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North American, Central American and Caribbean Office

WORKING PAPER

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Tulum, Mexico, from 8 to 12 September 2025

Agenda Item 3: Use and Integration of Aeronautical Meteorological Data

Impact of Meteorological Phenomena on Aviation

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This Note analyses the evolution of ICAO's aeronautical meteorological services, from a static product model to a data-centric digital environment through System Wide Information Management (SWIM). It reviews the key requirements of the Global Air Navigation Plan (GANP) and proposes actions for a smooth transition and the implementation of the IWXXM format.

Action:	As presented in numeral 4
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Annex 3 – Meteorological Service for International Air Navigation, Twentieth Edition, July 2018.

1. Introduction

1.1 Global aviation is undergoing a digital transformation driven by the concept of System Wide Information Management (SWIM). SWIM is the foundation of a global, interoperable, and data-centric aviation ecosystem.

1.2 Within this framework, aeronautical meteorological services are evolving from a product-based model to one of integrated and seamless information services. This change is guided by the requirements of the ICAO Global Air Navigation Plan (GANP), with the goal of optimizing air operations and decision-making.

1.3 The availability of aeronautical meteorological information in a globally interoperable digital format is considered a key element for the future of global air traffic management in the SWIM environment.

2. Analysis and Discussion

2.1 Currently, traditional meteorological (MET) services are based on static, text-based products, such as METAR reports and TAF forecasts. This approach has limitations for integration with automated systems and real-time decision-making. To address these limitations and comply with GANP requirements, an evolution has been defined toward a future approach based on dynamic, machine-readable MET information.

2.2 This digital transformation implies a series of key requirements for the provision of meteorological information:

- Meteorological information must be in IWXXM format, which is a machine-readable standard based on the Extensible Markup Language (XML) and the Geographic Markup Language (GML). This format facilitates automation and global interoperability.

- Information must be delivered through web services, allowing on-demand access and seamless integration with air traffic management (ATM) systems and airline operators.

- Annex 3 requires that digital information be in a format that conforms to a globally interoperable information exchange model and be accompanied by appropriate metadata.

2.3 The ICAO GANP AMET-B2 Module (2025-2030) describes the future vision for these services, emphasizing high spatial and temporal resolution of data, as well as the provision of automated and user-defined services in IWXXM format.

3. Conclusions

3.1 Aeronautical meteorological services are undergoing a fundamental change, moving away from static products to adopt a data-centric model based on IWXXM information and web services.

3.2 This change is driven by the need for greater global interoperability and automation to support decision-making. The adoption of these new standards, as defined by the ICAO GANP, is essential to achieve a more efficient, safe, and resilient aviation ecosystem.

4. Suggested Actions

4.1 The meeting is invited to consider the following actions:

a) Energize the adoption and use of the IWXXM format for all aeronautical meteorological information, facilitating its integration with air traffic management systems.

b) Consider the challenges of implementing web services for meteorological data delivery, which allows information to be accessible on demand for future automated user systems.

c) Promote staff training on the new formats and systems to ensure a smooth transition and effective use of the information.

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