035)

– “Maturity”: “All elements defined” vs. “All elements not defined” (to be further refined)

(“Applicability”, “Desired Implementation Timeframe” and “Maturity” are yet to be reviewed by the Subsidiary Groups)

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
APAC Common SWIM Aeronautical Information Services							
Airspace management service	Exchanges of airspace status information between ASM Support System and Air Traffic Control (ATC) System. The sharing of airspace availability and airspace structure in real-time will contribute to a more efficient execution of the flight as information impacting the trajectory will be exchanged.	Availability or activation/deactivation or temporarily change of airspace, restricted area, danger area, search and rescue regions	AIXM	Pub/Sub or Req Reply			
Airspace feature service	Provides the characteristics of the three-dimensional airspace, described as horizontal projection with vertical limits, and their relevance to air traffic.	FIR/UIR boundaries, waypoints, enroute ATS routes, SIDs and STARs, navaids, procedures, and other airspace not limited to restricted area, prohibited	AIXM	Pub/Sub or Req Reply			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
		area, danger area, search and rescue regions (Remarks – Other data published in the AIP may be included)					
Aerodrome feature service	Provides current and/or planned airport layout features, such as aerodrome mapping data, runway, taxiway, passenger facilities.	Runways, movement areas, aerodrome services, nav aids, instrument landing systems, Aerodrome location, communication facilities (frequencies)	AIXM	Pub/Sub or Req Reply			
Runway Condition Report service	Provides runway surface conditions and contaminants (least to most slippery) that are directly correlated to aircraft take-off and landing performance.	Global Reporting Format (GRF) for runway surface conditions	AIXM	Pub/Sub or Req/Reply			
Digital NOTAM distribution service	Provides aeronautical information in accordance with the Digital NOTAM Specification, such as runway closure.	Digital NOTAM (e.g. Special activity airspace (SAA) NOTAMs, or other types of NOTAMs)	AIXM	Pub/Sub or Req Reply			
ATIS distribution service	Provides continuous and automated broadcast of recorded aeronautical information in airport and terminal areas.	Current weather conditions, runway in use, available approaches, and other data relevant to arriving and departing aircraft, specific ATC procedures, and any airport construction activity that could affect taxi planning	TBD	Pub/Sub			
Search and rescue service	Allows Rescue Coordination Centres (RCCs) to exchange information with neighbouring RCCs and ATS units for coordination during SAR operations.	Search and rescue regions, Registered aircraft operator details and contacts, ICAO Autonomous Distress Tracking (ADT) data, Location of Aircraft in	TBD	Pub/Sub			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
		Distress Repository (LADR) data, ICAO OPS CTRL database contact information, SAR Unit (SRU) location and capability data					
APAC Common SWIM Flight Information Services							
GUFİ service	GUFİ (Globally Unique Flight Identifier) generation and provision	GUFİ	FIXM	Req/Reply			
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM. Appendix A: Filing Service Scenarios	Flight plan for registration, update or cancellation	FIXM	Appendix A			
FF-ICE publication service	Provides harmonised sharing of flight plan information in a global standard supporting common situation awareness.	Flight information for publication	FIXM	Pub/Sub			
FF-ICE trial service	Allows operators to test the effect of a potential change in a flight plan prior to committing to the change. Appendix A: Trial Service Scenarios	Proposed changes in a flight plan	FIXM	Appendix A			
FF-ICE flight data request service	Allows an operator to request the current status of a flight plan, or an ANSP can request an operator to submit the latest version of their flight plan. Appendix A: Flight Data Request Service Scenarios	Current status of a flight plan, a copy of flight plan or supplementary plan	FIXM	Appendix A			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
FF-ICE notification service	Provides notification of a change in flight state, such as Departure (DEP) and Arrival (ARR) Air Traffic Service (ATS) messages. Appendix A: Notification Service Scenarios	ARR, DEP messages	FIXM	Appendix A			
FF-ICE planning service	Allows operators to submit preliminary flight plans for early Air Traffic Flow Management (ATFM) planning and to obtain feedback regarding restrictions/constraints affecting the flight. Appendix A: Planning Service Scenarios	Preliminary flight plan for early ATFM planning	FIXM	Appendix A			
ADP Distribution Service	Supports publication and distribution of ATFM Daily Plan (ADP), based on information included in the APAC ADP Exchange Procedure ¹ . The published ADP is designed to inform for stakeholders on upcoming demand/capacity constraints and possible ATFM measures.	Refer to ADP template	FLXM ² ?	Pub/Sub			
Flight-Specific ATFM Measure Service	Supports notification of information related to “flight-specific” ATFM measures, i.e. measures whose control mechanisms apply to a single flight. An example is the Ground Delay Program (GDP), whose control mechanism is a Calculated Take-Off Time (CTOT), or an ATFM measure for	CTOT, CTO, CLDT, and fields currently included in APAC AFTN/AMHS-Based ICD for ATFM ³	FIXM	Appendix B			

¹ The ADP template included herein is not updated. The new ADP template had been agreed by the AMNAC group and included into the [AMNAC COP v6.1](#), Appendix D, and was proposed to the ATFM/SG/15 (Apr-May 2025). The meeting agreed that the Secretariat will update the ADP Exchange Procedure to include the new template, which has already been supplied by AMNAC core team post-meeting.

² FLXM: Flow Information Exchange Model

³ Based on the conclusion from ATFM/SG/15, an amendment to this ICD will be proposed in which a more structured use of REGUL and REGCAUSE fields will be introduced. This proposal is expected to be tabled at the upcoming CNS/SG meeting.

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
	airborne flight, whose control mechanism is a Calculated Time Over (CTO). Recipients of this information should take actions to comply with the ATFM measure contained herein. Appendix B: ATFM Operational Scenarios						
Flow-Specific ATFM Measure Service	Supports notification of information related to “flow-specific” ATFM measures, i.e. measures whose control mechanisms apply to a “group of flights” on a particular traffic flow. An example is the Minutes-in-Trail (MINIT) requirement applied on an eastbound traffic using A1 from VT*, VV* to RK*. Recipients of this information should take actions to comply with the ATFM measure contained herein.⁴	Spacing parameters for MINIT, MIT; Departure intervals for MDI; Alternate routes for Re-Routing; Flight level allocation for Level Capping	TBD	Pub/Sub			
ATFM/A-CDM Integration Service	Supports exchanges of flight-specific ATFM measure information and A-CDM milestone parameters among stakeholders, including arrival/departure ATFM units, airspace users, and airport operators, to integrate A-CDM process with ATFM operations. Appendix B: ATFM Operational Scenarios	ATFM measure information: CTOT A-CDM departure planning information: TOBT, TTOT, TSAT	FIXM	Appendix B			
APAC Common SWIM Meteorological Information Services							

⁴ Common operating procedure for this group of ATFM measures (e.g., MINIT, MIT, MDI, Re-Route, Level Capping) has not been developed for the APAC region yet, and should be developed before finalizing the information service to support the operations.

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
FOR AERODROME							
METAR/SPE CI service	Provides of IWXXM-formatted METAR/SPECI product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service	IWXXM	Pub/Sub Req/Reply			
TAF service	Provides of IWXXM-formatted TAF product specified in ICAO Annex 3.		IWXXM	Pub/Sub Req/Reply			
Aerodrome Meteorological Observation Information Service	Provides continuous observations of weather parameters at an aerodrome. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.	To be introduced as recommended practice in Annex 3 (Amd 84) in Nov 2030 tentatively (Note: Level of standardisation needs to be considered, as different aerodrome information services may be required for different use cases.)	IWXXM	Pub/Sub or Req/Reply			
Aerodrome Meteorological Forecast Information Service	Provides information of the expected meteorological conditions, including probability, at an airport during a specified period. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.		IWXXM	Pub/Sub or Req/Reply			
FOR ENROUTE							
SIGMET service	Provides IWXXM-formatted SIGMET product specified in ICAO Annex 3.	SIGMETs for thunderstorm, tropical cyclone, turbulence, icing, mountain wave, duststorm, sandstorm, volcanic ash and radioactive cloud	IWXXM	Pub/Sub Req/Reply			
AIRMET service	Provides IWXXM-formatted AIRMET product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service	IWXXM	Pub/Sub Req/Reply			
Tropical Cyclone Advisory service	Provides IWXXM-formatted Tropical Cyclone Advisory product specified in ICAO Annex 3. (Designated provider: States with Tropical Cyclone Advisory Centre)		IWXXM	Pub/Sub Req/Reply			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
Volcanic Ash Advisory service	Provides IWXXM-formatted Volcanic Ash Advisory product specified in ICAO Annex 3. (Designated provider: States with Volcanic Ash Advisory Centre)		IWXXM	Pub/Sub Req/Reply			
Space Weather Advisory service	Provides IWXXM-formatted Space Weather Advisory product specified in ICAO Annex 3. (Designated provider: States with Space Weather Advisory Centre)		IWXXM	Pub/Sub Req/Reply			
Volcano Observatory Notice for Aviation (VONA) service	Provides of IWXXM-formatted VONA specified in ICAO Annex 3. Provision of VONA is a recommended practice in Annex 3 (Amd 82). (Designated provider: States with a designated State Volcano Observatory)		IWXXM	Pub/Sub Req/Reply			
Quantitative volcanic ash concentration information (QVA) service	Provides detailed information of significant volcanic ash in the atmosphere, including probabilities of ash concentration thresholds over space and time. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel. (Designated provider: States with Volcanic Ash Advisory Centre (VAAC))	QVA gridded forecasts including probabilities, and IWXXM QVA objects. A recommended practice for significant ash clouds in Annex 3 (Amd 82) for VAACs in a position to do so from Nov 2025, and for all VAACs from Nov 2026.	Gridded data (e.g. NetCDF), IWXXM	Pub/Sub Req/Reply			
WAFC (World Area Forecast Centres) gridded forecast service	Provides global gridded weather forecasts. (Designated provider: WAFCs (UK and US))	Global gridded forecasts of CB, icing, turbulence, upper winds, upper-air temperatures and humidity, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind	Gridded data in GRIB2	Pub/Sub Req/Reply			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
WAFC significant weather (SIGWX) forecast service	Provides global WAFC SIGWX data sets with coverage expressed in polygons. (Designated provider: WAFCs (UK and US))	Significant weather forecast such as tropical cyclone, turbulence, icing, etc.	IWXXM	Pub/Sub or Req/Reply			
Special Air Report (ARS) service	Provides reports of special observations made by aircraft when they encounter special weather phenomena, such as moderate/severe turbulence or icing. (Note: Currently there is no plan to implement this information service at MET Panel)	Special aircraft observations of weather phenomena as specified in Annex 3, including turbulence, icing, mountain wave, thunderstorms, duststorm, sandstorm, volcanic cloud, volcanic activity / eruption	TBD	Pub/Sub or Req/Reply			
MET derived from Mode S DAPs service	Provides upper air winds and temperatures derived from Mode S Downlinked Aircraft Parameters (DAPs) (e.g. true airspeed, ground speed, magnetic heading, true track angle) and facilitates exchange of derived winds and temperatures among MET service providers.	Upper air winds and temperatures derived from Mode S DAPS	TBD	Pub/Sub or Req/Reply			
Satellite image service	Provides satellite observational information.	Satellite derived MET information (e.g. significant convection)	Gridded format (e.g. NetCDF) and image format	Req/Reply			
Weather radar image service	Provides two- or three-dimensional radar observational information.	Weather radar reflectivity to visualise the intensity of convection	Gridded format (e.g. NetCDF) and image format	Req/Reply			
APAC Common SWIM Surveillance Information Services							
Surveillance data only sharing service	Provides surveillance data of aircraft. (Reference: Guidance Material for the Sharing of Surveillance Data in SWIM)	latitude, longitude, flight level, ground speed (optional), magnetic heading (optional), target	ASTERIX Cat 21 (payload in JSON or RAW format)	Pub/Sub			

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Applicability	Desired implementation timeframe	Maturity
		identification, target address, mode 3/A code (optional), date, time of message reception for position, quality indicators, SAC, SIC					
Surveillance data with flight plan information sharing service	Provides surveillance data of aircraft with flight plan information. (Reference: Guidance Material for the Sharing of Surveillance Data in SWIM)	globally unique flight identifier, aircraft identification, departure aerodrome, destination aerodrome, aircraft type (optional), wake turbulence category (optional), latitude, longitude, flight level, ground speed (optional), magnetic heading (optional), target identification, target address, mode 3/A code (optional), date, time of message reception for position, quality indicators, SAC, SIC	ASTERIX Cat 21+FPL (payload in JSON format) Or ASTERIX Cat 21+FPL (FPL contained in message header and Cat 21 payload in RAW format)	Pub/Sub			

APPENDICES

Purpose

These appendices provide detailed operational scenarios for SWIM Information Services that require further description than can be achieved in the main Business Functionality for APAC Common SWIM Information Services table. The additional detail may be associated with varying requirements and business completion criteria, or where the behaviour of the service may depend on the operational scenario, therefore requiring a more granular analysis.

Scenario Steps Table

Operational scenarios detailed in the appendices should follow the format of a Scenario Steps table. The table below specifies and elaborates the fields in the Scenarios Steps table, as well as indicates who is responsible for completing each field.

Fields	Description	Responsibility
Step	Sequential identifier for each message exchange within the scenario	Domain Expert Group
Message	Specific message type, e.g. FF-ICE message type, with sender and recipient identification (e.g., "eAU sends Filed Flight Plan to eASP", "eASP returns Submission Response to eAU")	Domain Expert Group
Message Requirements	Message requirement classification and prerequisite conditions that must be satisfied prior to message transmission • Mandatory - Message must be sent/received in all instances of the scenario without exception • Conditional - Message must be sent/received when specific triggering conditions are met, but is not required when those conditions do not occur	Domain Expert Group
Business Timeout	Maximum acceptable time duration for message response from an operational perspective. The message originator is expected to contact the recipient if no response is received within the timeout period.	Domain Expert Group
Comments	Additional operational context, processing requirements, or business rule specifications that inform technical implementation	Domain Expert Group
Message Exchange Pattern	A template that describes relationships of multiple messages exchanged between interacting components to accomplish a single complete information exchange.	SWIM TF

APPENDIX A

Purpose

This appendix provides detailed operational scenarios for FF-ICE Flight Information Services, with the corresponding recommended MEP by the SWIM Task Force. Each FF-ICE service could contain multiple operational scenarios that have varying requirements and business completion criteria. Hence, technical specifications cannot be defined at the FF-ICE service level. They require more granular scenario-based analysis.

Scope and Application

Five of the six FF-ICE/R1 services are covered. Publication Service is not included as it requires a straightforward Pub/Sub MEP. For each of the 5 FF-ICE/R1 services, the possible operational scenarios were identified. Within each operational scenario, the business completion criteria and a table containing the scenario steps, message exchanges, actors involved, message requirements and business timeouts were detailed. With this information, the SWIM TF recommended the corresponding MEP.

Role Delineation

- Domain Expert Groups: The FF-ICE Ad-Hoc Group defined the operational scenarios and business completion criteria based on operational requirements
- SWIM Task Force: Determined appropriate technical specifications and Message Exchange Patterns based on the clearly defined business requirements provided

Business Completion Criteria Definition

- **Business Completion Criteria** — The point at which the relevant actor can consider their operational procedure for the specific flight to be complete and proceed with subsequent flight operations for that specific flight. This is defined by specific message receipts by the relevant actor.
 - *Format: [Actor] receives/sends [Message Type] [with specific status/condition when applicable]*

FILING SERVICE SCENARIOS

Scenario 1: Submission of Filed Flight Plan (eFPL) by eAU

Business Completion Criteria:

- eAU receives Filing Status with ACCEPTABLE or NOT ACCEPTABLE status indication; or
- eAU receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Filed Flight Plan (eFPL) to eASP	Mandatory	N/A	Initial flight plan submission	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following reception) eFPL	1 minute following eFPL submission	Message format validation and basic rule compliance check ACK: Flight plan received and stored on file REJ: Flight plan rejected and not stored on file MAN: Manual intervention required	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be • MAN (manual processing ongoing); • ACK (manual processing resolved and proceed to Filing Status); or • REJ (manual processing failed)	
4	eASP returns Filing Status (FS) to eAU	Conditional (when SR = ACK)	1 minute following SR "ACK"	Operational evaluation against ATM configuration and applicable restrictions/constraints	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
				ACCEPTABLE: Complies with requirements NOT ACCEPTABLE: Does not comply with requirements PENDING: Not yet evaluated	
5	eASP returns Filing Status(es) to eAU	Conditional (when previous FS = PENDING or triggered by re-evaluation process)	Variable	Additional Filing Status messages sent when: 1) Initial status was PENDING and eASP subsequently completed flight plan evaluation, or 2) Re-evaluation of eFPL detects changes in ATM restrictions/constraints affecting flight plan acceptability	

Scenario 2: Submission of Flight Plan Update (FPU) by eAU

Business Completion Criteria:

- eAU receives Filing Status with ACCEPTABLE or NOT ACCEPTABLE status indication; or
- eAU receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Flight Plan Update (FPU)	Mandatory	N/A	Modification to existing flight plan data via update message	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following reception) FPU	1 minute following FPU submission	Message format validation and basic rule compliance check ACK: Update processed successfully, flight plan modified	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
				REJ: Update failed, flight plan unchanged MAN: Manual intervention required	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be • MAN (manual processing ongoing): • ACK (manual processing resolved and proceed to Filing Status); or • REJ (manual processing failed)	
4	eASP returns Filing Status (FS) to eAU	Conditional (when SR = ACK)	1 minute following SR "ACK"	Operational evaluation against ATM configuration and applicable restrictions/constraints ACCEPTABLE: Complies with requirements NOT ACCEPTABLE: Does not comply with requirements PENDING: Not yet evaluated	
5	eASP returns Filing Status(es) to eAU	Conditional (when previous FS = PENDING or triggered by re-evaluation process)	Variable	Additional Filing Status messages sent when: 1) Initial status was PENDING and eASP subsequently completed flight plan evaluation, or 2) Re-evaluation of FPU detects changes in ATM restrictions/constraints affecting flight plan acceptability	

Scenario 3: Submission of Flight Cancellation (FC) by eAU

Business Completion Criteria:

- eAU receives Submission Response with ACK or REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Flight Cancellation (FC) to eASP	Mandatory	N/A	Termination of flight plan and associated GUFU operational use	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following Flight Cancellation message reception)	1 minute following FC submission	Message format validation and basic rule compliance check ACK: Cancellation processed successfully, flight plan cancelled REJ: Cancellation failed, flight plan remains active MAN: Manual intervention required, flight plan remains active	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be - MAN (manual processing ongoing); - ACK (manual processing resolved, cancellation successful); or - REJ (manual processing and cancellation failed)	

PLANNING SERVICE SCENARIOS

Scenario 1: Submission of Preliminary Flight Plan (PFP) by eAU

Business Completion Criteria:

- eAU receives Planning Status with CONCUR, NEGOTIATE, OR NON-CONCUR status indication; or
- eAU receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Preliminary Flight Plan (PFP) to eASP	Mandatory	N/A	Initial preliminary flight plan submission for collaborative decision making	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following reception) PFP	1 minute following PFP submission	Message format validation and basic rule compliance check ACK: Preliminary Flight plan received and stored on file REJ: Preliminary Flight plan rejected and not stored on file MAN: Manual intervention required	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be • MAN (manual processing ongoing); • ACK (manual processing resolved and proceed to Planning Status); or • REJ (manual processing failed)	
4	eASP returns Planning Status (PS) to eAU	Conditional (when SR = ACK)	1 minute following SR "ACK" if re-	Planning evaluation against ATM configuration and applicable restrictions/constraints.	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
			evaluation process is provided	CONCUR: Complies with requirements NEGOTIATE: Would be accepted if filed, but eASP proposes modifications/constraints or identifies differences from desired route/trajectory NON-CONCUR: Does not comply with requirements	
5	eASP returns Planning Status(es) to eAU	Conditional (when re-evaluation process detects changes)	Variable	Additional Planning Status messages sent when re-evaluation detects changes in ATM restrictions/constraints affecting preliminary flight plan acceptability	

Scenario 2: Submission of Flight Plan Update (FPU) by eAU

Business Completion Criteria:

- eAU receives Planning Status with CONCUR, NEGOTIATE, OR NON-CONCUR status indication; or
- eAU receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Flight Plan Update (FPU) for PFP to eASP	Mandatory	N/A	Modification to existing preliminary flight plan data via update message	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following reception) FPU	1 minute following FPU submission	Message format validation and basic rule compliance check ACK: Update processed successfully, preliminary flight plan modified	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
				REJ: Update failed, preliminary flight plan unchanged MAN: Manual intervention required	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be • MAN (manual processing ongoing); • ACK (manual processing resolved and proceed to Planning Status); or • REJ (manual processing failed)	
4	eASP returns Planning Status (PS) to eAU	Conditional (when SR = ACK)	1 minute following SR "ACK"	Planning evaluation against ATM configuration and applicable restrictions/constraints. CONCUR: Complies with requirements NEGOTIATE: Would be accepted if filed, but eASP proposes modifications/constraints or identifies differences from desired route/trajectory NON-CONCUR: Does not comply with requirements	
5	eASP returns Planning Status(es) to eAU	Conditional (when re-evaluation process detects changes)	Variable	Additional Planning Status messages sent when re-evaluation detects changes in ATM restrictions/constraints affecting preliminary flight plan acceptability	

Scenario 3: Submission of Flight Cancellation (FC) by eAU

Business Completion Criteria:

- eAU receives Submission Response with ACK or REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Flight Cancellation (FC) to eASP	Mandatory	N/A	Termination of preliminary flight plan and associated GUF1 operational use	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following Flight Cancellation message reception)	1 minute following FC submission	Message format validation and basic rule compliance check ACK: Cancellation processed successfully, preliminary flight plan cancelled REJ: Cancellation failed, preliminary flight plan remains active MAN: Manual intervention required, preliminary flight plan remains active	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be - MAN (manual processing ongoing); - ACK (manual processing resolved, cancellation successful); or - REJ (manual processing and cancellation failed)	

NOTIFICATION SERVICE SCENARIOS

Scenario 1: Dissemination of Flight Departure (FD) Notification by Departure eASP

Business Completion Criteria:

- Departure eASPs receives Submission Response with ACK or REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Departure eASP sends Flight Departure (FD) to relevant eASP(s)	Mandatory	N/A	Notification of actual departure event (equivalent to DEP message)	
2	Receiving eASP returns Submission Response (SR) to departure eASP	Mandatory (following departure message reception)	1 minute following dissemination of FD	Message format validation and basic rule compliance check ACK: Departure notification successful REJ: Departure notification failed MAN: Manual intervention required	
3	Receiving eASP returns subsequent Submission Response(s) to departure eASP	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be - MAN (manual processing ongoing); - ACK (departure notification successful); or - REJ (departure notification failed)	

Scenario 2: Dissemination of Flight Arrival (FA) Notification by Arrival eASP

Business Completion Criteria:

- Arrival eASPs receives Submission Response with ACK or REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Arrival eASP sends Flight Arrival (FA) to relevant eASP(s)	Mandatory	N/A	Notification of actual arrival event (equivalent to ARR message)	
2	Receiving eASP returns Submission Response (SR) to arrival eASP	Mandatory (following arrival message reception)	1 minute following dissemination of FA	Message format validation and basic rule compliance check ACK: Arrival notification successful REJ: Arrival notification failed MAN: Manual intervention required	
3	Receiving eASP returns subsequent Submission Response(s) to arrival eASP	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual processing. Response can be - MAN (manual processing ongoing); - ACK (arrival notification successful); or - REJ (arrival notification failed)	

TRIAL SERVICE SCENARIOS

Scenario 1: Submission of Trial Request (TRQ) by eAU

Business Completion Criteria:

- eAU receives Trial Response with CONCUR, NEGOTIATE, or NON-CONCUR; or
- eAU receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU sends Trial Request(s) (TRQ) to eASP	Mandatory	N/A	Multiple independent requests can be sent simultaneously without waiting for responses. These "what-if" requests allow evaluation of flight plan alternatives without creating new flight plans or modifying existing flight plans. eASPs may limit number/frequency of requests.	
2	eASP returns Submission Response (SR) to eAU	Mandatory (following each trial request reception)	1 minute following TRQ submission	Message format validation and basic rule compliance check ACK : Trial request processed and will be evaluated REJ : Trial request rejected MAN : Manual intervention required	
3	eASP returns subsequent Submission Response(s) to eAU	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual intervention. Response can be	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
				• MAN (manual processing ongoing); • ACK (manual processing resolved and proceed to Trial Response); or • REJ (manual processing failed)	
4	eASP returns Trial Response (TRP) to eAU	Conditional (when SR = ACK)	1 minute following SR "ACK"	Evaluation against ATM configuration and applicable restrictions/constraints. . CONCUR: Complies with requirements NEGOTIATE: Would be accepted if submitted as eFPL or PFPs, but eASP proposes modifications/constraints or identifies differences from desired route/trajectory NON-CONCUR: Does not comply with requirements	

FLIGHT DATA REQUEST SERVICE SCENARIOS

Scenario 1: Submission of Flight Data Request (FDRQ) by eAU/eASP

Business Completion Criteria:

- Requestor (eAU/eASP) receives Flight Data Response; or
- Requestor (eAU/eASP) receives Submission Response with REJ status indication

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	eAU or eASP sends Flight Data Request (FDRQ) to eASP or eAU	Mandatory	N/A	Request for flight plan data, supplementary data, or flight status. Additional flight information may be provided, subjected to eAUs/eASPs implementation	
2	Receiving party returns Submission Response (SR) to message originator	Mandatory (following each flight data request reception)	1 minute from submission of FDRQ	Message format validation and basic rule compliance check ACK: Flight data request processed and flight information will be provided REJ: Flight data request rejected (invalid format, unauthorized access, or data not found etc.) MAN: Manual intervention required	
3	Receiving party returns subsequent Submission Response(s)	Conditional (only when previous SR = MAN)	Variable (dependent on manual processing duration)	Additional Submission Responses will be sent after manual intervention. Response can be • MAN (manual processing ongoing); • ACK (manual processing resolved and proceed to Flight Data Response); or	

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
				REJ (manual processing failed)	
4	Receiving party returns Flight Data Response (FDRP)	Conditional (when SR = ACK)	1 minute following SR "ACK"	Requested flight information provided. No response expected from recipient of Flight Data Response	

APPENDIX B

ATFM Operational Scenarios for APAC Common SWIM Information Services

1. Background

- 1.1. As the aviation community moves away from legacy point-to-point teletype messaging, System-Wide Information Management (SWIM) serves as the primary enabler for the digital exchange of aeronautical, flight, and meteorological information.
- 1.2. The exchange of tactical ATFM requirements, specifically **Calculated Take-Off Time (CTOT)**, and **Calculated Time Over (CTO)**, and one of the key A-CDM data elements supporting demand prediction, the **Target Take-Off Time (TTOT)**, is currently managed through a mix of legacy message formats and systems and emerging digital services. To ensure global interoperability and seamless transition to FF-ICE operating environment, these exchanges must be mapped to clear operational use cases within ICAO guidance materials and regionally operating procedures.
- 1.3. The exchange of CTO, CTOT, and TTOT is critical for the following operational reasons:
- 1.4. Enabling Flexible Trajectory-Based Demand-Capacity Balancing (CTO): The exchange of CTO allows an ANSP to balance demand and capacity within their area of responsibility by metering traffic through a specific waypoint in their airspace or at the boundary of their Flight Information Region (FIR) rather than imposing ATFM control mechanism at the departure airport which may be outside their FIRs. This approach aligns with the spirit of FF-ICE, in which FF-ICE capable ATM service provider (eASP) provides ATM restriction/constraint impacting trajectory within their area to the FF-ICE capable airspace user (eAU), and the eAU is responsible for managing their trajectory to comply with the requirements. This approach provides greater flexibility for the AUs to determine how best to meet the DCB requirement while still honouring their business objectives.
- 1.5. Balancing Demand and Capacity through an ATFM Measure Imposed at Departure Aerodrome (CTOT): While the move toward CTO is foreseeable in the future FF-ICE environment, there will be cases where a conventional Ground Delay Program (GDP) with the assignment of CTOT will still be used, e.g., in the case of domestic ATFM operations or in specific areas of cross-border ATFM operations with special

arrangements among the ANSPs involved. In a GDP, CTOT is the primary constraint time issued to regulate departures of flights destined for congested or constrained airspace or arrival aerodrome. The sharing of CTOT with ANSP managing the

departure aerodrome ensures that the departure aerodrome holds the aircraft on the ground to smooth out traffic peaks before they enter the airborne network or going to the arrival aerodrome.

- 1.6. Enhancing Predictability via Airport Collaboration (TTOT): TTOT is derived from Airport-Collaborative Decision Making (A-CDM) processes and provides a more accurate picture of when an aircraft is expected to be ready for departure compared to the filed flight plan. Integrating A-CDM derived times such as TTOT into ATFM assists in enhancing ATFM's demand prediction, resulting in a more accurate, dynamic, and effective demand-capacity balancing initiatives.
- 1.7. The transition from legacy messages (such as Slot Allocation Messages - SAM) transmitted via AFTN/AMHS to modern Flight Information Exchange Model (FIXM) messages is driven by the need for global interoperability, data richness, and the implementation of SWIM.
- 1.8. There is a need to shift from existing SAM and related messages to ATFM FIXM messages due to the following reasons below:
 - 1.8.1. Limitations of legacy AFTN/AMHS formats: Legacy teletype-based formats are rigid and often lack the flexibility to carry complex trajectory data required for modern ATFM.
 - 1.8.2. Support for FF-ICE and global standardization (which FIXM will be used for exchanging flight-related information): Shifting ATFM and A-CDM information exchange to FIXM-based message formats ensures that APAC ATFM and A-CDM operations are aligned with global ICAO standards and are ready to support the operations in FF-ICE environment, as well as facilitating "global interoperability.
 - 1.8.3. Handling of region-specific requirements via extensions: Shifting to FIXM allows the region to define specific data elements (such as those found in the APAC Regional FIXM Extension) in a structured, machine-readable format (XML/GML) that legacy teletype-based messages cannot easily support.

2. Operational Scenarios

- 2.1. The three parameters cited represent different phases within a flight trajectory:

- 2.1.1. TTOT (Target Take-Off Time): Generated by A-CDM system, representing the expected time a flight is expected to depart from the departure aerodrome considering factors including the airspace user's TOBT (Target Off-Block Time) and departure sequencing requirements.
- 2.1.2. CTOT (Calculated Take-Off Time): Generated by the ATFM system to manage traffic into constrained or congested airspace or arrival aerodrome by controlling the departure (take-off) time of the flight from the departure aerodrome.
- 2.1.3. CTO (Calculated Time Over): Generated by the ATFM system to manage traffic into constrained or congested airspace by controlling the time the flight is expected to cross a specific waypoint in an airspace.
- 2.2. Operational Use Cases for ATFM FIXM messages to be exchanged using Flight-Specific ATFM Measure Service and ATFM/A-CDM Integration Service (ref. Business Functionality of APAC Common SWIM Information Services, version 1.0) are elaborated below:
 - 2.2.1. Cross-Border A-CDM data exchange: Using SWIM to provide timely cross-border TTOT updates from A-CDM airports to airport operators or ANSP. This enables more accurate demand prediction, allowing for more optimised CTOT/CTO allocation and more appropriate delay assignment, reducing unnecessary buffering and ground delay.
 - 2.2.2. Cross-Border Metering between Adjacent ANSPs: Sharing a CTO, especially between two adjacent Air Navigation Service Providers (ANSPs) enables traffic metering through early speed adjustments in the cruise phase, rather than ad-hoc holding by the downstream ANSP which are more costly, less environmentally friendly, and introduces additional workload on ATCOs.
 - 2.2.3. Expanding the scope of ATFM measure: Conventional ATFM measure such as a GDP targets management of pre-departure flights. With the inclusion of CTO issuance, the scope of ATFM measure could be expanded to include airborne flights. AUs could contribute to overall traffic management through trajectory adjustments during cruise phase to meet with the required CTO. This could reduce ground delays as ATFM delays are spread across a wider flight profile range.

2.2.4. Dynamic Collaborative-Decision Making Process: Enabling ANSPs and AUs to view ATFM information in real-time and perform timely negotiations as information are exchanged.

3. ATFM FIXM Messages Identified

- 3.1. In order to achieve the above ops scenarios, five different messages were identified, namely (1) FIXM TTOT Allocation, (2) FIXM CTOT Allocation, (3) FIXM CTOT Cancellation, (4) FIXM CTO Allocation and (5) FIXM CTO Cancellation.
- 3.2. The FIXM TTOT, CTOT and CTO Allocation messages allow the system to exchange TTOT, CTOT or CTO values (respectively) when made available as well as providing the revision to them. Note that the revision to TTOT, CTOT, and CTO can be distributed using the “Allocation” messages by replacing the existing time values. Recipient systems should be able to differentiate between an initial allocation and a revision.
- 3.3. The FIXM CTOT and CTO Cancellation messages allow the system to remove the CTOT or CTO values usually sent after an ATFM program is cancelled.

Step	Message	Details	Business Timeout	Comments	Message Exchange Pattern
1	FIXM TTOT Allocation	Mandatory (when TTOT is available)	N/A	For all departure flights with TTOT, ANSPs will publish.	
2	FIXM CTOT Allocation	Mandatory (after ATFM program ran)	N/A	After a GDP is run or revised, dependent on individual configuration condition set on when to be sent out, this message has to be published.	
3	FIXM CTOT Cancellation	Mandatory (after ATFM program is canceled)	N/A	After GDP is canceled, or the assigned CTOT no longer applies to the flight, this message has to be published.	
4	FIXM CTO Allocation	Mandatory (after ATFM program ran)	N/A	After the ATFM measure is run or revised, dependent on individual configuration condition	

				set on when to be sent out, this message has to be published.	
5	FIXM CTO Cancellation	Mandatory (after ATFM program is canceled)	N/A	After the ATFM measure is canceled, or the assigned CTO no longer applies to the flight, this message has to be published.	

4. Mapping of ATFM FIXM Messages to APAC Common SWIM Information Service

4.1. Business functionality of the information service: **Flight-Specific ATFM Measure Service**

4.1.1. Scenario: Dissemination of CTOT Allocation by Initiating ATFMU to Facilitating ATFMU, AU, and other relevant stakeholders

4.1.1.1. Business Completion Criteria: Initiating ATFMU disseminates FIXM CTOT Allocation Message to Facilitating ATFMU, AU, and other relevant stakeholders. No business confirmation needed.

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Initiating ATFMU sends FIXM CTOT Allocation to Facilitating ATFMUs, AUs, and other relevant stakeholders	Mandatory (after ATFM program ran)	N/A	After a GDP is run or revised, dependent on individual configuration condition set on when to be sent out, this message has to be published.	

4.1.2. Scenario: Dissemination of CTOT Cancellation by Initiating ATFMU to Facilitating ATFMU, AU, and other relevant stakeholders

- 4.1.2.1. Business Completion Criteria: Initiating ATFMU disseminates FIXM CTOT Cancellation Message to Facilitating ATFMU, AU, and other relevant stakeholders. No business confirmation needed.

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Initiating ATFMU sends FIXM CTOT Cancellation to Facilitating ATFMUs, AUs, and other relevant stakeholders	Mandatory (after ATFM program is cancelled)	N/A	After GDP is cancelled, or the assigned CTOT no longer applies to the flight, this message has to be published.	

- 4.1.3. Scenario: **Dissemination of CTO Allocation** by Initiating ATFMU to Facilitating ATFMU and AU

- 4.1.3.1. Business Completion Criteria: Initiating ATFMU disseminates FIXM CTO Allocation Message to Facilitating ATFMU and AU. No business confirmation needed.

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Initiating ATFMU sends FIXM CTO Allocation to Facilitating ATFMU and AU	Mandatory (after ATFM measure ran)	N/A	After ATFM measure is run or revised, dependent on individual configuration condition set on when to be sent out, this message has to be published.	

- 4.1.4. Scenario: Dissemination of CTO Cancellation by Initiating ATFMU to Facilitating ATFMU and Facilitating ATFMU and AU

- 4.1.4.1. Business Completion Criteria: Initiating ATFMU disseminates FIXM CTO Cancellation Message to Facilitating ATFMU and AU. No business confirmation needed.

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Initiating ATFMU sends FIXM CTO Cancellation to Facilitating ATFMU and AU	Mandatory (after ATFM measure cancelled)	N/A	After ATFM measure is cancelled, or the assigned CTO no longer applies to the flight, this message has to be published.	

4.2. Business functionality of the information service: **ATFM/A-CDM Integration Service**

- 4.2.1. Scenario: Dissemination of TTOT Allocation by departure eASP/ATFMU

- 4.2.1.1. Business Completion Criteria: Departure eASP/ATFMU disseminates FIXM TTOT Allocation to relevant eASPs/ATFMU. No business confirmation needed.

Step	Message	Message Requirements	Business Timeout	Comments	Message Exchange Pattern
1	Departure eASP/ATFMU sends FIXM TTOT Allocation to relevant eASPs/ATFMUs	Mandatory (when TTOT is available)	N/A	For all departure flights with TTOT, ANSPs will publish.	