



ICAO

*International Civil Aviation Organization***WORKING PAPER**

Asia and Pacific (APAC)

**Twenty-second Meeting of the Meteorological  
Information Exchange Working Group (MET/IE WG/22)**

Bangkok, Thailand, 18 to 21 March 2024

**Agenda Item 5: Meteorological information exchange in SWIM****PROPOSED BUSINESS FUNCTIONALITY OF APAC COMMON SWIM INFORMATION  
SERVICES AND THE INFORMATION TO BE EXCHANGED**

(Presented by SWIM TF Task Lead)

**SUMMARY**

This paper presents the updates on the work of SWIM TF Task 6 team to identify the catalog of basic data elements to be exchanged via APAC SWIM and propose business functionality to be supported by APAC Common SWIM Information Services for addressing the operational needs in APAC.

**1. INTRODUCTION**

1.1 ICAO APAC SWIM Task Force (SWIM TF) had been actively working on the development of APAC SWIM Implementation Guidance Document, taking into account the APAC SWIM Implementation Timeframe of 2024-2030 adopted by APANPIRG/33 held in 2022.

1.2 According to the outcome of SWIM survey conducted in 2022, it was recommended to develop of a list of the common set of SWIM information services for APAC. SWIM TF Task 6 team undertook the work, in coordination with relevant subject matter experts, to identify the basic information/data to be exchanged via in APAC SWIM and proposed the necessary functionality to be supported APAC Common SWIM information services as the idea for further refinement.

1.3 This paper presents the updates on the work of SWIM TF Task 6 team to identify:

- catalog of basic data elements to be exchanged via APAC SWIM; and
- propose business functionality to be supported by APAC Common SWIM Information Services for addressing the operational needs in APAC.

1.4 This paper also seeks suggestions and comments from the MET/IE WG regarding the catalog of basic MET data and APAC Common SWIM Meteorological Information Services to be incorporated into the APAC SWIM Implementation Guidance being developed by SWIM TF.

## 2. DISCUSSION

2.1 With suggestions on the additional potential list of information from the SWIM TF/7 meeting, the revised data catalog was shared for further consideration by the SWIM TF/8 meeting held in November 2023, which included information to be exchanged through the following APAC Common SWIM Information Services:

- APAC Common SWIM Flight Information Services
- APAC Common SWIM Aeronautical Information Services
- APAC Common SWIM Meteorological Information Services
- APAC Common SWIM Surveillance Information Services

2.2 Furthermore, the draft list of the business functionality of APAC Common SWIM Information Services was developed and introduced. If the aeronautical, flight, flow, MET and surveillance information could be exchanged in common digital format via APAC Common SWIM Information Services, the changes in the status of flights, demands, constraints (airspace or MET) and other real-time updates could be published to the all the relevant stakeholders more efficiently, facilitating stakeholders to retrieve relevant tailored information automatically, allowing operational users to have increased lead time to react in pre-departure phase (pre-tactical) and airborne phase (tactical) and increasing the situation awareness for better decision-making processes. This would enhance overall operational efficiency and reduce the impact to the ANSP, airspace users, passengers and other aviation stakeholders.

2.3 The SWIM TF/8 Meeting was invited to review the proposed data catalog (**APPENDIX A**) and the list of proposed business functionality of APAC Common SWIM Information Services (**APPENDIX B**) and provide inputs and comments for further refinement, in particular:

- (i) the naming of the services,
- (ii) the message exchange patterns;
- (iii) whether the service should be considered as mandatory or optional in APAC SWIM; and
- (iv) other proposed common SWIM information services to be included in the list.

2.4 An online voting for proposed APAC Common SWIM Information Services was set up and promulgated to APAC States through State Letter to collect a more comprehensive comments from related subject matter experts within APAC States during November to December 2023. The results would be used as an input for identifying and further refining the first version of APAC Common SWIM Information Services list.

2.5 There were 59 responses from 18 States/Administrations, 2 airlines and the CRV provider received through the online survey. The results of the survey and the comments received are summarized in **APPENDIX C**.

2.6 Regarding the proposed list of the APAC Common SWIM MET Information Services, the responses from States showed some consensus in the following aspects:

- For message exchange pattern, publish/subscribe is considered as more important than request/reply for most of the MET information services.
- There is a higher demand for the request/reply exchange pattern for the exchange of the relative voluminous MET information such as gridded forecast and image (weather radar or satellite), compared with the exchange of MET information in smaller volume.
- Most respondents selected information services with MET information supported by IWXXM as part of the initial minimum set of common SWIM services in APAC SWIM, such as information services involving aerodrome observation, aerodrome forecast, SIGMET, etc.

2.7 Based on the survey responses from States, the MET information services with the following proposed business functionalities could be considered as part of the minimum set of common SWIM service in APAC SWIM, which might be incorporated into the APAC SWIM Implementation Guidance Document:

- Aerodrome observation / METAR information service
- Aerodrome forecast / TAF information service
- SIGMET information service

2.8 Meanwhile, ICAO MET Panel is working on the development of future advanced SWIM MET information services beyond the provision of legacy MET products at the global level, such as aerodrome observation information service, aerodrome forecast information service and quantitative volcanic ash concentration information service, which would likely be introduced to Annex 3 in 2027. Similar development was underway in the EUR Region. The meeting is invited to provide suggestions and comments regarding the harmonization of APAC Common SWIM MET Information Services with the relevant global development.

### **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) review the proposed data catalog in APPENDIX A and provide suggestions on additional MET information that should be exchanged through APAC Common SWIM MET Information Services;
- b) review the proposed minimum set of APAC Common SWIM MET Information Services mentioned in para. 2.7, and provide inputs and comments considering the global development mentioned in para. 2.8; and
- c) discuss any relevant matters as appropriate.

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**APPENDIX A**  
**Proposed data catalog presented in SWIM TF/8**

*(a) Information to be exchanged via APAC Common SWIM Aeronautical Information Services:*

<u>Aerodrome</u>	<u>Airspace</u>
<ul style="list-style-type: none"><li>• Location of aerodrome reference point</li><li>• Elevation</li><li>• Runways</li><li>• Navigational aids and instrument landing systems</li><li>• Available aerodrome equipment</li></ul>	<ul style="list-style-type: none"><li>• FIR boundary</li><li>• Restricted areas</li><li>• Prohibited areas</li><li>• Search and rescue areas</li><li>• Temporary flight restrictions</li></ul>

*(b) Information to be exchanged via APAC Common SWIM Flight Information Services:*

<ul style="list-style-type: none"><li>• Global Unified Flight Identifier (GUFI)</li><li>• Departure aerodrome</li><li>• Destination aerodrome</li><li>• Planned route/trajectory</li><li>• Aircraft type</li><li>• Estimated Off-Block Time (EOBT)</li><li>• Estimated Take-Off Time (ETOT)</li><li>• Estimated Landing Time (ELDT)</li><li>• Estimated Elapsed Time (EET)</li><li>• Calculated Take-Off Time (CTOT)</li><li>• Calculated Landing Time (CLDT)</li><li>• Target Off-Block Time (TOBT)</li></ul>	<ul style="list-style-type: none"><li>• Target Start Up Approval Time (TSAT)</li><li>• Target Take-Off Time (TTOT)</li><li>• Actual Off-Block Time (AOBT)</li><li>• Estimated Time Over (ETO)</li><li>• Calculated Time Over (CTO)</li><li>• Actual Time Over (ATO)</li><li>• Flight Plan Amendments</li><li>• Flight Plan Cancellations</li><li>• Miles-in-Trail (MIT)</li><li>• Minutes-in-Trail (MINIT)</li></ul>
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*(c) Information to be exchanged via APAC Common SWIM Meteorological Information Services:*

<u>Aerodrome</u>	<u>Airspace</u>
<ul style="list-style-type: none"><li>• Cloud amount and type</li><li>• Crosswind</li><li>• Headwind</li><li>• Lightning</li><li>• Low-level wind shear and turbulence</li><li>• QNH</li><li>• RVR</li><li>• Surface wind and gust</li><li>• Temperature and dew point</li><li>• Visibility</li><li>• Weather radar data</li></ul>	<ul style="list-style-type: none"><li>• WC SIGMET (thunderstorms, turbulence, icing, mountain waves, dust / sand storms, radioactive clouds)</li><li>• WV SIGMET (volcanic ash)</li><li>• WC SIGMET (tropical cyclone)</li><li>• Volcanic ash advisory</li><li>• Tropical cyclone advisory</li><li>• Space weather advisory</li><li>• Volcano Observatory Notice for Aviation (VONA)</li><li>• Quantitative Volcanic Ash (QVA) Concentration Information</li><li>• Special air reports (ARS)</li><li>• Upper air wind and temperature</li><li>• Thunderstorms forecast</li><li>• Clear air turbulence forecast</li><li>• Icing forecast</li><li>• Tropopause height</li><li>• Satellite data</li><li>• Weather radar data</li></ul>

*(d) Information to be exchanged via APAC Common SWIM Surveillance Information Services:*

- Time
- Latitude/longitude
- Altitude
- Ground speed
- Track angle
- Callsign
- Mode S address
- Data Quality
- Mode-S DAP

**APPENDIX B**  
**Proposed business functionality of APAC Common SWIM Information Services**  
**presented in SWIM TF/8 and considered in the online voting**

<b>Domain</b>	<b>Business functionality of the service</b>	<b>Type of information / data to be exchanged</b>	<b>Information Exchange Model</b>	<b>Message exchange pattern (Pub/Sub and/or Req/Reply?)</b>	<b>Minimum Set (Mandatory / Optional?)</b>
Aeronautical	Airspace management service	Restricted area, danger area, airspace availability, search and rescue area	AIXM	TBD	M / O
Aeronautical	Airspace feature service	FIR/UIR boundaries, waypoints, enroute ATS routes, SIDs and STARs, nav aids, procedures, aerodrome location	AIXM	TBD	M / O
Aeronautical	Aerodrome feature service	Runways, movement areas, aerodrome services, nav aids, instrument landing systems, other aerodrome facilities	AIXM	TBD	M / O
Aeronautical	Digital NOTAM distribution service	Digital NOTAM	AIXM	TBD	M / O
Aeronautical	Runway Condition Report service	Global Reporting Format (GRF) for runway surface conditions	AIXM	TBD	M / O
Aeronautical	ATIS distribution service	Terminal information	TBD	TBD	M / O
Flight	ATFM/A-CDM integrated service	CTOT, CTO, TTOT, TSAT, etc.	FIXM	TBD	M / O
Flight	Flight status change notification service	DLA, ARR, DEP, CNL messages	FIXM	TBD	M / O
Flight	Trajectory update service	Updated flight plan	FIXM	TBD	M / O
Flight	Flight plan filing service	Flight plan for registration	FIXM	TBD	M / O
Flight	Flight plan distribution service	Flight plan for publication	FIXM	TBD	M / O
Flight	Trial request service for FF-ICE	Proposed changes in a flight plan	FIXM	TBD	M / O
Flight	Flight plan status request service for FF-ICE	Current status of a flight plan	FIXM	TBD	M / O
Flow	Traffic flow status service	Demand and constraints, ATFM measures, ATFM daily plan	TBD	TBD	M / O
MET	Aerodrome observation	As specified in Annex 3 (METAR and SPECI)	IWXXM	TBD	M / O
MET	Aerodrome forecast	As specified in Annex 3 (TAF)	IWXXM	TBD	M / O
MET	WAFS grid point forecast	As specified in Annex 3	Gridded format (e.g. NetCDF)	TBD	M / O
MET	WAFS significant weather (SIGWX) forecast	As specified in Annex 3	IWXXM	TBD	M / O
MET	QVA grids point forecasts including probabilities	As specified in Annex 3	Gridded format (e.g. NetCDF)	TBD	M / O
MET	QVA objects	As specified in Annex 3	IWXXM	TBD	M / O
MET	Volcanic Ash Advisory	As specified in Annex 3	IWXXM	TBD	M / O

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<b>Domain</b>	<b>Business functionality of the service</b>	<b>Type of information / data to be exchanged</b>	<b>Information Exchange Model</b>	<b>Message exchange pattern (Pub/Sub and/or Req/Reply?)</b>	<b>Minimum Set (Mandatory / Optional?)</b>
MET	Volcano Observatory Notice for Aviation (VONA)	As specified in Annex 3	IWXXM	TBD	M / O
MET	Tropical Cyclone Advisory	As specified in Annex 3	IWXXM	TBD	M / O
MET	Space Weather Advisory	As specified in Annex 3	IWXXM	TBD	M / O
MET	SIGMET information	As specified in Annex 3	IWXXM	TBD	M / O
MET	AIRMET information	As specified in Annex 3	IWXXM	TBD	M / O
MET	Special Air Report (ARS) / Pilot Report (PIREP)	As specified in Annex 3	TBD	TBD	M / O
MET	Satellite image service	Satellite derived information (e.g. convection)	Gridded format (e.g. NetCDF)	TBD	M / O
MET	Weather radar image service	Reflectivity to visualise the intensity of convection	Gridded format (e.g. NetCDF)	TBD	M / O
Surveillance	Surveillance data sharing service	Position, altitude, ground speed track angle, call sign, Mode S address, data quality, Mode S DAP	ASTERIX Cat 21 (payload in JSON or RAW format)	TBD	M / O

# Results of online survey for proposed APAC Common SWIM Information Services

November - December 2023  
ICAO APAC SWIM TF



# Online voting for proposed APAC Common SWIM Information Services - Number of responses (Nov-Dec 2023)

- 59 responses from 18 States/Administrations, 2 airlines and the CRV provider

State / Administration	Organization (number of responses)
Australia	Civil Aviation Safety Authority, Bureau of Meteorology, Australian Maritime Safety Authority (1) Airservices Australia (1)
Cambodia	Cambodia Air Traffic Services (4)
China	Civil Aviation Administration of China, Air Traffic Management Bureau (8)
Hong Kong, China	Hong Kong Civil Aviation Department (2)
Macao, China	Civil Aviation Authority of Macao China (1)
India	Airports Authority of India (4)
Indonesia	AirNav Indonesia (2)
Japan	Japan Civil Aviation Bureau (1) Electronic Navigation Research Institute (1)
Malaysia	Civil Aviation Authority of Malaysia / Telekom Malaysia (2)
New Zealand	Airways New Zealand (1)
Papua New Guinea	Civil Aviation Safety Authority of Papua New Guinea (1)
Philippines	Civil Aviation Authority of the Philippines (1)
Republic of Korea	Ministry of Land, Infrastructure and Transportation (1)
Singapore	Civil Aviation Authority of Singapore (8) Meteorological Service Singapore (1)
Sri Lanka	Airport & Aviation Services (Sri Lanka) Limited (4)
Thailand	Civil Aviation Authority of Thailand (1) Aeronautical Radio of Thailand (AEROTHAI) (2) Airport of Thailand (3) Thai Meteorological Department (4)
Vietnam	Civil Aviation Authority of Vietnam (1) Vietnam Air Traffic Management Corporation (3)
USA	Federal Aviation Administration
Others	Bangkok Airways (1) KLM Royal Dutch Airlines (1) PCCW Global (1)

# 1. Business functionality of Common SWIM Information Services

## - Message exchange pattern and the minimum set for APAC SWIM

Domain	Business functionality of the service	Publish/ Subscribe	Request/ Reply	Mandatory service? (for minimum set of services in APAC SWIM)
Aeronautical	Airspace management service	71%	31%	73%
Aeronautical	Airspace feature service	64%	41%	63%
Aeronautical	Aerodrome feature service	58%	46%	63%
Aeronautical	Digital NOTAM distribution service	73%	29%	76%
Aeronautical	Runway Condition Report service	46%	51%	59%
Aeronautical	ATIS distribution service	61%	47%	51%
Flight	ATFM/A-CDM integrated service	75%	32%	59%
Flight	Flight status change notification service	71%	29%	78%
Flight	Trajectory update service	59%	41%	54%
Flight	Flight plan filing service	58%	44%	75%
Flight	Flight plan distribution service	71%	32%	75%
Flight	Trial request service for FF-ICE	39%	58%	37%
Flight	Flight plan status request service for FF-ICE	36%	61%	44%
Flow	Traffic flow status service	58%	54%	53%

Highlighted: Responses of 50% or higher

# 1. Business functionality of Common SWIM Information Services

## - Message exchange pattern and the minimum set for APAC SWIM

Domain	Business functionality of the service	Publish/ Subscribe	Request/ Reply	Mandatory service? (for minimum set of services in APAC SWIM)
MET	Aerodrome observation	69%	41%	63%
MET	Aerodrome forecast	64%	46%	64%
MET	WAFS grid point forecast	54%	53%	44%
MET	WAFS significant weather (SIGWX) forecast	66%	41%	53%
MET	QVA grids point forecasts including probabilities	58%	53%	34%
MET	QVA objects	58%	49%	32%
MET	Volcanic Ash Advisory	69%	34%	56%
MET	Volcano Observatory Notice for Aviation (VONA)	69%	34%	49%
MET	Tropical Cyclone Advisory	71%	36%	54%
MET	Space Weather Advisory	64%	41%	37%
MET	SIGMET information	78%	36%	64%
MET	AIRMET information	58%	51%	42%
MET	Special Air Report (ARS) / Pilot Report (PIREP)	51%	56%	32%
MET	Satellite image service	51%	61%	20%
MET	Weather radar image service	53%	59%	25%
Surveillance	Surveillance data sharing service	63%	46%	32%

Highlighted: Responses of 50% or higher

## 2. Any comments on the naming of the business functionality of any of the above proposed APAC common SWIM information services?

- I suggest that the name of Flight related services could refer to **Manual on FF\_ICE(DOC 9965)**, or use other name instead.
- **Flight-FF-ICE Planning Service, Flight-FF-ICE Filing Service, Flight-FF-ICE Trial Service, Flight-FF-ICE Flight Data Request Service, Flight-FF-ICE Notification Service**
- Clear and comprehensive, fully agree.
- Nothing in particular, but simple expressions are better.
- The naming of the business functionality (MET) should follow with **Annex 3**.
- I think we need to prepare the **naming convention for the service end-point** (technical perspective). Take flight plan filing service as example. As end-point address it could be flight-plan-filing, or flightplanfiling or else. Naming convention will make the service more predictable, and the consistency will make easier on the app development
- APAC SWIM INFORMATION SERVICE (ASIS)
- They need to be clear.

## 2. Any comments on the naming of the business functionality of any of the above proposed APAC common SWIM information services? (cont'd)

- The services **will probably need to be broken down further**. Currently, there is a case for a lot of the information, especially the Aeronautical Information Services, to be both pub-sub and request reply. It depends on the service functionality, whether are new users of the service going **to receive a data dump on first connection**, or whether it's based **on request of certain features**, such as aerodrome reference points etc.
- **Without having a clear indication of what the operational needs are for the information to be shared via the Common SWIM Information in the APAC it becomes difficult to provide specific answers.** The lists of data properties to be considered for exchange seem simplified, to provide clarity data properties should be **aligned with the data catalogue as per PANS-AIM**. If the purpose of exchanging the information is for APAC to be aware of flights status, demands, constraints and other real-time updates then all the information is mandatory however for it to be effective it must be used by all relevant users. This means that **ICAO regions will also have to be able to exchange between the regions**. It will be better if there is a world-wide initiative to ensure harmonisation. For AIXM, Annex 15 is being amended to indicate that digital data sets should be made available through information services, therefore aeronautical data elements are marked as mandatory in the responses. **Alignment with AIRM V1.0.0 must be assured**, particularly if any deviation from the domain-specific information exchange models (e.g. AIXM, FIXM and WXXM).

### 3. Any suggestions on other proposed APAC common SWIM information services to be included on the list?

- The information data included in the services above and the name of APAC common SWIM information services **should be coordinated and confirmed together with related ICAO APAC groups like ATM SG/ATFM SG/SURICG/MET SG, etc.** Another suggestion is that the scope of the survey can be expanded **through state letters**.
- For this stage, the number of common SWIM information service is a little **too much**. It is recommended **to start with the most urgent and common needs** in APAC region, select a subset of each category, and create an initial version of common SWIM information services, such as Digital-NOTAM, Runway Condition, ATFM/A-CDM integration, Flight status change notification, Flight plan distribution, and so on.
- **GUFi Service**
- MET information service is rather completely.
- Aeronautical - Runway Condition Report Service. In my point of view, this **allows users to report the runway condition**. Suggest another service to **allow users to retrieve runway condition**. e.g. Aeronautical - Runway Condition Service. Please don't mind if this function has been covered by another service.
- The list is comprehensive, but should be **able to be expanded** easily if the need arises.

### 3. Any suggestions on other proposed APAC common SWIM information services to be included on the list? (cont'd)

- Take off condition, AD warning, Wind shear warning and alert, MET info. from NWP to support ATM.
- maybe can study some information from:  
<https://applications.icao.int/dataservices/default.aspx>
- I think it's a good start to identify the services, but we'll need to **take it back to our respective Subject Matter Experts** to better establish which services are missing, and which should be mandatory in APAC, keeping in mind that not all countries might be able to furnish the required information, especially Met Related information.
- Should **add flight data request**
- **VOLMET, Aerodrome warning, MET report for ATIS broadcast**
- **Public Health and Safety in aviation**
- Please consider for **Aerodrome Obstacle information** should be added.
- **Aerodrome/Terminal warning** information might be included on the list.

### 3. Any suggestions on other proposed APAC common SWIM information services to be included on the list? (cont'd)

- **General comment**

Static data (changed on regular intervals) could be made available as a baseline via publish/subscribe methods and dynamic data could be made available via request/reply at the time it is required (and should have the ability to also provide notices when information changes).

- **Specific comments**

Additional elements for “Aeronautical - Airspace management service”: CTA/TMA boundaries, Prohibited Areas (although listed in the SL), MEA, MTA and ADIZ. Search and Rescue information (see later comment).

“Aeronautical - Airspace feature service”: Aerodrome location to be moved to “Aeronautical - Aerodrome feature service”.

“Aeronautical - Aerodrome feature service”: Add Aerodrome location, communication facilities (frequencies).

- **Comments on Search and Rescue information**

A dedicated “Search and Rescue” information service could be added or the following items added to existing services.

The term “Search and rescue area” changed to “Search and Rescue Regions”, and a new category added “Ad hoc search and rescue areas” which are created by Rescue Coordination Centres (RCCs) during operations to share and coordinate with neighbouring RCCs and ATS units.

Registered aircraft operator details and emergency contacts.

ICAO Autonomous Distress Tracking (ADT) Location of Aircraft in Distress Repository (LADR) data.

ICAO OPS CTRL database contact information.

SAR Unit (SRU) location and capability data, as provided in the ICAO Regional Air Navigation Plan - eANP, Volume II, Part VI (SAR), Table SAR II-1, and designated ATS area radio frequencies.





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Thank You!