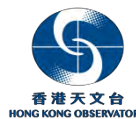




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# APAC User Requirements for SWIM- Based MET Information Services Supporting ATFM

Presented by  
Australia, Hong Kong China and Thailand

APAC MET/ATM Webinar 2021

24-28 May 2021



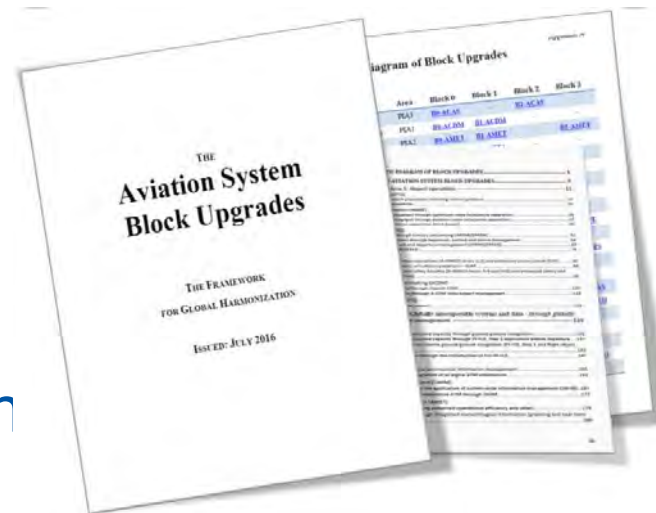


# Outline

- Reviews the recent SWIM activities related to MET and ATM at global and regional levels
- Provides some examples of
  - SWIM-based MET information services; and
  - Use cases for supporting ATFM

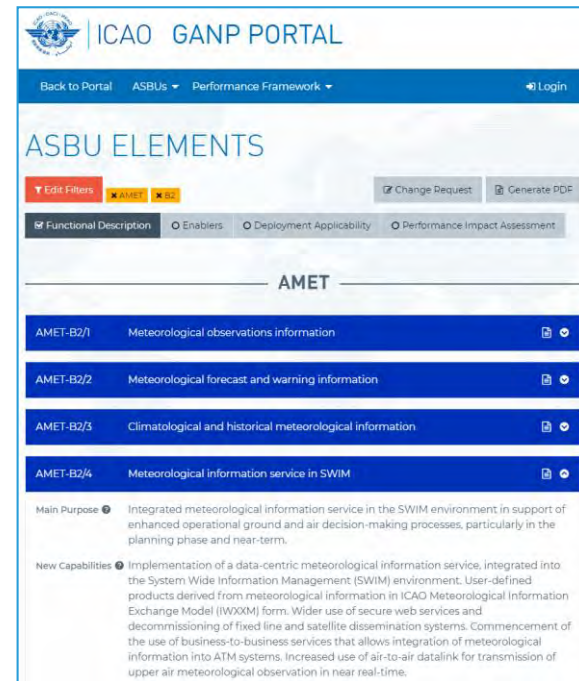
# ASBU B1-SWIM (2019-2025)

- improve current human-to-human communication with machine-to-machine interconnection
- enhanced efficiency in data distribution and accessibility
- global interoperability among aviation stakeholders.



# ASBU B1-SWIM (2019-2025)

- all information concerning air navigation, including MET information
- dissemination of MET information using MET information service in SWIM is included as part of AMET thread in ASBU



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## ASBU ELEMENTS

Edit Filters AMET B2

Change Request Generate PDF

Functional Description Enablers Deployment Applicability Performance Impact Assessment

### AMET

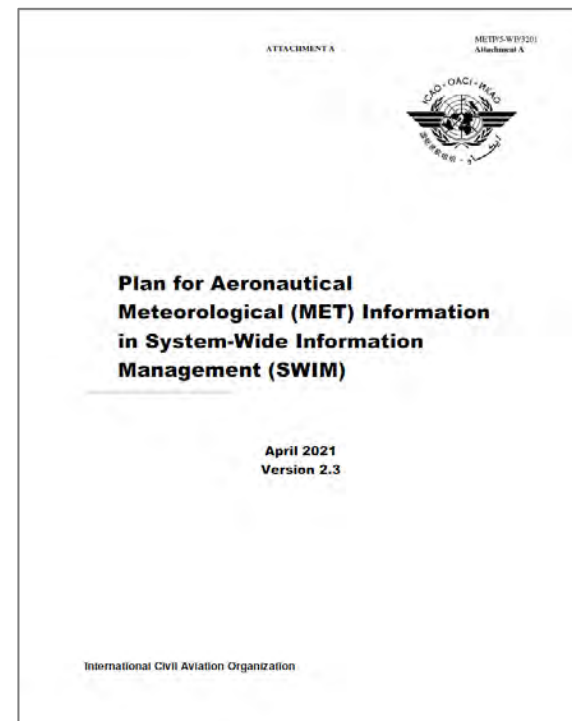
AMET-B2/1	Meteorological observations information	📄	🔍
AMET-B2/2	Meteorological forecast and warning information	📄	🔍
AMET-B2/3	Climatological and historical meteorological information	📄	🔍
AMET-B2/4	Meteorological information service in SWIM	📄	🔍

**Main Purpose** 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.

**New Capabilities** Implementation of a data-centric meteorological information service, integrated into the System Wide Information Management (SWIM) environment. User-defined products derived from meteorological information in ICAO Meteorological Information Exchange Model (IWXXM) form. Wider use of secure web services and decommissioning of fixed line and satellite dissemination systems. Commencement of the use of business-to-business services that allows integration of meteorological information into ATM systems. Increased use of air-to-air datalink for transmission of upper air meteorological observation in near real-time.

# METP and MET-SWIM Plan

- ICAO Meteorology Panel (METP)
  - to define concepts for aeronautical MET service provision supporting the future globally interoperable air traffic management system through SWIM.
- MET-SWIM Plan being developed by METP WG-MIE outlines the concepts of
  - how MET information service can be discovered and
  - how MET information should be exchanged in the SWIM environment.





# ICAO APAC SWIM Task Force

- ICAO APAC SWIM TF established in 2017
  - to develop SWIM-related components and supporting materials required for regional implementation in region.
- APAC SWIM Survey results discussed in SWIM TF/3(May 2019)
  - identified cross-border ATFM as one of the most important operations which could be more efficiently conducted using SWIM.
  - agreed that the SWIM implementation to support cross-border ATFM operation should be given high priority.
  - not only the SWIM infrastructure services but also the information services required to support such operation,
  - Including information service providing MET information in IWXXM



**Survey on Implementation of SWIM Services  
ICAO APAC Region**

PART I General

\* 4. Would your State plan to develop or support AIXM/FIXM/IWXXM messages to be exchanged over SWIM? What is the tentative schedule to implement the above SWIM models?

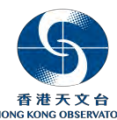
\* 5. Could you please provide your requirement for SWIM system/operations? What does your State expect to do to Implement SWIM operations?

\* 6. What is the expected scope of SWIM? What are the stakeholders and services expected to be involved in SWIM?

# SWIM in ASEAN Demonstration Project

- successfully conducted in Singapore and Thailand in Nov 2019
- included operations scenarios focusing on cross-border Distributed Multi-Nodal ATFM and A-CDM operations involving the handling of weather impact
- to explore how MET information can be better distributed and integrated through the SWIM environment into end-user systems to support their pre-tactical and tactical decision making.





# MET/R ad-hoc group

- Decision MET SG/24-13: Development of APAC User Requirements for SWIM-based MET Information Services Supporting ATFM
  - That, the MET SG approves the terms of reference at the Appendix 8 to the MET SG/24 Report regarding the scope and objectives of the MET/R ad hoc group to develop SWIM-based MET information services specifically addressing the needs of ATFM in the APAC Region.
- More details available in MET/R WG/10 – WP/07



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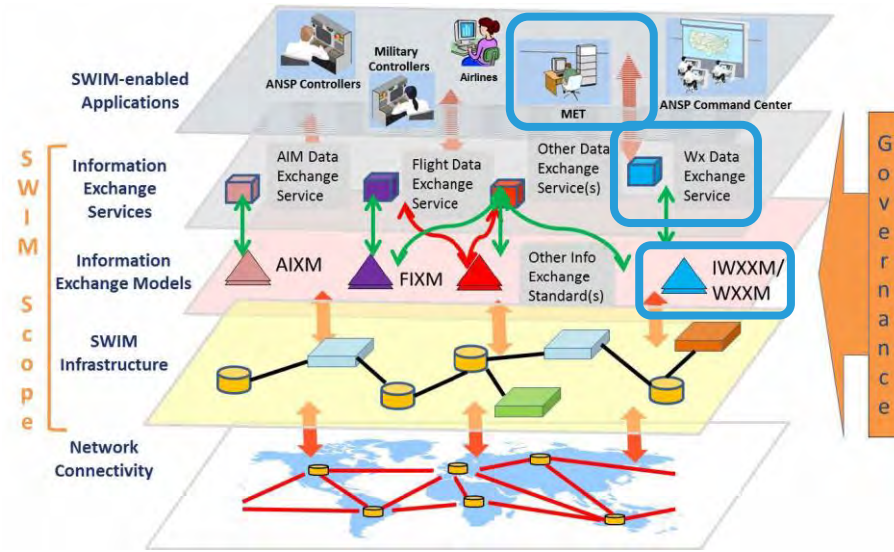
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# SWIM-based MET Information Services and Examples of use cases to support ATFM

# SWIM-based MET information services

- Requested information is consumed by SWIM-enabled Applications via Information Exchange Services to meet end-users' needs.



**SWIM Global Interoperability Framework**

ICAO Manual on SWIM (Doc 10039)

## SWIM-based MET information services

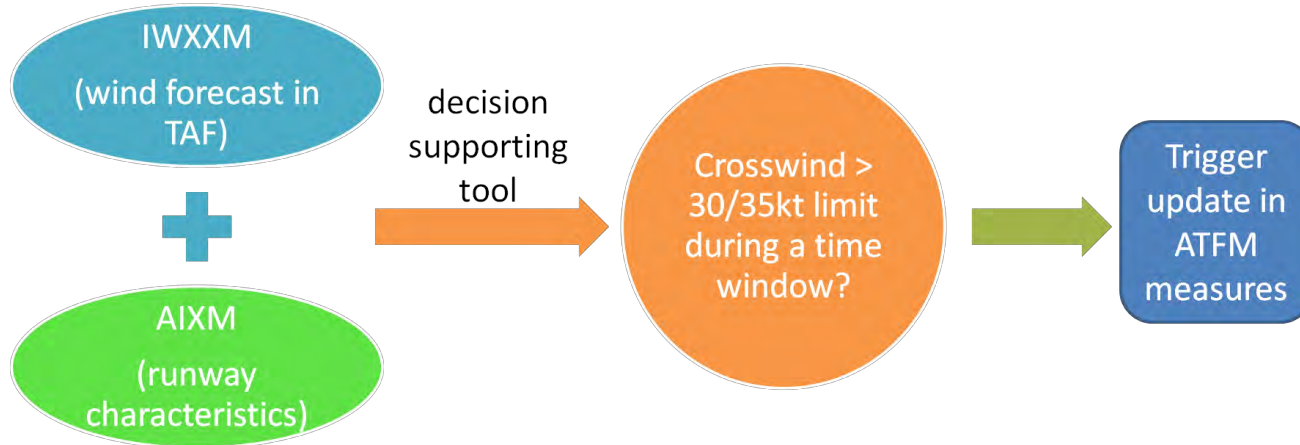
- capable to geospatially and/or temporally filter a data set to provide the users' system only the tailored information required by the user

Sample data to be exchanged via SWIM-based MET Information Services to support ATFM operations

Sample MET data catalogue	Sample ATFM data catalogue
<u>Aerodrome</u> <ul style="list-style-type: none"><li>Surface wind and gust</li><li>Headwind</li><li>Windshear</li><li>Turbulence</li><li>Crosswind</li><li>QNH</li><li>Temperature and dew point</li><li>RVR</li><li>Visibility</li><li>Cloud amount and type</li><li>Lightning</li><li>Radar data</li><li>Wake vortex</li><li>Weather phenomenon and intensity</li></ul>	<ul style="list-style-type: none"><li>Departure aerodrome</li><li>Destination aerodrome</li><li>Flight identification</li><li>Planned route/trajectory</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><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></ul>
<u>Enroute</u> <ul style="list-style-type: none"><li>Wind</li><li>Temperature</li><li>CB clouds / deep convection area</li><li>Icing</li><li>Clear air turbulence</li><li>Tropopause height</li><li>SIGMET phenomenon and intensity</li><li>Volcanic ash cloud</li><li>Tropical cyclone</li><li>Satellite data</li></ul>	

# Use case example 1

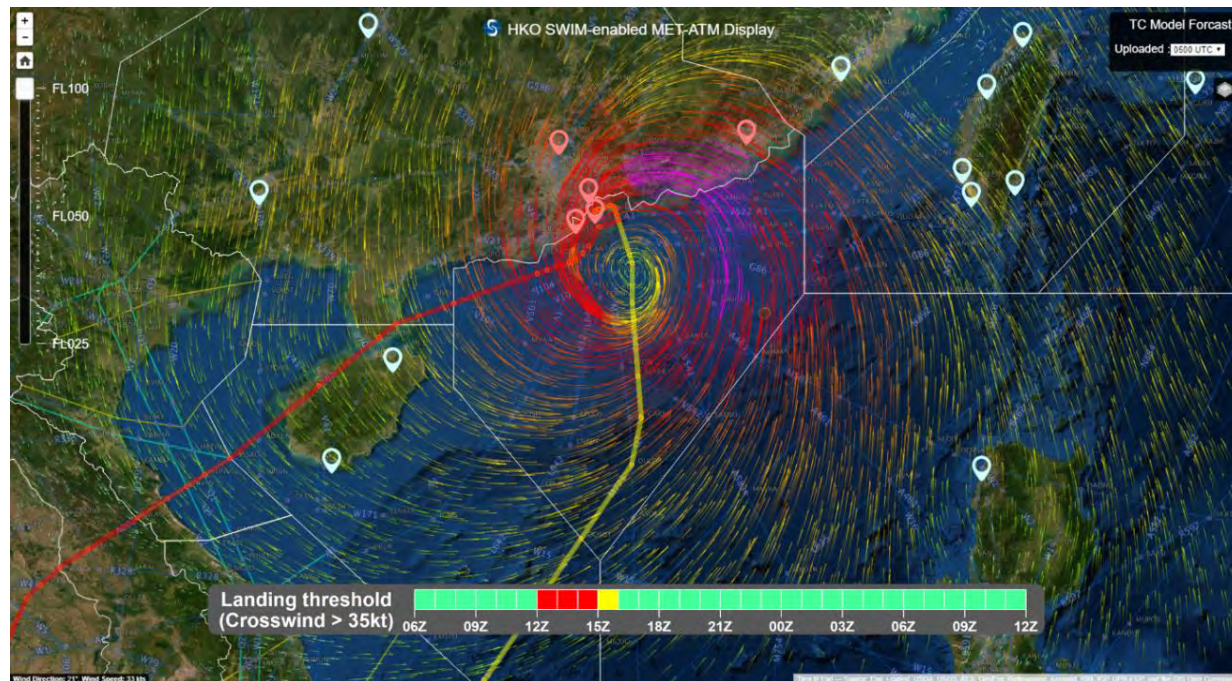
- Integration of MET information in IWXXM with aerodrome information in AIXM to assess the crosswind at destination within a requested time period





# Use case example 1 – Ground Delay Program

- Based on weather elements extracted in digital TAF (received in IWXXM format)
- To support ATC's decision-making on when the airport arrival rate should be reduced and resumed normal



# Ground Delay Program

- FLM lowers AAR in ATFMS during the alerted window, resulting in demand exceeding capacity for two or more hours
- FLM decides to activate a Ground Delay Program for the aerodrome
- ATFMU issues an updated ATFM Daily Plan (ATFM measure)

ATFM Daily Plan (ADP) - SWIM Scenario 3.2

ATFM DAILY PLAN	HONG KONG
DATE / TIME OF ISSUE	12 NOV 2019, 0500UTC
STATUS / REFERENCE	EFFECTIVE – 0800UTC, 12 NOV 2019

CONSTRAINTS AND IMPACT					
LOCATION	PERIOD (UTC)		DETAILS		REMARK
VHHH	12 NOV 19	0800	1200		AAR=34
		1200	1500	X-wind exceeding 30kt	AAR=29
		1500	1600	X-wind 20-25 kt	AAR=31
		1600	1730	Occasional wind shear	AAR=32

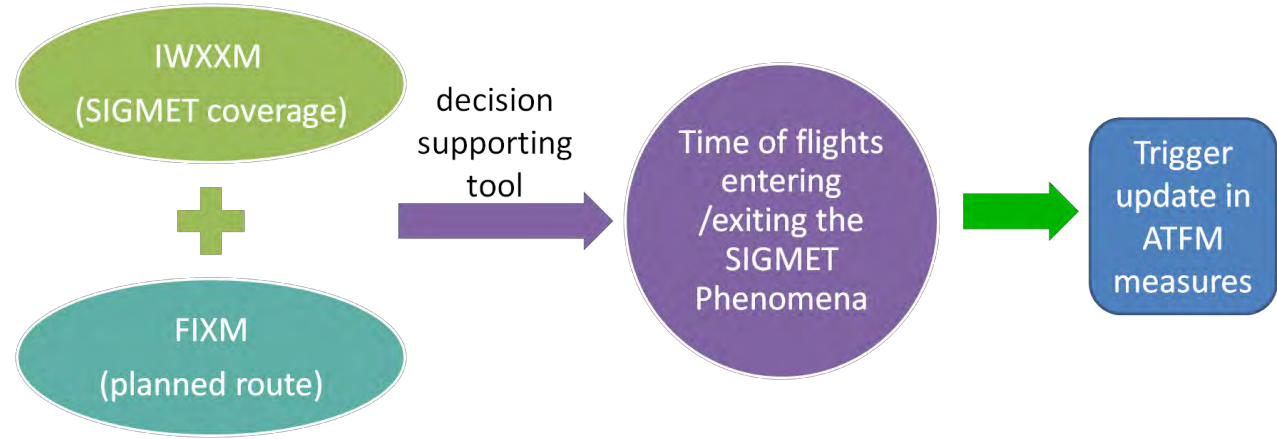
ATFM MEASURE				
LOCATION	ATFM MEASURE PERIOD (UTC)			ATFM MEASURE
VHHH	12 NOV 19	1200	1600	GDP

POSSIBLE / DEVELOPING ISSUES				
LOCATION	PERIOD (UTC)			REMARK

WEATHER BRIEFING
Tropical cyclone track has changed and will now pass close to VHHH, affecting operations. Crosswind will increase beyond 30kts from 1200-1500 before reducing later in the evening.

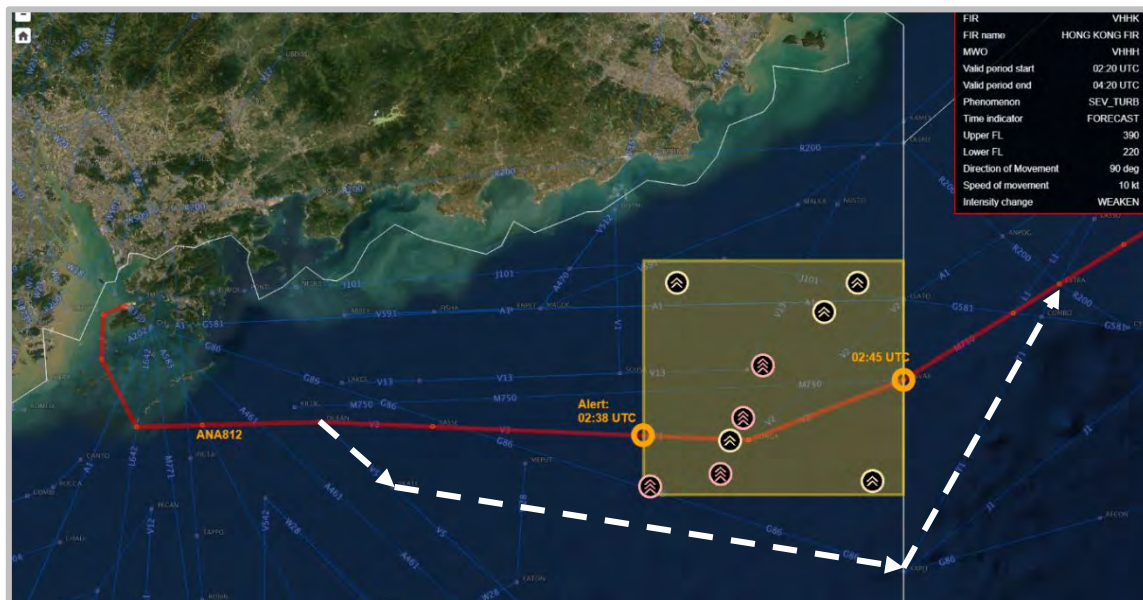
# Use case example 2

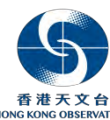
- Integration of MET information in IWXXM with flight information in (FIXM) to assess the number of flights crossing areas of significant weather phenomena mentioned in SIGMET reports (such as CBs and associated SEV TURB and SEV ICE) within a requested time period



## Use case example 2 – Airborne rerouting

- FPL and SIGMET exchanged in SWIM format
  - integrate flight and MET information in the automatic decision-supporting tool
  - better support the timely tactical decision making by the ATC and FOC





# Your views?

- What are your possible new use cases using the MET elements extract from IWXXM messages of METAR, TAF, SIGMET, Tropical cyclone / volcanic ash advisories, etc.
  - which could better facilitate your work flow or decision supporting tools?



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