



(Virtual, 23 to 25 May 2022)

**Agenda Item 2: Review of planning and implementation of the exchange of OPMET information in IWXXM format and preparation for SWIM**

**IWXXM Implementation Project in the SAM Region**

(Presented by the Secretariat)

|   |   |
|---|---|
| <b>SUMMARY</b>  |   |
| <b>This information paper presents the Project for the implementation of OPMET Message Exchange in IWXXM format and its current status under consideration by the GREPECAS Programme and Project Review Committee.</b>  |   |
| <b>References:</b>  |   |
| <ul style="list-style-type: none"> <li>• Report of the First MET Coordination Meeting</li> <li>• Report of the Fourth Virtual Meeting of the GREPECAS Programme and Project Review Committee (GREPECAS PPRC)</li> </ul> |   |
| <b>ICAO strategic objectives:</b>   | <i>A - Safety</i><br><i>B - Air navigation capacity and efficiency</i><br><i>E - Environmental protection</i> |

**1. Introduction**

1.1 The first MET Coordination Meeting recommended the preparation of a regional implementation project for the ICAO meteorological information exchange model (IWXXM).

1.2 The development of the project had been entrusted to the State of Peru for its submission to the PPRC Meeting, through the Secretariat.

**2. Discussion**

2.1 The Coordinator of the IWXXM implementation project, on behalf of the State, prepared the aforementioned project, shown in Appendix A.

2.2 The Fourth Virtual Meeting of the PPRC (ePPRC/4) reviewed the project submitted by the SAM Region. After reviewing the project contents, the meeting noted that the projects formulated by the SAM Region would have implications for the implementation in the CAR Region and proposed the following draft conclusion:

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|--|---|
| <b>DRAFT CONCLUSION</b>  |   |
| <b>ePPRC/4-3</b>   | <b>REVIEW OF MET PROJECTS IN ORDER TO CONSIDER EXTENDING THEIR SCOPE TO THE CAR REGION</b>                                  |
| <b>That:</b><br>CAR States, in coordination with the NACC Regional Office, review the scope of the projects formulated by the SAM Region in order to | <b>Expected impact:</b><br><input type="checkbox"/> Political / Global<br><input checked="" type="checkbox"/> Interregional |

|  |   |
|--|---|
| <p>consider possible improvements, the extension of their scope to the CAR Region and possible contributing experts:</p> <ul style="list-style-type: none"> <li>- SIGMET Coordination Project between MWOs serving adjacent FIRs;</li> <li>- Regional implementation of the ICAO meteorological information exchange model (IWXXM)</li> </ul> <p>and upon completion of the analysis by May 2022 at the latest, the projects be submitted to GREPECAS for approval through the fast-track procedure.</p> | <p><input type="checkbox"/> Economic<br/> <input type="checkbox"/> Environmental<br/> <input checked="" type="checkbox"/> Technical/Operational</p> |
| <p><b>Why:</b></p> <ul style="list-style-type: none"> <li>a) It is felt necessary to analyse the feasibility of extending the scope of both projects.</li> <li>b) The issuance of continuous and homogeneous SIGMET messages when an occurrence affects more than one FIR means that reliable and quality-assured information is provided in support of safety.</li> <li>c) The implementation of OPMET message exchange in IWXXM format is an enabler for SWIM.</li> </ul>                              |   |
| <p><b>When:</b></p> <ul style="list-style-type: none"> <li>a) Complete analysis by May 2022 at the latest;</li> <li>b) Both projects are to be completed by December 2025 at the latest.</li> </ul>  | <p><b>Status:</b> <input checked="" type="checkbox"/> Valid / <input type="checkbox"/> Invalid / <input type="checkbox"/> Finalised</p>             |
| <p><b>Who:</b> <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO <input checked="" type="checkbox"/> Others:</p>   | <p>Users/industry</p>   |

3. **Conclusion**

3.1 The draft project for the implementation of the OPMET Message Exchange in WXXM format was welcomed by the ePPRC/4. However, its approval is awaiting the analysis of its applicability to the CAR Region and hence of the need to extend its scope.

3.2 The CAR Region should complete its review by May, and then it would be submitted to GREPECAS for approval through the fast-track procedure.

## APPENDIX A

## MET Project

|                            |   |                            |           |
|----------------------------|---|----------------------------|-----------|
| <b>Name of the Project</b> | Regional implementation of the ICAO Meteorological Information Exchange Model (IWXXM) |                            |           |
| <b>Date:</b>               | xx/xx/2022  | <b>Emisión:</b> xx/xx/xxxx | Versión 1 |
| <b>Author:</b>             | SAM Regional Office   |                            |           |
| <b>Promoter:</b>           | GREPECAS  |                            |           |
| <b>Representative:</b>     | Armoa, Jorge  |                            |           |
| <b>Client:</b>             | States of the CAR/SAM Region  |                            |           |
| <b>ID Document:</b>        | xxx   |                            |           |
| <b>Link:</b>               | xxx   |                            |           |

Note: This document is valid only on the date it is printed.

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## **1. Executive Summary**

Amendment 78 to ICAO Annex 3 establishes the mandatory use of the IWXXM meteorological information exchange model for the transmission and reception of meteorological data related to the following products: meteorological observations and reports (METAR and SPECI) including trend forecast (TREND), aerodrome forecasts (TAF), SIGMET and AIRMET information and advisory information on volcanic ash, tropical cyclones and space weather, in order to adapt the capabilities of the meteorological service to integrate an interoperable environment in the context of the future System-Wide Information Management (SWIM). Likewise, it is provided that the production of OPMET messages be developed in parallel in TAC format and IWXXM XML/GML format.

The States of the CAR/SAM Region have begun the process of adapting their aeronautical meteorology systems towards solutions compatible with IWXXM, by virtue of the commitments made. The current ongoing process is supported by publications and procedures developed by the Meteorological Experts Panel (METP) Working Group on Meteorological Information Exchange (WG-MIE), established with the purpose of providing assistance to the ICAO Member States in the implementation phase of version 3.0 of the IWXXM.

On the other hand, the SAM Region Implementation Group established the Interoperability Task Force (GT-INTEROP), with the aim of providing guidance to the States of the Region regarding the interconnection processes of the implemented aeronautical systems, in order to ensure interoperability between the systems used by air navigation services. The MET/IWXXM sub-group, which is part of GT-INTEROP, deals with the specific issues of exchanging OPMET messages in IWXXM digital format for the Region.

This document has the purpose of establishing a coordinated, harmonized and effective implementation methodology for the Region, considering the purposes of the global provisions.

## **2. Problem Statement**

The rate of progress in the implementation of the IWXXM in the Region presents differences between the States that will affect the future regional and interregional exchange of OPMET data.

## **3. Objective of the project**

Based on the available material and procedures, establish a regional methodology that defines coordinated, harmonized and effective actions to consolidate the regional implementation of the ICAO meteorological information exchange model (IWXXM).

## **4. Guidance documents**

The guidance material available to guide implementation includes the following documents:

- Guidelines for the implementation of OPMET data exchange using IWXXM, Fourth edition, November 2020.
- ICAO Meteorological Information Exchange Model Manual, ICAO DOC 10003 Second Edition, 2019.
- System-Wide Information Management (SWIM) Concept Manual, Interim Advanced Edition, DOC 10039, 2015.
- Description of the external interfaces (SICD) for the OPMET Bank, CISCEA-ATECH.

## 5. Estimated term

It is estimated that IWXXM implementation will be consolidated in the CAR/SAM Region during the last quarter of 2025, based on the ATM plan described in the Global Air Traffic Management Operational Concept document (DOC 9854).

## 6. Implementation Perspective

The implementation of the IWXXM implies changes in the functionality of data processing with the purpose of reducing the size of the products, facilitating the regular and efficient flow of data and enabling its digital use. *Table 1* presents the overview of the evolution of the processes, included in the period 2022-2025.

| Process                 | Current scenario 2022   | New scenario 2025   |
|-------------------------|---|---|
| <b>Data production</b>  | <ul style="list-style-type: none"> <li>• Production of data in TAC format.</li> <li>• From November 2020, data production must also use the IWXXM format.</li> <li>• Not all States have acquired the capacity to produce data in IWXXM format.</li> <li>• Use of AFTN and AMHS interface.</li> </ul> | <ul style="list-style-type: none"> <li>• Parallel production of data in TAC and IWXXM format from the original source.</li> <li>• Use of the AMHS interface including FTBP.</li> <li>• Introduction of defined metadata.</li> <li>• Projection to stop producing data in TAC format.</li> </ul>                       |
| <b>Data aggregation</b> | <ul style="list-style-type: none"> <li>• Limited validation and compilation of the same type data in newsletters.</li> </ul>  | <ul style="list-style-type: none"> <li>• Introduction of defined metadata.</li> <li>• Regular meteorological messages (METAR, TAF) are aggregated, compressed and packaged using the WMO Feature Collection (COLLECT) model.</li> <li>• Generation of independent bulletins for each format (TAC / IWXXM).</li> </ul> |
| <b>Data switching</b>   | <ul style="list-style-type: none"> <li>• Data routing according to the bulletin's WMO abbreviated heading structure.</li> </ul>   | <ul style="list-style-type: none"> <li>• Forwarding of compressed files using an AMHS interface with FTBP.</li> <li>• The WMO short header structure is part of the FTBP file name as a data identifier.</li> <li>• The filename extension will use the suffix gzip (.gz) for identification.</li> </ul>              |

**Table 1**

The OPMET data management centers also need to adapt their processes and capacities to the needs of using the IWXXM for the exchange of meteorological information. *Table 2* presents the expected changes in a scenario close to the year 2025.

| OPMET Center                         | Current scenario 2022   | New scenario 2025   |
|--------------------------------------|---|---|
| <b>National OPMET Center (NOC)</b>   | <ul style="list-style-type: none"> <li>• Collection and validation of messages required at the international level generated by originating agencies.</li> <li>• Compilation of national data in bulletins.</li> <li>• International distribution according to the regional distribution scheme.</li> <li>• Provision of data to national users.</li> </ul>   | <ul style="list-style-type: none"> <li>• Translation of national messages from TAC format to IWXXM.</li> <li>• Individual aggregation of IWXXM messages in bulletins.</li> <li>• Data compression and transfer to the responsible ROC</li> </ul>  |
| <b>Regional OPMET Center (ROC)</b>   | <ul style="list-style-type: none"> <li>• Collection of OPMET data generated by the NOCs in their area of responsibility.</li> <li>• Validation of all the data required in its responsibility area, in accordance with the regional distribution scheme.</li> <li>• Dissemination of data from its area of responsibility, required by other ROCs.</li> <li>• Provision of data from your responsibility area, required by the NOCs.</li> </ul> | <ul style="list-style-type: none"> <li>• Recolección de datos OPMET de los NOC de su área de responsabilidad, en formato IWXXM.</li> <li>• Difusión de datos de su área de responsabilidad a otros ROC, en formato IWXXM.</li> <li>• Suministro de datos requeridos por los NOC de su área de responsabilidad, en formato IWXXM.</li> <li>• Collection of OPMET data from NOCs in its area of responsibility, in IWXXM format.</li> <li>• Dissemination of data from your area of responsibility to other ROCs, in IWXXM format.</li> <li>• Provision of data required by the NOCs in their area of responsibility, in IWXXM format.</li> </ul> |
| <b>International OPMET Data Bank</b> | <ul style="list-style-type: none"> <li>• Offers data interrogation/response capacity in TAC and IWXXM format through the AFTN and AMHS network.</li> <li>• Offers the ability to query/response OPMET data in IWXXM format, through web services using the Internet.</li> </ul>   | <ul style="list-style-type: none"> <li>• It is projected that the interrogation and access methods will be expanded, according to the needs that arise in the implementation process.</li> </ul>  |

**Table 2**

## 7. Actions for implementation

Actions based on the participation of States, international organizations and interested parties are proposed. The collaborative approach is the critical factor of this initiative. The actions proposed are the following:

### 7.1 Establishment of support groups

The SAM Region Implementation Group (SAM/IG) has established the Region's Interoperability Task Force (GT-INTEROP), to support and promote air navigation services modernization projects and guarantee interoperability between automated systems used by AIM, ATM, ATFM, CNS, MET and SAR users. Likewise, the MET/IWXXM subgroup has been activated to comply with the specific issues of adapting the aeronautical meteorology system to the new IWXXM digital format.

In order to ensure that the implementation process meets the projected deadline, a collaborative approach is proposed that generates synergy based on the effort and participation of each State.

It is proposed to form groups of 3-4 countries, according to criteria to be determined, to develop coordinated and harmonized implementation actions. Each group will regularly coordinate its progress with the other groups, in order to harmonize implementation and make collaborative decisions.

| <b>Actions</b>  | <b>Completion period</b>   |
|---|----------------------------|
| 1. Convening letter to the States                     | 1 week from approval       |
| 2. Meeting and establishment of groups                | 2 weeks from completion 1) |
| 3. Presentation of the action plan for implementation | 3 weeks from completion 2) |
| 4. Progress report until the end of the plan          | Every 4 months             |

## 7.2 Regional documents / guidance material to support implementation

The group of experts on meteorology (MET Panel-METP) has established the Working Group on Meteorological Information Exchange (WG-MIE) to assist ICAO Member States in IWXXM implementation actions. As a result, manuals and support guides have been disseminated that are being used as a reference worldwide.

It is necessary to adapt the available material to the structure of the regional system and the needs of the CAR/SAM States. Therefore, the development, publication and updating of documents related to the following matters should be promoted:

- Regional version of the document *Guidelines for the implementation of the exchange of meteorological information in IWXXM format*.
- Framework for exchange and conformance testing, at the regional and intra-regional level.
- Integration of OPMET messages with aeronautical information service messages.
- Agreements to establish data translation centers.

This initiative suggests establishing a team of experts in charge of the development of guide material oriented to the Region.

| <b>Actions</b>                               | <b>Completion period</b>   |
|--|----------------------------|
| 1. Convening letter to the States            | 1 week from approval       |
| 2. Establish guide material development team | 2 weeks from completion 1) |
| 3. Presentation of work plan                 | 3 weeks from completion 2) |
| 4. Progress report until the end of the plan | 1 month from the end 3)    |
| 5. Publication and dissemination             | To be determined           |

## 7.3 Organization of interregional cooperation seminar

The IWXXM implementation process is of general interest to ICAO Member States, since it materializes the first transition step towards an interoperable environment that will benefit the global aviation community. It is proposed to request the cooperation of international organizations for the transmission of knowledge and experience according to the progress of implementation in their regions.

| Actions  | Completion date             |
|--|-----------------------------|
| Request for cooperation to designated organization | 1 week from approval        |
| Organization and invitation to virtual seminar     | 2 weeks from response of 1) |
| Development of virtual seminar                     | 2 weeks from completion 2)  |
| Presentation of conclusions and recommendations    | 2 weeks from completion 3)  |

#### 7.4 Application of exchange and conformance tests

The regional and intra-regional meteorological information exchange tests in IWXXM format require a methodology that defines the test platform and the logistical support to be used by the regional system. Each State must form the appropriate team responsible for developing the data exchange tests, applying the agreed meteorology and maintaining the statistical record.

| Actions  | Completion date            |
|--|----------------------------|
| 1. Request formation of national team            | 1 week from approval       |
| 2. Establish and disseminate common methodology  | 3 weeks from completion 1) |
| 3. Development of exchange and conformance tests | 2 weeks from completion 2) |
| 4. Conclusions and recommendations               | 1 week from completion 3)  |
| 5. Reschedule tests according to 4)              | 2 weeks from completion 4) |
| 6. Test control report                           | Monthly                    |

#### 7.5 Application of regional guidelines for implementation

Each State is responsible for implementing the IWXXM format for the exchange of OPMET information in their national systems. The regional version of the document *Guidelines for the implementation of the exchange of meteorological information in IWXXM format* must be implemented by all the States of the Region to ensure coordinated and harmonized actions.

| Actions   | Completion date            |
|---|----------------------------|
| 1. Consultation with States on the status of implementation | 1 week from approval       |
| 2. Request an action plan to comply with the guidelines     | 1 month from completion 2) |
| 3. Follow-up control report until completion                | every 2 months             |
| 4. Report of continuous improvement actions                 | every 6 months             |

### 8. Expected Benefits

The expected benefits of the implementation are:

- Implementation of the standards for the exchange of meteorological information.
- Integration of the meteorological service to an interoperable environment, according to the SWIM concept.
- Supply of integral and transparent meteorological information to the ATM.
- More effective support for collaborative decision making (CDM).
- Timely information for flow management and airspace capacity.

- Availability of increasingly accurate forecasts.
- Availability of timely information for processing in graphic format, with superimposition on other variables in a georeferenced environment.

### 9. Budget / Costs

Foreseen costs related to the following needs are:

- Adaptation of AMHS terminals to infrastructure compatible with the IWXXM format.
- Implementation of AMHS interconnections to facilitate the exchange of OPMET messages in IWXXM format.
- Education and training of human resources.
- Requirement of specialized personnel in the short term.

The implementation of IWXXM requires an initial investment, however it allows the future integration of information originated by other aeronautical services that need to be part of the SWIM digital environment, reflecting a consequent cost reduction.

### 10. Main risks

- Short-term costs. States must take into account in their budget the initial costs involved in the implementation of the IWXXM, as well as the medium and long-term benefits to the aviation system.
- Context of uncertainty. The COVID 19 pandemic maintains a state of uncertainty that affects project planning.
- Shortage of available specialists and experts. The administrations may have limited availability of appropriate human resources to provide support for the implementation.
- Failure to comply with agreed deadlines. The implementation of the IWXXM is behind schedule in the Region, which does not allow sufficient flexibility in terms.

### 11. Possible downside

Weak link between the operating systems and the organic units that managing them.

### 12. Project Deliverable

The following records are expected:

- Progress control of the IWXXM implementation in the CAR/SAM Region.
- Result of meteorological information exchange tests in IWXXM format.

Regional reference documents and advice for the implementation of the IWXXM.

— END —