

## Awareness workshop on the Roadmap of Aeronautical Meteorological (MET) Information in System-Wide Management (SWIM) – English Session

(Virtual, 20 March 2024)

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### Agenda Item 3 - AMET elements relating to dissemination of meteorological information and the SWIM elements.

#### DP3.2 – MET-SWIM CONCEPTS and SWIM related ASBU Elements

##### 1. Introduction

- 1.1. MET information exchange takes place in SWIM using the core concepts described in ICAO *Doc 10039 – Manual on the System-wide Information Management Concept*.
- 1.2. MET-SWIM exchanges are enabled by the following specialized concepts.

##### 2. MET-SWIM Concepts

- 1.1. **Information:** The MET information contents being utilized and exchanged in SWIM. Information is exchanged using a **data exchange format**, of which one type is an Information Exchange Model. **The primary information exchange model in MET-SWIM is IWXXM.**
- 1.2. **Information Service:** A **web service** which provides **information consumers** access to one or more applications or systems by means of the SWIM core services. It encapsulates a distinct set of operations logic within a well-defined functional boundary.
- 1.3. **MET Information Services:** An information service which is used to exchange MET information. An information exchange service enables **interoperability** by following **well-defined standards and governance specifications** agreed upon by stakeholders and implemented via commonly agreed means. In the MET-SWIM system, information exchange services are used to distribute, filter and transform MET information for use in SWIM.
- 1.4. **Information Service Overview:** the **information service metadata** intended to promote service discovery and an initial evaluation of an information service. It is the responsibility of service providers (e.g., MET service providers, ANSPs, etc.) to ensure that Service Overview information is available to describe the SWIM information services.

##### 3. SWIM Interfaces

- 3.1. MET-SWIM is a subset of the larger SWIM system and will interface with other SWIM components.
- 3.2. There are two primary relationships: a MET-SWIM utilization and reliance upon SWIM infrastructure (such as reliable messaging); and MET-SWIM use of AIM in SWIM information services and data.

3.3. MET-SWIM utilizes the common SWIM infrastructure for Transmission Control Protocol (TCP) / IP network communications, publish/subscribe messaging, request/reply communications, security, registry and metadata, and other facilities.

3.4. MET-SWIM may interface with AIM in SWIM, such as:

- Meteorological observing station metadata at aerodromes (such as location);
- Aerodrome reference points;
- Aerodrome runways;
- Flight information region (FIR) data and locations; and,
- Links to further metadata regarding aeronautical service providers as described in Annex 3 to Chicago Convention.

#### 4. Registries and Metadata

4.1. The fundamental purpose of the SWIM registry (also known as a **catalogue**) is to provide a **repository of information** about **who are the available information service providers**, and **what services and information each provides**.

4.2. A **MET-SWIM information service consumer** will utilize many of the resources identified for the SWIM registry, including:

- **Web service instances** (list of services available in SWIM from the various SWIM information service providers);
- **Web service description documents**.
- **Reference models** (common models for the implementation of services and information structures, i.e., the Aeronautical Information Reference Model (AIRM));
- **Information exchange standards** (e.g., Aeronautical Information Exchange Model (AIXM), IWXXM, Flight Information Exchange Model (FIXM));
- **Policies** (constraints to be respected in SWIM for security or other purposes);
- **Compliance** (describe levels of conformity e.g., SWIM compliance); and
- **Participants** (e.g., information service providers)

#### 5. ASBU Elements related to MET-SWIM

5.1. **Table 1** provides a summary of the ASBU Elements related to SWIM while **Table 2** provides more detailed information on the MET-SWIM ASBU Elements.

*Table 1 Summary of the ASBU elements related to MET-SWIM*

ASBU Element	ASBU Element Title	ASBU Element Description	ASBU	Timeline
AMET-B1/4	Dissemination of MET Information	Represents the <b>dissemination</b> of meteorological products using a variety of formats	1	2019 – 2024
AMET-B2/4	MET Information Service in SWIM	Establishes <b>standards for global exchange</b> of the MET information within the SWIM environment	2	2025 – 2030
AMET-B3/4			3	2031 – 2036
AMET-B4/4			4	2037 – 2042
SWIM-B2/1	Information Service Provision	Defines the <b>requirements for an information service provider</b> to make aviation-related information available as an information service	2	2025 – 2030
SWIM-B2/2	Information Service Consumption	Defines the <b>requirements for an information service consumer</b> to discover and access aviation related information provided via information services	2	2025 – 2030
SWIM-B2/3	SWIM Registry	Implements a <b>SWIM registry</b> as a means for the information service producer to publicize and for an information service consumer to discover information services within a SWIM environment	2	2025 – 2030
SWIM-B2/4	Air/Ground SWIM for Non-Safety Critical Information	<b>Enables airspace users</b> , specifically flight crew, to make information available to the air navigation service provider (ANSP), including reroute preferences and air reports / airspace conditions	2	2025 – 2030
SWIM-B2/5	Global SWIM Processes	Establishes <b>global access to aviation-related information</b> by connecting information service providers and consumers within a global interoperability framework	2	2025 – 2030
SWIM-B3/1	Air/Ground SWIM for Safety Critical Information	Extends Air/Ground SWIM to enable the exchange of safety critical information	3	2031 – 2036

Table 2 Detailed ASBU Elements related to MET-SWIM

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
<i>ASBU MET Elements in the SWIM Environment</i>			
<b>AMET-B1/4 Dissemination of meteorological information</b>	<b>Dissemination of meteorological information in support of automated decision process or aids, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support</b>	AMET-B0/4 - Dissemination of meteorological products	Evolution <i>(Evolution of capability)</i>
		AMET-B1/1 - Meteorological observations information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		AMET-B1/2 - Meteorological forecast and warning information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		COMI-B0/7 - ATS Message Handling System (AMHS)	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
		DAIM-B1/1 - Provision of quality-assured aeronautical data and information	Information need <i>(Required information from a specific element to support the operation of the said element).</i>

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
		DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets	Information need <i>(Required information from a specific element to support the operation of the said element).</i>
<b>AMET-B2/4 Meteorological information service in SWIM</b>	<b>Integrated meteorological information service in the SWIM environment in support of enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term.</b>	AMET-B1/1 - Meteorological observations information	Evolution <i>(Evolution of capability)</i>
		AMET-B2/1 - Meteorological observations information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		AMET-B2/2 - Meteorological forecast and warning information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment	Information need <i>(Required information from a specific element to support the operation of the said element).</i>
		SWIM-B2/1 - Information service provision	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
		SWIM-B2/2 - Information service consumption	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/3 - SWIM registry	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/4 - Air/Ground SWIM for non-safety critical information	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
		SWIM-B2/5 - Global SWIM processes	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
		AMET-B2/3 - Climatological and historical meteorological information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
<b>AMET-B3/4 Meteorological information service in SWIM</b>	<b>Integrated meteorological information service in the SWIM environment in support of enhanced operational ground and air</b>	AMET-B2/4 - Meteorological information service in SWIM	Evolution <i>(Evolution of capability)</i>

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
	<b>decision-making processes, for all flight phases and corresponding air traffic control operations</b>	AMET-B3/1 - Meteorological observations information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		AMET-B3/2 - Meteorological forecast and warning information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B3/1 - Air/Ground SWIM for safety critical information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		AMET-B3/3 - Climatological and historical meteorological information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/1 - Information service provision	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/2 - Information service consumption	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
		SWIM-B2/3 - SWIM registry	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/4 - Air/Ground SWIM for non-safety critical information	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
		SWIM-B2/5 - Global SWIM processes	<b>Operational need</b> <i>(Required operational specific activity to support the operation of the said element).</i>
<b>AMET-B4/4 MET Information Service in SWIM</b>	<b>Development underway</b>		
<b><i>ASBU SWIM MET Related Elements</i></b>			
SWIM-B2/1 Information Service Provision	To define the requirements for an information service provider to make aviation-related information available as an information service	SWIM-B2/5 - Global SWIM processes.	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
		SWIM-B2/3 - SWIM registry	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
		COMI-B1/1 - Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
SWIM-B2/2 Information Service Consumption	To define the requirements for an information service consumer to discover and access aviation-related information provided via information services.	SWIM-B2/1 - Information service provision	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
		SWIM-B2/3 - SWIM registry	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
		COMI-B1/1 - Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
		SWIM-B2/5 - Global SWIM processes	Operational benefit <i>(Operational enhancement of said element related to the use of enhanced operations)</i>
SWIM-B2/3 SWIM Registry	A registry is a means for the information service producer to publicize and for an information service consumer to discover	No Dependencies	

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
	information services within a SWIM environment		
SWIM-B2/4 Air/Ground SWIM for Non-Safety Critical Information	Exchange of non-safety critical information with the aircraft to improve operational awareness and efficiency	SWIM-B2/1 - Information service provision	Evolution <i>(Evolution of capability)</i>
		SWIM-B2/2 - Information service consumption	Evolution <i>(Evolution of capability)</i>
		COMI-B1/1 - Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
		Relation-technology need COMI-B2/3 - Links meeting requirements for non-safety critical communication	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
SWIM-B2/5 Global SWIM Processes	SWIM governance helps establish global access to aviation-related information by connecting information service providers and consumers within a global interoperability framework.	SWIM-B2/1 - Information service provision	Evolution <i>(Evolution of capability)</i>
		SWIM-B2/2 - Information service consumption	Evolution <i>(Evolution of capability)</i>
		SWIM-B2/3 - SWIM registry	Evolution <i>(Evolution of capability)</i>
		COMI-B1/1 - Ground-Ground Aeronautical Telecommunication	Technology need

ASBU AMET elements	Main purpose	Dependencies	Type of dependency
		Network/Internet Protocol Suite (ATN/IPS)	<i>(Required technological capability to achieve the implementation of the said element).</i>
SWIM-B3/1 Air/Ground SWIM for Safety Critical Information	Exchange of safety critical information with the aircraft to improve operational awareness and efficiency	COMI-B3/4 - Links meeting requirements for safety critical communication	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>
		SWIM-B2/4 - Air/Ground SWIM for non-safety critical information	Evolution <i>(Evolution of capability)</i>
		COMI-B1/1 - Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS)	Technology need <i>(Required technological capability to achieve the implementation of the said element).</i>

END