International Civil Aviation Organization

The Tenth Meeting of System Wide Information Management Task Force (SWIM TF/10)

Bangkok, Thailand, 20 – 23 May 2025

Agenda Item 5: Updates on the assigned tasks by task leads/contributors, including progress reports and issues

b) SWIM Infrastructure

- Task 2: Regional SWIM Infrastructure

AGGREGATION FUNCTION FOR MET INFORMATION SERVICES

(Presented by Australia)

SUMMARY

This paper provides an update on two options being considered by the ICAO Meteorological Panel for the implementation of a function in the SWIM environment to "aggregate" or "concentrate" information from multiple meteorological information services for distribution to downstream users.

Action by meeting is in paragraph 3.1.

1. INTRODUCTION

1.1 The ICAO Meteorological Panel (METP), through Job Card METP.004, *Inclusion of aeronautical meteorological information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology*, is tasked with developing the technical requirements and policies to support meteorological exchange in a SWIM environment.

1.2 Recently, the 6th meeting of METP endorsed version 3 of the *Roadmap for Meteorology in System-Wide Information Management* (MET-SWIM Roadmap). The MET-SWIM Roadmap describes the transition plan and associated timelines for implementing MET in SWIM (MET-SWIM).

1.3 This latest version of the roadmap includes a SWIM Data Aggregator function, which was not present in previous versions of the MET-SWIM Roadmap. The SWIM Aggregator function is intended to simplify users' access to multiple MET information services.

1.4 The METP is investigating whether this SWIM Aggregator function should be a regulated or unregulated function. This paper provides some background and seeks input from the SWIM/TF.

2. DISCUSSION

2.1 The MET-SWIM Roadmap details the components that support the transition into MET-SWIM, including the

- Communication protocols
- Information exchange services
- Data addressing
- Information exchange flow
- Data aggregator

2.2 Currently, where MET information (IWXXM) is exchanged over the aeronautical fixed service (AFS), it is exchanged over Aeronautical Message Handling System (AMHS) with File Transfer Body Part (FTBP).

2.3 The information exchange flow for MET information in the current environment is fixed, where information flows from National OPMET Centres (NOCs), to Regional OPMET Centres (ROCs), to Regional OPMET Data Banks (RODBs), to Inter-Regional OPMET Gateways (IROGs), with aggregation occurring along its way. This allows users to access globally aggregated MET information through the AFS. In the APAC Region, distribution of such information is documented in the ROBEX Handbook.

2.4 In the future SWIM environment, however, the information exchange flow can be dynamic (e.g. directly from producers to consumers). Given users wish to retain access to global MET information, MET-SWIM services will benefit from an aggregator function. Details related to the entity responsible for aggregation are being developed. For this purpose, the term “SWIM Aggregator” is used.

2.5 The table below describes the expected mechanisms over each Aviation System Block Upgrade (ASBU) as the exchange of MET information is modernized. Capabilities deemed as “optional” indicate that the early adoption of SWIM is encouraged by States that are able to do so. It is expected that the MET domain will achieve a full SWIM environment in Block 4 (2037+).

	Capabilities Expected During Block 1 (2019-2024)	**Capabilities Expected During Block 2 (2025-2030)**	**Capabilities Expected During Block 3 (2031-2036)**	**Capabilities Expected During Block 4 (2037+)**
Communication Protocols	AMHS FTBP	AMHS FTBP AMQP/HTTP (optional)	AMHS FTBP AMQP/HTTP	AMQP/HTTP
Information Exchange Services	RODB TAC request/reply RODB IWXXM request/reply	RODB TAC request/reply RODB IWXXM request/reply OGC Standardized Services (optional)	RODB IWXXM request/reply OGC Standardized Services	OGC Standardized Services
Data Addressing	AFS Addressing	AFS Addressing IP (optional) SWIM Registry (optional)	AFS Addressing IP SWIM Registry	IP SWIM Registry

Information Exchange Flow	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG Dynamic (optional)	NOC, ROC, RODB, IROG Dynamic	Dynamic
Data Aggregator	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG SWIM Aggregator (optional)	NOC, ROC, RODB, IROG SWIM Aggregator	SWIM Aggregator

2.6 It is important to note that it is not the intention to duplicate the current function of the NOC, ROC etc, as the premise of SWIM is that the user access the information they require directly from the producer (or publisher) of the service, but rather that the process a user employs to find the necessary information in the SWIM environment, be as simple as possible. This is particularly an issue in the case of flight planning where information from many aerodromes is required simultaneously, and where new and unique locations/requests may be frequently necessary. The process of pre-registering and establishing a connection in these scenarios could be overly complex, especially when making a data request for the first time, or when changes are made by the publisher.

2.7 The absence of aggregation functions may result in:

- All States needing to design and implement SWIM infrastructure that supports a larger number of unique users
- All States managing a large number of unique users accessing SWIM services
- Users identifying and managing access (e.g., agreements, access keys, etc.) to a large number of service providers, particularly in the case of flight planning.

2.8 For these reasons, METP has decided that this aggregation function will be necessary, and clarity on how this function will be performed will assist States and regions design and implement meteorological SWIM services. There are two main options to consider:

1) **Option 1: Regulated** – Aggregation should be a regulated function by allocated providers under the ICAO framework. This option would ensure the function is performed in a consistent manner globally and offers the possibility of formal oversight and reporting of the function. The process for selecting States to provide this service is unknown at this time and may result in delays in the implementation of this capability.

2) **Option 2: Unregulated** – Each MET service provider makes their information available, and any aggregation function would be a purely commercial undertaking, unregulated by ICAO (although the provision of the information services are defined in Annex 3 and therefore under a State's oversight). It is anticipated that in the absence of a regulated service, commercial (or State) entities may provide this service for the globe or their region/s. The availability, cost and quality of such services from different aggregation entities may vary.

2.9 The European Meteorological SWIM Services Sub-Group (EUR MET3SG) has been discussing the same issue in a regional context, and whilst not reaching any firm consensus yet, the following important points have been noted:

- The term “aggregator” may be misleading, particularly if the intent is to aggregate the locations (e.g., a catalogue-type function) as opposed to aggregating the payloads. There urgently needs to be an alignment of terminology used, especially considering the various options to simplify service access.

- The MET3SG recognised that other domains are having similar discussions, and it will be important for MET to keep appraised of these developments, and, where appropriate, to align to the greatest extent possible to ensure consistency for users.

- The MET3SG is also investigating whether the functionality of the existing EUR SWIM Registry can be repurposed to add new fields to aid users searching for specific meteorological services.

2.10 METP's Working Group on Meteorological Information Exchange (WG-MIE) is continuing this work in consultation with user groups.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss any relevant matter as appropriate;

c) share similar experiences in other information domains, if any; and

d) consider forming an action or task to progress this work from an APAC perspective.

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