



ICAO BANGKOK | UNITING AVIATION

The Role of IWXXM in the International Air Navigation System

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Webinar on the implementation of the ICAO Meteorological
Information Exchange Model (IWXXM), 27 to 29 October 2020





Outline

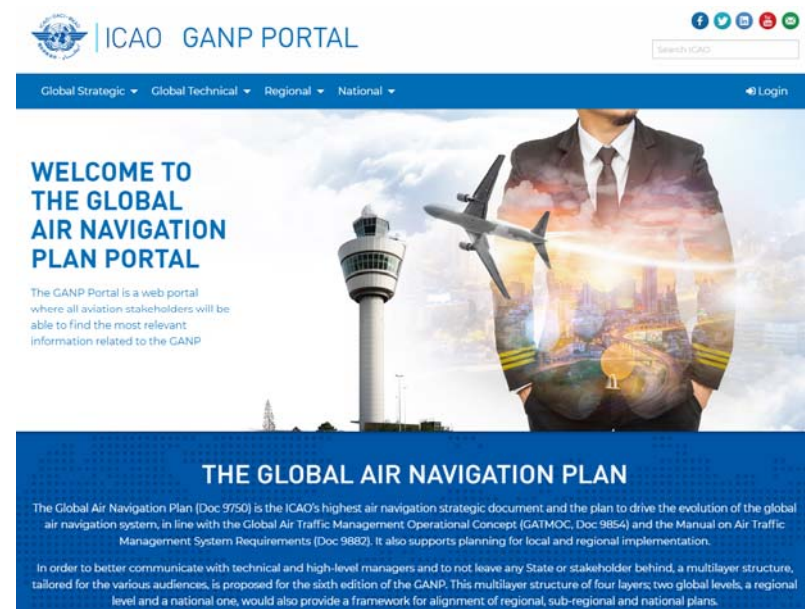
- Global Air Navigation Plan
- Aviation System Block Upgrades
- Meteorology Panel
- Working Group on Meteorological Information Exchange
- WMO Task Team on Aviation Data
- Annex 3 Provisions
- Documents and Guidance





Global Air Navigation Plan (GANP)

- ICAO's highest air navigation strategic document.
- In line with the Global Air Traffic Management Operational Concept (GATMOC, Doc 9854) and the Manual on Air Traffic Management System Requirements (Doc 9882).
- Aimed at achieving a global interoperable air navigation system for all users, during all phases of flight, that will meet agreed levels of safety, provide optimum economic operations, is environmentally sustainable and will meet national security requirements.
- GANP resources:
<https://www.icao.int/airnavigation/pages/ganp-resources.aspx>



GANP PORTAL

<https://www4.icao.int/ganportal/>



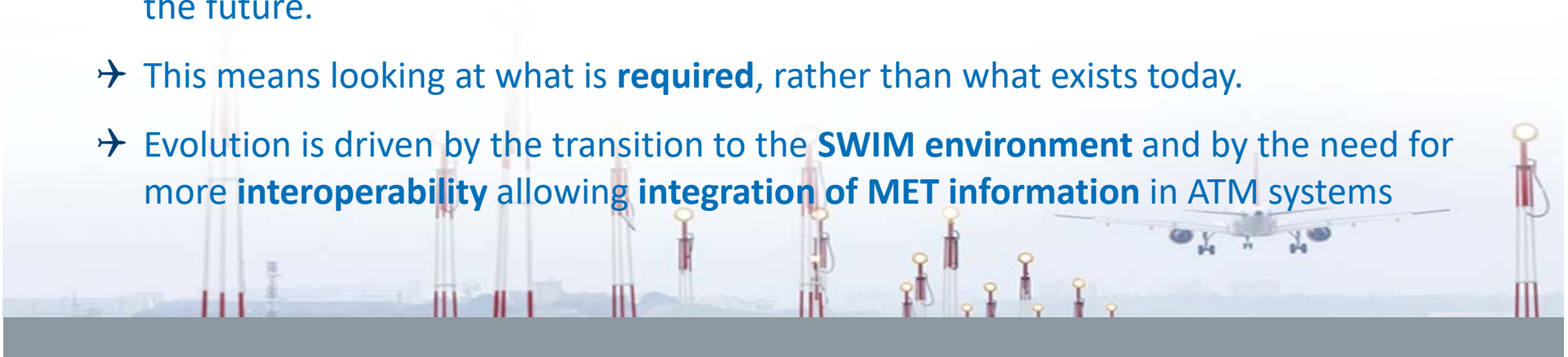
Aviation System Block Upgrade (ASBU)

- **ASBU Framework:** a group of operational improvements organised in a way to facilitate the planning of implementation of air navigation improvements based on specific operational needs.
- **ASBU Thread:** key feature area of the air navigation system that needs improvement in order to achieve the vision outlined in the Global ATM Operational Concept (GATMOC).
- **ASBU Element:** a specific change in operations designed to improve the performance of the air navigation system under specified operational conditions.
- **ASBU Enabler:** component (standards, procedures, training, technology, etc) required to implement an element.
- **ASBU Block:** a six-year timeframe whose starting date defines a deadline for an element to be available for implementation.
- **ASBU Module:** a group of elements from a thread that, according to the enablers' roadmap, will be available for implementation within the defined deadline established by the ASBU Block.



AMET & SWIM Modules

- Meteorology and System Wide Information Management (SWIM) are **enablers** for the majority of the other Threads.
- Challenge is to ensure that **all the other ASBU threads** and related modules are able to fully articulate the requirements they have for both MET information and SWIM in the future.
- This means looking at what is **required**, rather than what exists today.
- Evolution is driven by the transition to the **SWIM environment** and by the need for more **interoperability** allowing **integration of MET information** in ATM systems





ASBU AMET - Dissemination

AMET B0/4: Dissemination of Meteorological Products

Commencement of IWXXM, being the conversion of TAC using an IWXXM schema into XML/GML.

AMET B1/4: Dissemination of Meteorological Information

IWXXM form starts to replace TAC products. Human-readable products start to be derived from the IWXXM information (rather than the other way around). The introduction of web services allows for progressive replacement of fixed line dissemination systems.

AMET B2/4: Dissemination of Information Services in SWIM

Implementation of a data-centric MET information into a SWIM environment. User-defined products derived from meteorological information in IWXXM. Wider use of secure web services and decommissioning of fixed line and satellite dissemination systems. Commencement of the use of business-to-business services, allowing integration of MET information into ATM systems. Increased use of air-to-air datalink for transmission of upper air meteorological observation in near real-time.

AMET B3/4: Dissemination of Information Services in SWIM

Continued implementation of a data-centric meteorological information service into SWIM. Enhancement of IWXXM with further schemas and formats for meteorological information exchange. User-defined products automatically derived from meteorological information IWXXM form. Extensive use of secure web services, in particular business-to-business services that allows full integration of meteorological information.



ASBU SWIM

SWIM B2/1: Information Service Provision

Once an information service is created by an information service provider, it can be discovered by the ATM community through its service overview made available via a registry. The service overview includes metadata specifying the characteristics of the provided information service including the means by which the service is accessed by the authorized users.

SWIM Information services typically apply publish/subscribe or request/reply message exchange patterns. SWIM information services facilitate integration with automation systems.

SWIM B2/2: Information Service Consumption

An information service consumer has access to a registry to discover available information services. A registry's search and filter capability helps an information service consumer discover an information service appropriate to their specific needs. The information service consumer needs to implement publish/subscribe and request/reply message exchange patterns over an internet protocol-based communication infrastructure in order to consume information services.

SWIM B2/3: SWIM Registry

A registry contains a listing of service overviews. It has a search and filter capability to identify and select information services, permits managing service overviews, and provides user access control mechanism.



ASBU SWIM

SWIM B2/4: Air/Ground SWIM for non-Safety Critical Information

Air/Ground (A/G) SWIM leverages inflight internet connectivity (e.g., broadband) capabilities, along with the air navigation service provider's ground SWIM infrastructure, to enable information exchange with the aircraft.

SWIM B2/5: Global SWIM Process

SWIM governance comprises a set of standards, policies and processes in support of, for example, rights of usage of information, quality of service aspects and trust. Within a global interoperability framework, registries will be interconnected to provide a single access point for information services.

SWIM B3/1: Air/Ground SWIM for Safety Critical Information

A/G SWIM capability is extended to address the exchange of safety critical information with the aircraft.

BBB (Basic Building Blocks): *baseline*

Block 0: <i>from 2013</i>	→ Introduction of IWXXM	→ Annex 3 Amd 76 (2013), Amd 77 (2016), Amd 78 (2018)
Block 1: <i>from 2019</i>	→ IWXXM a standard	→ Annex 3 Amd 79 (2020), Amd 81 (2023)
Block 2: <i>from 2025</i>	→ Introduction of SWIM	→ Annex 3 Amd 82 (Nov 2026) etc
Block 3: <i>from 2031</i>		
Block 4: <i>from 2037</i>		



Meteorology Panel

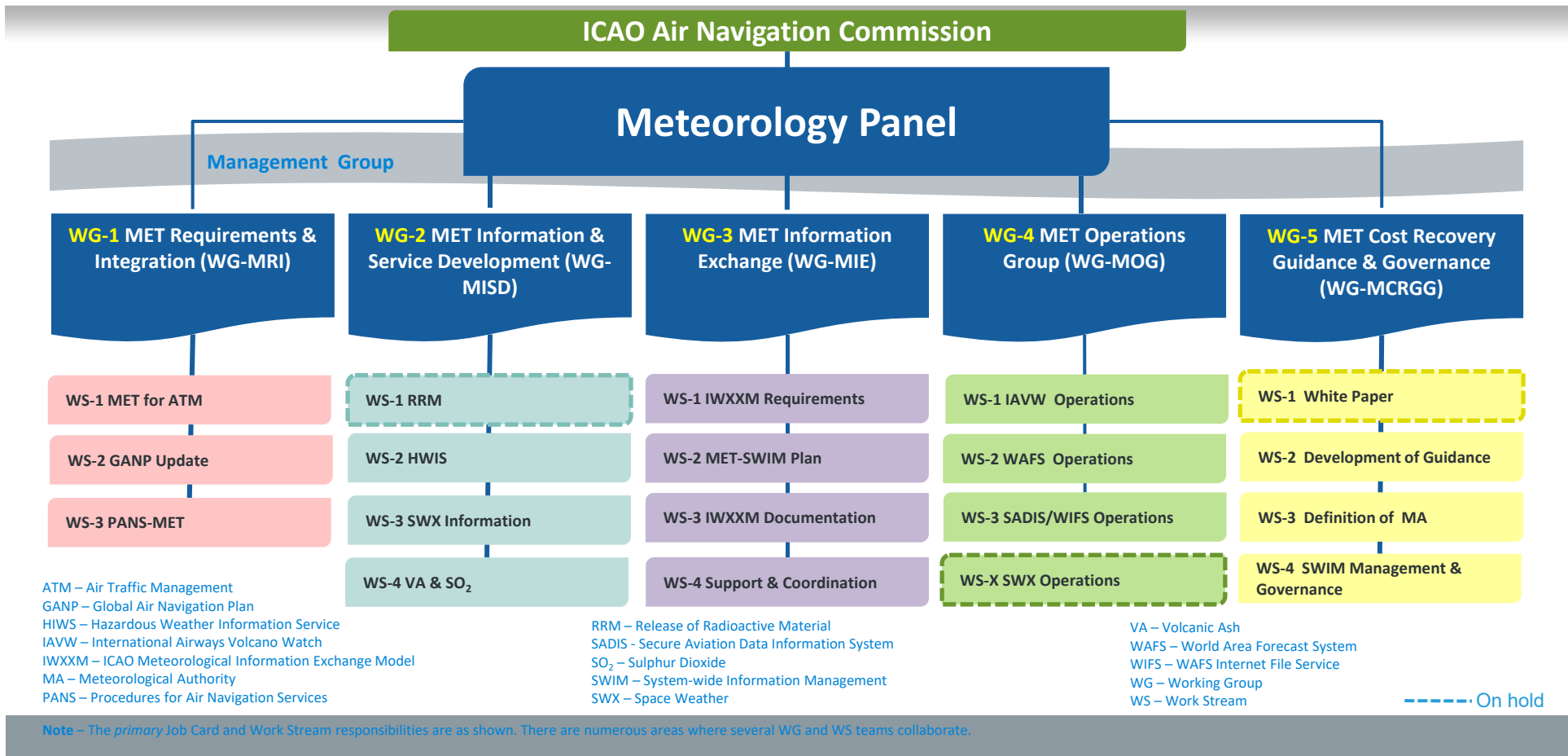
ICAO Air Navigation Commission (ANC) Job Card METP.004:

Inclusion of aeronautical meteorological information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology

Problem Statement: Aeronautical meteorological information needs to be integrated into the SWIM-enabled environment which introduces unique issues relating to governance and data management.

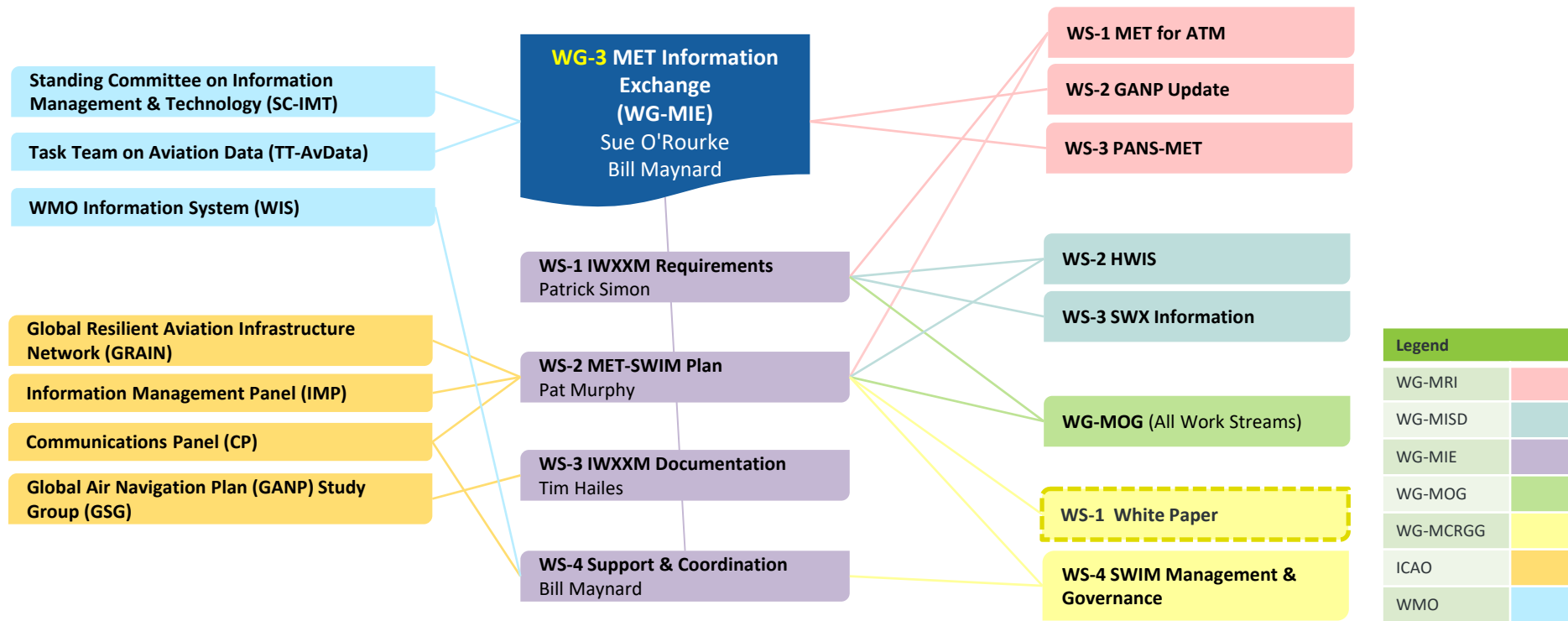
Expected Benefits: The full integration of aeronautical meteorological information into the SWIM environment will enable the full benefits to be derived relating to safety and efficiency.





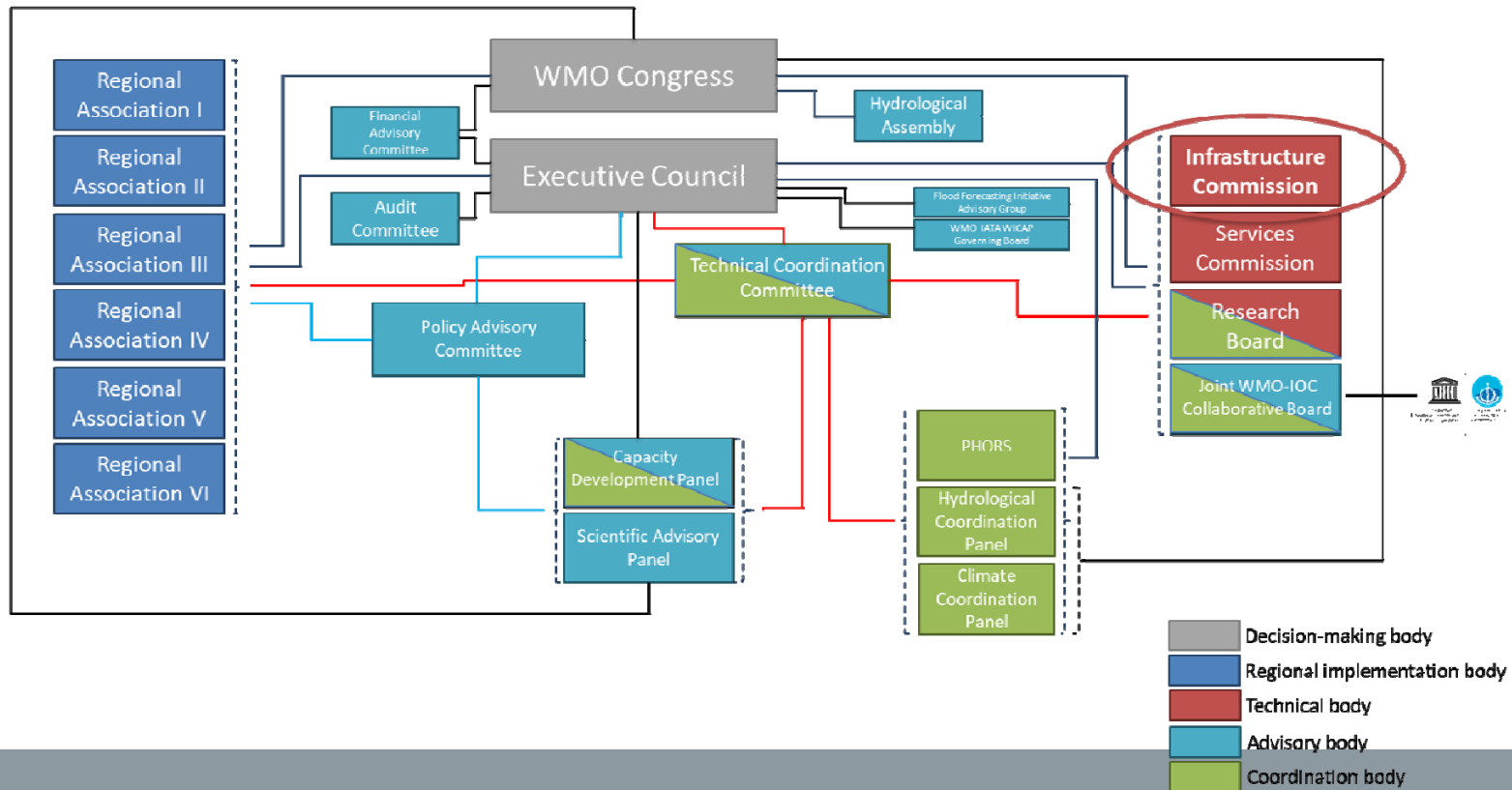


Working Group on Meteorological Information Exchange (WG-MIE)



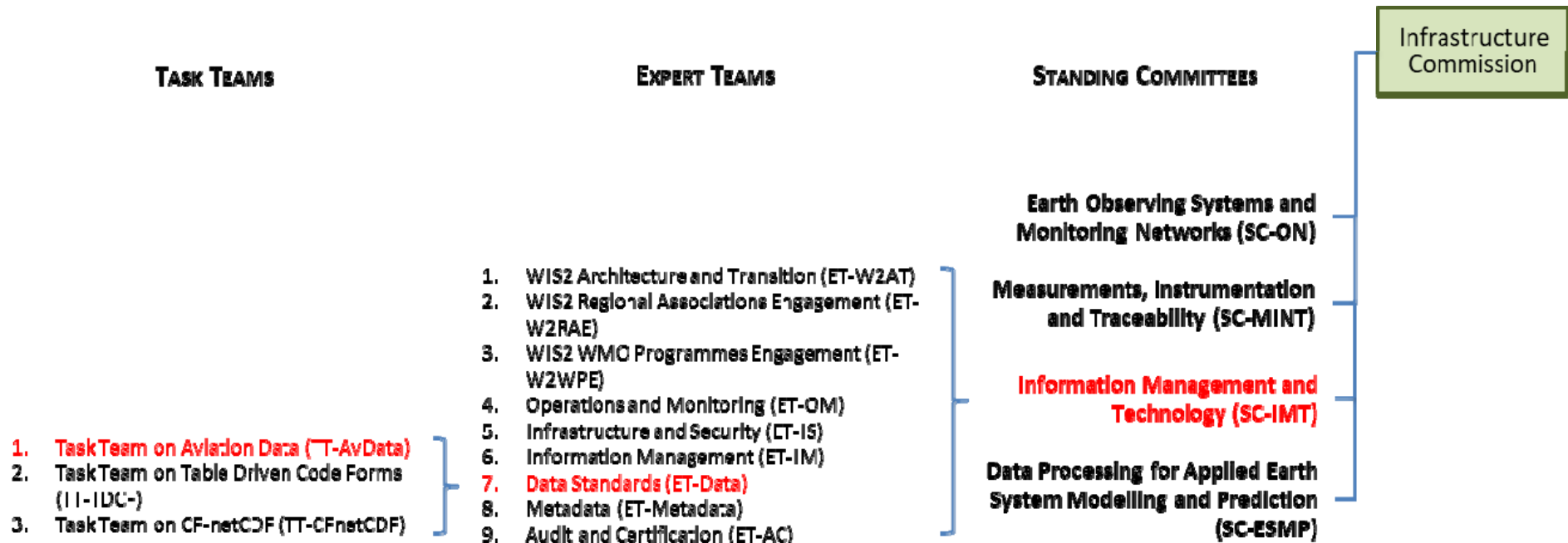


World Meteorological Organization (WMO)





WMO Task Team on Aviation Data (TT-AvData)





TT-AvData Terms of Reference (to be finalised)

- Further the development of IWXXM
- Maintain/streamline/revamp IWXXM related documents, websites, etc.
- Maintain aviation specific entries in the WMO Codes Registry and the code tables they are referencing.
- Engage the migration and ownership of aviation specific code tables back into WMO No.306 Vol. I.3
- Engage the development of CF conventions of netCDF in collaboration with TT-CFnetCDF and relevant ICAO working groups
- Maintain aviation TAC and related documents
- Liaison with other (WMO, ICAO, OGC, etc.) teams



ANNEX 3 PROVISIONS - IWXXM

ICAO Annex 3: Meteorological Service for International Air Navigation

- Amd 76 (Nov 2013):** IWXXM introduced for exchange of METAR/SPECI, TAF, AIRMET, SIGMET, VAA and TCA) under bilateral agreements between States in a position to do so.
- Amd 77 (Nov 2016):** IWXXM a recommended practice for the exchange of METAR/SPECI, TAF, AIRMET, SIGMET, VAA and TCA.
- Amd 78 (Nov 2018):** IWXXM a recommended practice for the exchange of space weather advisories (SWXA) from Nov 2019. IWXXM a standard for OPMET from 2020.
- Amd 79 (Nov 2020):** IWXXM a standard for METAR/SPECI, TAF, AIRMET, SIGMET, VAA, TCA and SWXA.





DOCUMENTS & GUIDELINES

ICAO

Annex 3:	Meteorological Service for International Air Navigation
PANS-MET:	Procedures for Air Navigation Services – Meteorology (<i>under development</i>)
Doc 8896:	Manual of Aeronautical Meteorological Practice
Doc 9750:	Global Air Navigation Plan
Doc 10003:	Manual on the ICAO Meteorological Information Exchange Model
Doc 10039:	Manual on System Wide Information Management (SWIM) Concept
IWXXM Guidelines:	Guidelines for the implementation of OPMET data exchange using IWXXM

WMO

No.49 Vol II:	Meteorological Service for International Air Navigation
No.306 Vol I.3:	Manual on Codes Part D - Representations derived from data models
No.386:	Manual on the Global Telecommunication System



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Dakar
- European and North Atlantic (EUR/NAT) Office
Paris
- Middle East (MID) Office
Cairo
- Eastern and Southern African (ESAF) Office
Nairobi
- Asia and Pacific (APAC) Sub-office
Beijing
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THANK YOU