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WORKING PAPER

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Mexico City, Mexico, 30 September to 04 October 2024

Agenda Item 4: Follow-up to the NACC/WG 2023-2024 work plan

INTEROPERABILITY TESTS FOR THE EXCHANGE OF OPMET DATA OVER AMHS ACCORDING TO THE IWXXM MODEL

(Presented by the COMM/TF Rapporteur)

EXECUTIVE SUMMARY

This working note presents a summary of tests carried out by Cuba, jointly with other States/Organizations, to demonstrate the interoperability of the systems of all parties in the exchange of operational meteorological information (OPMET) data under the ICAO Weather Information Exchange Model (IWXXM) on Aeronautical message handling system (AMHS).

Action:	Suggested actions are presented in Section 4.
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency • Economic Development of Air Transport • Environmental Protection
References:	• Thirty first MEVA Technical Management Group Meeting (MEVA/TMG/31), Kingston, Jamaica, 24 to 26 May 2016 • Second Meeting of Rapporteurs of the North American, Central American and Caribbean Working Group (NACC/WG/RAP/02)

1. Introduction

1.1 In 2016, during the Thirty-first MEVA Technical Management Group Meeting (MEVA/TMG/31), the first activities for the exchange of XML-encoded meteorological information on AMHS were recommended. The objectives set were:

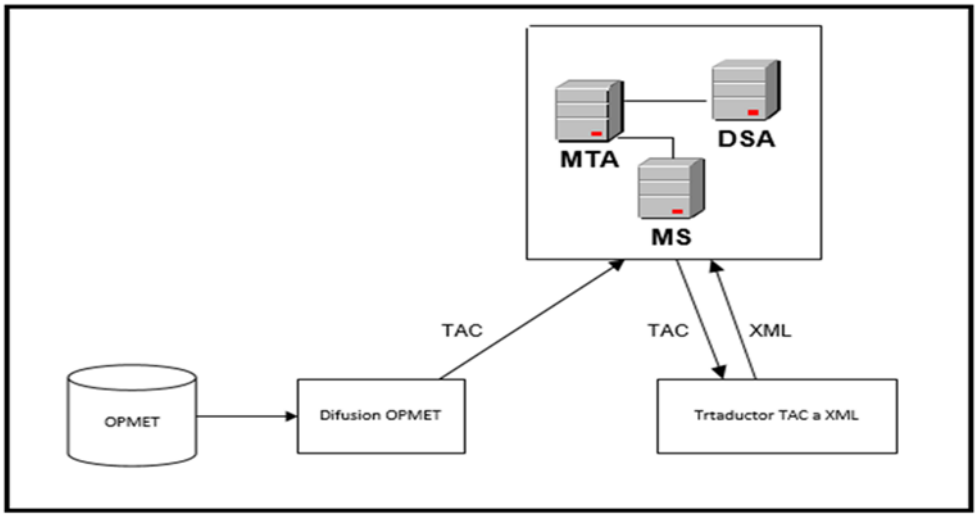
a) Testing the exchange of data using the File Transfer Body Part (FTBP) of AMHS messages, as it is the support for the encoded information to be disseminated;
b) the approximate estimation of the bandwidth required by this traffic;
c) the encoding and validation of OPMET information according to the ICAO Weather Information Exchange Model (IWXXM).

1.2 The operational implementation of OPMET data dissemination according to the IWXXM model on AMHS must be preceded by tests that allow verification of the systems and networks involved in such dissemination. The tests that have been carried out by Cuba for this purpose were presented during the NACC/WG/RAP/02 meeting.

2. Discussion

2.1 The Cuban OPMET Data Bank, as the National OPMET Center (NOC), is responsible for the reception and validation of all internationally required OPMET messages, which are generated by all national originators, to create the bulletins that will then be disseminated according to the regional distribution scheme.

2.2 To comply with AMD 78 of ICAO Annex 3, which indicates that as of 5 November 2020, each State must disseminate its OPMET information using both the Traditional Alphanumeric Codes (TAC) format and the format defined by IWXXM, Cuba implemented the OPMET TAC to OPMET IWXXM data translator, whose source of information is the existing TAC data dissemination.



2.3 The OPMET TAC to OPMET IWXXM data translator is an application responsible for generating XML files from the data bulletins in TAC format that are disseminated by the OPMET database. Once it receives the TAC data to be encoded, it generates the corresponding XML file, compresses it, and then inserts it into the FTBP of the AMHS message that will take them to their destinations, through the Aeronautical Fixed Service (AFS). From the communications point of view, it is nothing more than a User Agent (UA) that makes use of functional groups (FG) belonging to the AMHS extended service level, necessary to manage the information contained in the FTBP.

2.4 The implementation process of the dissemination of OPMET data according to the IWXXM model must be preceded by tests defined and agreed upon by the participating parties. These procedures, in the case of the tests in which Cuba took part, were based on and guided by the following documents:

- EUR Doc 020: EUR AMHS Manual v14.0, EUR AMHS Interoperability Test Guidelines for COM Centres with FTBP relay capabilities.
- EUR Doc 020: EUR AMHS Manual v14.0, EUR AMHS Pre-Operational Test Guidelines for COM Centres with FTBP relay capabilities.
- EUR AMHS Manual v14.0, Appendix H– Application/Service-oriented AMHS Profiles.
- ICAO Guidelines for the Implementation of OPMET Data Exchange Using IWXXM; Fourth Edition, Nov, 2020.

2.5 The testing procedures were grouped into phases, defined by their objectives:

Phase	Objectives to comply
I	Demonstrate the ability of AMHS centres to successfully exchange messages containing a File Transfer Body Part (FTBP).
II	Demonstrate the ability to generate compressed XML files from OPMET TAC messages, which will be sent using the AMHS message FTBP under the profile for the exchange of meteorological data encoded according to the IWXXM model.
III	Demonstrate the validity and correct conformation, according to the IWXXM 3.0.0 model, of the generated XML files.

2.6 For the tests, Cuba uses the environment shown in Fig. 1, consisting of:

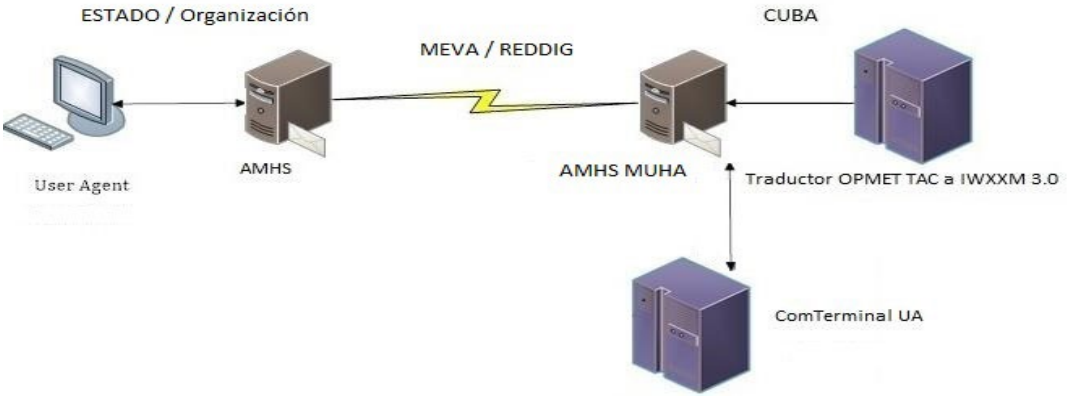


Fig.1 Test environment for OPMET data exchange according to IWXXM.

a) AMHS MUHA Message Center.
b) ComTerminal User Agent (UA): Application for testing purposes, used to generate AMHS messages as indicated in the scenarios of the procedures to follow. It can generate AMHS messages with basic service levels, as well as AMHS messages that make use of the FTBP functional block of the extended service level. It could generate, if necessary, huge message queues during stress load testing procedures. (Phase I and III).
c) TAC to IWXXM Translator: UA that upon receiving an OPMET TAC message (METAR, SPECI, TAF, SIGMET) generates the corresponding XML file, according to the IWXXM 3.0.0 model, and

compresses it. It places the resulting .gz file in the file transfer body part (FTBP) of an AMHS message and sends it through its message center. (Phase II and III).

2.7 The types of OPMET data exchanged during the tests were:

Data type	Designator	Example
METAR	LA	A_LACU31MUHA031900_C_MUHA_20221003190036.xml.gz
SPECI	LP	A_LPCU31MUHA031253_C_MUHA_20221003125406.xml.gz
TAF (VT >= 12 hours)	LT	A_LTCU31MUHA031100_C_MUHA_20221003110106.xml.gz
SIGMET WS	LS	A_LSCU31MUHA191920_C_MUHA_20220919192426.xml.gz

2.8 To date, interoperability tests have been carried out with:

State / Organization	Carried-out Phases	Observations
FAA	I, II *, III	Successfully concluded.
RODB Brasilia	I, III	Successfully concluded.
COCESNA	I	Successfully concluded.

(*Including load stress procedures)

2.9 Considering the use of the AMHS extended service level to support the dissemination of OPMET data according to the IWXXM model, during the load stress procedures (*), with the support of the MEVA III network provider, the monitoring of the link channel for tests between Cuba and the USA was carried out, in anticipation of a greater demand for bandwidth.

3. Conclusions

3.1 Interoperability tests are crucial during the implementation process of the operational dissemination of OPMET IWXXM data over AMHS since it is the ideal and opportune environment to:

- Check the capacity of the AMHS centres involved to handle FTBP, as defined in the AMHS extended service level.
- Identify errors in the validity and conformity of the XML exchanged with the IWXXM model.

4. Suggested actions

4.1 The meeting is kindly invited to:

a) review the information presented in this Working Paper;

b) plan and promote these interoperability tests in the States of the region, taking into account that it is possible to carry them out in phases, depending on the conditions for carrying out each of them;

c) contribute with the results obtained in each test carried out to the development of other regional projects.

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