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Workshop on the Implementation of the Amendment 82 to Annex 3 to Chicago Convention and the PANS-MET

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Session 2 : Main changes introduced by Amendment 82 to Annex 3

PPT2.4 : Implications of Amendment 82 for civil aviation authorities and MET service providers

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Introduction

- Annex 3 Amendment 82 restructures the regulatory framework by separating requirements (SARPs) from means of implementation (PANS-MET).

- It supports the transition to data-centric meteorological services, in line with SWIM, and has major impacts for civil aviation authorities and service providers, including in terms of oversight, quality, data management and skills.

Implications of Amendment 82 for meteorological authorities

Implications of Amendment 82 for the Met authorities

Strengthening Regulatory Responsibilities

- Amendment 82 clarifies and strengthens:
  - ◊ The **State's obligations** in the provision of MET services;
  - ◊ The distinction between **regulatory requirements** (Annex 3) and **implementation procedures** (PANS-MET);
  - ◊ The responsibility for ensuring **continuous compliance** of MET service providers.
- ***Article 28 of the Convention on International Civil Aviation*** *establishes the obligation of the State to provide meteorological information in its territory in order to facilitate international air navigation,* ***in accordance with the standards and recommended practices*** *established under the Chicago Convention*.
- **Origin amendment: METP/5**; Resolution of adoption by the Council (2 April 2025, Council, 234th Session 14th meeting): Restructuring by METP/5 and adoption by the Council of ANNEX 3 containing "REQUIREMENTS"; and PROCEDURES FOR AIR NAVIGATION SERVICES – METEOROLOGY (PANS-MET) containing the "MEANS OF COMPLIANCE».
- **A3 Chap. 2 STD :** 2.1.4 Each Contracting State shall designate the entity, hereinafter referred to as the meteorological authority, to arrange for the provision of meteorological service for international air navigation on its behalf. (Annex 15 – *Aeronautical Information Services*, Chapter 5 for more details).
- ***A3 Chap. 1 STD 1.1 : Administration météorologique.*** The entity arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State, and providing regulation and oversight of the meteorological service.

Implications of Amendment 82 for the Met authorities

Updating the national regulatory framework

- **The authorities to:**
  - ◊ **revise the regulations, circulars and others acts related to MET;**
  - ◊ **Explicitly incorporate the requirements of Amendment 82 into their national regulations;**
  - ◊ **Specify institutional responsibilities (Regulatory Entity, Entity providing MET services, etc.)**

- **A3 STD 2.1.3** Each Contracting State **shall determine the meteorological service** which it will provide to meet the needs of international air navigation. This determination shall be made in accordance with the provisions of this Annex and in accordance with regional air navigation agreement; **it shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas which lie outside the territory of the State concerned**.

- **A3 STD 2.1.4** Each Contracting State shall designate the entity, hereinafter referred to as the **meteorological authority**, to arrange for the provision of meteorological service for international air navigation on its behalf.

- **A3 STD 2.1.5** Each Contracting State shall designate an entity (or several entities), hereinafter referred to as the **meteorological service provider, to provide meteorological service for international air navigation on behalf of the Contracting State.**

Implications of Amendment 82 for the Met authorities

Strengthening Oversight and Oversight

- Amendment 82 facilitates more structured oversight:

  - ◊ **Updating MET inspection programs;**
  - ◊ **Development of checklists based on the revised SARPs and the PANS-MET;**
  - ◊ **Integration of QMS control into inspections/audits.**

- **A3 STD 2.2.6** Demonstration of compliance of the quality system applied shall be by audit. If non-conformity of the system is identified, action shall be initiated to determine and correct the cause. All audit observations shall be evidenced and properly documented.

- *Monitoring becomes more performance-based and demonstrable compliance.*

Implications of Amendment 82 for the Met authorities

Increased quality management requirements

- The authorities to verify that:
  - A **compliant QMS** is in place at the MET provider;
  - Processes are **documented and controlled**;
  - The **effectiveness of quality assurance** of meteorological information;
  - **Continuous improvement mechanisms** are operational.
- **A3 Chap. 2 STD 2.2.2** The meteorological authority shall ensure that the **designated meteorological service provider referred to in 2.1.5 establishes and implements a properly organized quality system** comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.
- **A3 Chap. 9 STD 9.4.3** Where **automated pre-flight information systems** are used to provide for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned, **the meteorological authority concerned shall remain responsible for ensuring that the quality control and quality management of meteorological information are provided by the meteorological service provider** by means of such systems, in accordance with Chapter 2, 2.2.2

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Implications of Amendment 82 for the Met authorities

Transition to digital information management

- Amendment 82 prepares for the integration of MET services into a digital environment:
  - Oversight of data exchange systems (e.g. IWXXM);
  - Assessment of effective Interoperability with ATS and AIM;
  - Verification of the traceability of MET data.

- The exchange of OPMET data in the ICAO IWXXM format was introduced as a **recommended practice by Amendment 77-A to Annex 3** to the Chicago Convention (MET Meeting at Division Level (2014)), **made mandatory by Amendment 78 to Annex 3**, and **applicable by Amendment 79** as of November 2020.

- *Authorities need to develop skills in overseeing digital systems*.

Implications of Amendment 82 for the Met authorities

Enhanced interinstitutional coordination

- Meteorological authorities to:
  - **Formalize coordination with other administrations;**
  - **Clarify the MET-ATS-AIM interfaces;**
  - **Establish governance and reporting mechanisms**.

- **A3 Chap. 3 STD 3.3.1** A Contracting State, having accepted the responsibility for providing air traffic services within a flight information region (FIR) or a control area (CTA), **shall establish**, in accordance with regional air navigation agreement, **one or more MWOs**, or **arrange for another Contracting State to do so**.

- *Compliance becomes a shared and structured responsibility.*

Implications of Amendment 82 for the Met authorities

Capability implications

- Amendment 82 implies:
  - **Training of MET inspectors;**
  - **Updating monitoring tools and guides;**
  - **Strengthening of technical and human resources.**
- ***Without capacity building, sustainable compliance is difficult to ensure.***

Implications of Amendment 82 for the Met authorities

In summary

- Amendment 82 strengthens the regulatory framework and better structures oversight activities through:
  - **Updating the national framework;**
  - **Inspections based on revised SARPs;**
  - **Process and traceability verification;**
  - **Supervision of the exchange of MET information;**
  - **Strengthened MET-ATS-AIM interaction/coordination;**
  - **Training of inspectors and experts**.

Implications of Amendment 82 for meteorological service providers

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Implications of Amendment 82 for meteorological service providers

Changing role of MET service providers

- The AMD 82 clarifies the definition of the MET provider and evolves its role from a producer of weather messages to a provider of structured, traceable aeronautical MET information that can be directly exploited by ATM systems.

- **A3 Chap. 1 STD 1.1** The **relevant entity designated to provide meteorological service** for international air navigation on behalf of a Contracting State.

- ***Note :*** *Meteorological assistance to international air navigation consists of providing users with meteorological information that is necessary for the performance of their respective functions.*

- *MET Service Provider Becomes a Key Player in MET Information Management.*

Implications of Amendment 82 for meteorological service providers

Adaptation of operational procedures

- **Alignment** of standard operating procedures (SOPs) with the **PANS-MET.**
- **Harmonization of practices for the production, monitoring and dissemination of OPMET information,**
- **Clarification of responsibilities and interfaces with ATS and AIM.**
- **Need to revise and document existing procedures**.
- **A3 Foreword refers:**
  - ◊ **STD 2.1** The PANS-MET are complementary to the Standards and Recommended Practices (SARPs) listed in Annex 3.
  - ◊ **§ 4. Implementation:** Responsibility for the implementation of the procedures lies with the Contracting States; these procedures are not actually applied in operation until after they have been put into force by the States and to the extent that they have been put into force.

    To facilitate their implementation by States, the procedures have been drafted in such a way as to allow their direct use by MET staff.

Implications of Amendment 82 for meteorological service providers

Transition to digital formats

- Preparation for the increased use of **machine-readable formats** (e.g. IWXXM).
- **Adaptation of the systems** for the production and dissemination of MET information.
- **Enhanced process automation**.
- **Investments** in technical infrastructure**.**

- A**MD 81 STD 2.2.10 Recommendation.** *Contracting States should ensure that the* ***meteorological information supplied*** *to the users listed in 2.1.2 is provided through* ***information services***.

  Note 1. *— In the context of system-wide information management (SWIM), the notion of information service addresses machine-to-machine interaction in a service-oriented architecture.*

  Note 2.— *Procedures on information services are contained in the* Procedures for Air Navigation Services — Information Management *(PANS-IM, Doc 10199).*

  Note 3.— *Guidance material on information services can be found in the* Manual on System-wide Information Management Implementation *(Doc 10203).*

Implications of Amendment 82 meteorological service providers

Transition to digital format

Amendment 82 restructured Annex 3 **to facilitate the transition to a globally interoperable digital format** based on the ICAO Meteorological Information Exchange Model (IWXXM).

The implementation of the IWXXM is not simply an update of information and communications technology, it is a **fundamental standard of interoperability** in aviation that ensures the consistent, **structured and machine-readable** exchange of weather information between aviation systems.

Roadmap for the modernisation of the exchange of MET information through the implementation of IWXXM

	Expected capacities in Block 1 (2019-2024)	Expected capacities in Block 2 (2025-2030)	Expected capacities in Block 3 (2031-2036)	Expected capacity in Block 4 (2037+)
Communication Protocols	AMHS FTBP	AMHS FTBP AMQP/HTTP (optional)	AMHS FTBP AMQP/HTTP	AMQP/HTTP
Information exchange services	Request/Reply RODB TAC Request/Reply RODB IWXXM	Request/Reply RODB TAC Request/Reply RODB IWXXM OGC Standard Services (optional)	Request/Reply RODB IWXXM OGC Standard Services	OGC Standard Services
Data addressing	SFA Addressing	SFA Addressing IP (optional) SWIM Registry (Optional)	SFA Addressing IP SWIM Registry	IP SWIM Registry
System-wide information	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

Implications of Amendment 82 for meteorological service providers

Strengthening quality management

- **More effective integration of QMS into MET activities.**
- **Improved traceability, consistency, and reliability of information.**
- **Provision of evidence of compliance with Annex 3 requirements**.
- **A3 Chap. 2 STD 2.2.2** The meteorological authority **shall ensure that the designated meteorological service provider referred to in 2.1.5 establishes and implements a properly organized quality system** comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.
- **A3 Chap. 2 STD 2.2.6** Demonstration of compliance of the quality system applied shall be by audit. If non-conformity of the system is identified, action shall be initiated to determine and correct the cause. **All audit observations shall be evidenced and properly documented**.
- *Quality and compliance become central elements of the performance of MET service providers*.

Implications of Amendment 82 for meteorological service providers

Enhanced inter-service coordination

- **Strengthening coordination with**:
  - **ATS services,**
  - **AIM Services**,
- **Increased consistency between MET information, NOTAMs and AIM products.**
- **Improved operational decision-making by users**.

A3 Chap. 3 STD 3.3.1 A Contracting State, having accepted the responsibility for providing air traffic services within a flight information region (FIR) or a control area (CTA), shall establish, in accordance with regional air navigation agreement, one or more MWOs, or arrange for another Contracting State to do so.

A3 Chap. 3 - 3.3.4 Recommandation.— *An MWO should coordinate the content of SIGMET and the provision of harmonized SIGMET information with neighbouring MWO(s), especially when the en-route weather phenomenon extends or is expected to extend beyond the MWO's specified area of responsibility.*

A3 Chap. 4 STD 4.2 Agreement between meteorological service provider and appropriate air traffic services authority

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Implications of Amendment 82 for meteorological service providers

Increased Skill Requirements

- Amendment 82 implies:
  - ◊ **Training of staff on PANS-MET;**
  - ◊ **Development of skills in digital data management;**
  - ◊ **Capacity building in quality assurance and regulatory compliance**.
- **A3 Chap. 2 STD** The meteorological authority shall ensure that the **designated meteorological service provider complies with the requirements** of the World Meteorological Organization (WMO) in respect of qualifications, competencies, education and training of meteorological personnel providing service for international air navigation.
- *Note.— Requirements concerning the qualifications, competencies, education and training of meteorological personnel in aeronautical meteorology are given in the* Technical Regulations *(WMO-No. 49), Volume I* – General Meteorological Standards and Recommended Practices*, Part V.*

- **A3 Chap. 2 STD 2.2.9** The meteorological information supplied to the users listed in 2.1.2 **shall be consistent with Human Factors principles** and shall be in forms which require a minimum of interpretation by these users, as specified in the following chapters.
- ***Note.—*** *Guidance material on the application of Human Factors principles can be found in the* Human Factors Training Manual *(Doc 9683).*
- ***The human factor is key factor to the successful implementation.***

Implications of Amendment 82 for meteorological service providers

Interaction with State oversight actvities

- Alignment of operational practices with national regulations;
- Contributing to better results in USOAP audits;
- MET service providers play a key role in demonstrating state compliance.

Implications of Amendment 82 for meteorological service providers

In summary

- **Key implications for MET service providers include::**
  - **Alignment with the PANS-MET adopted by the State;**
  - **Provision of MET information rather than "product-focused" services;**
  - **Digital Transition (IWXXM);**
  - **Enhanced weather information quality management;**
  - **Training and qualification of MET staff.**

Implications of the AMD 82

In Summary, Implications for States and MET Service Providers include:

- Revision of national regulations;
- Updating operational procedures;
- Adaptation of data exchange systems;
- Strengthening the skills of staff;
- Integration into Quality Management Systems (QMS);
- Enhancement of interaction/collaboration.

Thank You!

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