



International Civil Aviation Organization

**FOURTEENTH MEETING OF THE ASIA/PACIFIC
METEOROLOGICAL INFORMATION EXCHANGE WORKING GROUP
(MET/IE WG/14)**

Bangkok, Thailand, 7 – 9 March 2016

Agenda Item 4: Planning and Implementation of digital exchange of meteorological information

UPDATE ON THE ICAO METP WG-MIE

(Presented by Australia)

SUMMARY

This paper presents a summary of the status of matters being considered by ICAO METP WG-MIE.

1. INTRODUCTION

1.1 The Meteorology Panel (METP) was established by the 197th meeting of Air Navigation Commission (ANC 197-5) to define and elaborate concepts and to develop ICAO provisions for aeronautical meteorological (MET) services consistent with operational improvements envisioned by the Global Air Navigation Plan (Doc 9750) and in keeping with the working arrangements between ICAO and the World Meteorological Organization (WMO) (Doc 7475).

1.2 The METP subsequently established several working groups including a Working Group on Meteorological Information Exchange (WG-MIE) to assist with the work programme of the panel. The objective of the METP WG-MIE is to work collaboratively to ensure the smooth transition to the provision and exchange of MET information in digital format (IWXXM) and into the System Wide Information Management System (SWIM) environment. The METP also tasked WG-MIE with undertaking two job cards.

1.2 This paper describes progress on these two jobs cards.

2. DISCUSSION

Job Cards

2.1 Job Card METP.004.01 was developed to address the recommendations from the ICAO Meteorology Divisional Meeting 2014 (MET/14), specifically in regard to Recommendation 2/2, 3/2 and 3/3. Job Card METP.004.01 relates to the inclusion of aeronautical information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology.

2.2 Job Card CP.008.01 was developed to address the recommendations from the ICAO Meteorology Divisional Meeting 2014 (MET/14), specifically in regard to Recommendation 2/3c). Job Card CP.008.01 relates to the testing of the ATS message handling system (AMHS) in relation to the exchange of digital aeronautical meteorological information (IWXXM and WAFS). Most of the work associated with CP.008.01 will be undertaken by the Communications Panel (CP), with support for METP WG-MIE.

2.3 For full details on the aforementioned Job Cards, refer to Attachment A.

ICAO MET/P WG-MIE MEETINGS

2.4 METP WG-MIE consists of 15 expert members with support from 27 advisors and the ICAO Secretariat. To date, the members of WG-MIE have met eight times via WebEx and had one face-to-face meeting. The first face-to-face meeting was held in Montreal, Canada 16-20 November 2015. A second face-to-face meeting is scheduled for 23-27 in Paris, France.

2.5 During the first face-to-face meeting a conjoint meeting with the ICAO Information Management Panel (IMP) was held where a number of issue of mutual interest were discussed.

3. Job Card METP.004.01 (Met into SWIM)

Initial Focus

3.1 As per the Job Card, the group has initially focused on the implementation of IWXXM, however the group is also conscious of how this implementation will fit into SWIM.

3.2 Given Amendment 77 to ICAO Annex 3 – *Meteorological Service to International Air Navigation*, applicable in 2016, has the inclusion of the exchange of digital meteorological information for METAR, SPECI, TAF, SIGMET, AIRMET, Volcanic Ash Advisories (VAA) and Tropical Cyclone Advisories (TCA) as a recommendation, the meeting agreed that the scope of their initial work should focus on enabling the exchange of the aforementioned 7 products via IWXXM.

Relationship of IWXXM to SWIM

3.3 The group agreed that IWXXM and SWIM are complimentary and both are intended to support automated systems. Both IWXXM and SWIM are in their infancy. The relatively clear scope and immediate requirement for IWXXM will result in IWXXM developing in the near time frame, whereas the all-encompassing SWIM is far more complex and less well defined and will develop over many years. It was understood that the current development of IWXXM is a first step and will evolve significantly as SWIM develops.

3.4 The meeting agreed that a plan for MET into SWIM is needed in the near term. The plan should endeavor to identify methods to assist with expedited implementation of IWXXM and retirement of traditional alpha-numeric codes (TAC). The plan should also address; the time frame for XML schemas for the remaining TAC products; the essential freezing of any further TAC development (beyond bona fide exceptional cases); the retirement of TAC; and proposals related to the standardization of the visualization of XML.

3.5 The METP WG-MIE, in consultation with the ICAO Information Management Panel (IMP) and the Secretariat of ICAO Communications Panel (CP), agreed that Aeronautical Information Exchange Model (AIXM), Flight Information Exchange Model (FIXM) and IWXXM need to be

aligned as much as possible. This alignment should include techniques used within schemas and technology stacks utilized. If the technology stacks adopted are different, then costs will likely be much greater for all users so such decisions should not be made in isolation.

3.6 Whilst the need for alignment is agreed, the development of these standards is not aligned. Moreover, although IWXXM has very clear meteorological requirements and timeframes, AIXM and FIXM have less defined requirements and more relaxed schedules. As a result, the groups working on the development of IWXXM (the World Meteorological Organizations (WMO) Task Team on Aviation XML (TT-AvXML) and MET/P WG-MIE) are faced with making design decisions on the technical aspects (e.g. security, compression, use of test messages, etc) of IWXXM that could have an impact on AIXM and FIXM. Furthermore, the lack of detail in the original IWXXM concepts and limited advice from the IMP is causing delays to the IWXXM development and implementation.

Use of extensions within IWXXM

3.7 XML stands for eXtensible Markup Language and the METP WG-MIE group discussed whether IWXXM should utilise the extensible feature of XML (to allow States to include additional information) or lock down the schema to only a prescriptive set of Annex 3 parameters. If extensions were to be allowed, it was agreed that governance will be essential, given the world-wide cost to support this. Following submissions by multiple States about the safety implications of not allowing the international exchange of data beyond that defined in ICAO Annex 3 TAC code it was agreed that IWXXM should support the inclusion of extensions.

3.8 The meeting agreed that both ICAO Annex 3 optional parameters and State-specific extensions (Remark fields) should be allowed in IWXXM and these could be defined in the WMO Codes Handbook (rather than Annex 3). Whilst it was initially hoped that these extensions could be defined within IWXXM 2.0, it soon became apparent this would not be achievable.

3.9 The extensions should consider, in part, the current additional State-specified content (i.e. the Remarks section) appended to TAC. A review of such existing practices is a task of the METP WG-MIE.

Provision of TAC & IWXXM Messages:

3.10 The group discussed the continued provision of TAC and agreed that TAC would continue to be disseminated beyond 2018, but users should be encouraged to transition to IWXXM. New services would only be available in IWXXM and changes to TAC would only be applied in extraordinary situations.

3.11 The group also discussed the conversion of IWXXM and TAC. The meeting agreed to discourage users from converting IWXXM to TAC as there are many complications in doing so. If users require TAC, they should source/use the original TAC messages. If users convert IWXXM to TAC, they should not disseminate these messages to other users.

3.12 Where possible IWXXM (METAR/SPECI) messages should be generated directly from raw observations, rather than converted from TAC messages.

3.13 The group also discussed how missing observations should be handled in IWXXM (e.g. due to failure of RH sensor). It was agreed that the mandatory content requirements in Annex 3 are understood to be design criteria and intended to apply to system design criteria rather than day to day operations. Moreover, the group agreed if a mandatory field of METAR is temporarily unavailable, the IWXXM should still be generated. The group agreed that TT-AvXML should review how to accommodate missing METAR fields.

3.14 The group agreed that units of measurements and resolution need to be considered. In particular, the impact of converting TAC to IWXXM will have to address lower resolution data. Consideration has been given to use of only SI units within IWXXM and currently this is considered desirable and may be implemented at a later stage. Initially however only units defined within ICAO Annex 3 for each message type would be supported.

3.15 It has been recognized that some States will need assistance in having OPMET traditional alphanumeric code (TAC) translated to IWXXM. To manage this issue, it has been agreed that another State may request its respective ROC or RODB to translate TAC to XML on the States' behalf until the State can provide OPMET data in XML. In such cases the message header CCCC-field should not change to that of the translation centre. It was agreed that details (including which centre performed the translation, date and time) of the translation would be included in IWXXM and the information on which arrangements are in place would be lodged with ICAO.

Updates to ICAO Documentation:

3.16 The group agreed that given the tight implementation schedule and the chance for confusion amongst users, various ICAO documents should be updated as a matter of urgency. In particular this will require revisions to ICAO Doc 10003 (*Manual on the Digital Exchange of Aeronautical Meteorological Information*), ICAO Doc 8896 (*Manual of Aeronautical Meteorology*) and ICAO Doc 10039 (*Manual on System Wide Information Management (SWIM) Concept*) to indicate that States generating METAR, SPECI, TAF, SIGMET, AIRMET and two advisories (VAA and TCA) should do so in IWXXM format.

3.17 There will also be a need to advise IWXXM users that they should also continue to utilise TAC for a period of time, as not all IWXXM data may be received due to formatting errors in TAC.

3.18 The group, in consultation with the IMP, agree that all ICAO documentation should refer to IWXXM (rather than WXXM). There was also a strong desire from some members to name IWXXM products separately to their TAC equivalent to allow for the two products to diverge.

WAFS Related:

3.19 The group reviewed a proposal by WAFC Washington to introduce WAFS SIGWX charts in XML format. The group discussed whether other formats (e.g. BUFR v4) should be considered and determined that XML format was the most appropriate format, given it's aligned with other changes underway. The group was supportive for the introduction of XML formatted SIGWX, however felt that it would be premature to consider when BUFR be withdrawn.

3.20 The group felt it may also be opportunistic to include low-level SIGWX chart features in the SIGWX schema but this requirement should be confirmed by the METP Working Group on Meteorological Requirements and Integration (WG-MRI) prior to implementation.

3.21 The SADIS Provider also offered to provide IWXXM data via Open GIS Consortium Web Feature Service (OGC-WFS). There was much discussion about responsibility for approving this service (METP Working Group on Meteorological Operations Group (WG-MOG), WG-MIE or both). The meeting agreed to support its use as an experimental/trial service but did not agree to it being operational. The SADIS Provider committed to ensuring that users of this new trial service will be advised that this was a trial service and may be retracted at any time.

Governance Issues:

3.22 The group has identified many governance issues. Some were specific to meteorology, whilst others were broadly applicable to SWIM. Examples include responsibilities, cost recovery, right to access/distribute, etc.

3.23 It was agreed that until a long term governance arrangement is established with ICAO, the governance of the IWXXM schemas should remain with the WMO (TT-AvXML).

3.24 Two members of WG-MIE were nominated to work with IMP to monitor progress of governance matters within IMP.

Implementation Issues:

3.25 The group discussed the need for test identifiers within IWXXM to allow for testing over operational links (such as SIGMET tests). The meeting fully endorsed the need for the flags (including modes of testing) and free text fields (ie. title and free text).

3.26 There are a number of other items that are yet to be resolved including:

- How are extensions being handled (in-line with standard information or at the end of XML)?
- Max number of attachments?
- Max size of attachments (including WAFS GRIB forecasts)?
- Compression (i.e. GZIP)?
- Security (Virus check – who/where should checks be conducted)?

3.27 It was agreed that a validation schema for IWXXM was desirable and that the elaboration of full details regarding how, who and by when this could be done should be developed.

3.28 WMO provided details of other factors to consider when implementing IWXXM, including the training needs of different users and significant lead time to implement changes (18 months after ICAO decision to implementation). The latter could be a very significant change and

may result in changes associated with IWXXM taking effect some period (12 months) after a new amendment to Annex 3 become effective.

4. JOB CARD CP.008.01 (AMHS TESTING)

4.1 The group met with the Secretariat of the Communication Panel (CP) to progress the Job Card. WG-MIE have provided the CP with a list of items to be tested and are awaiting feedback.

4.2 It was understood that the main work will probably be undertaken by the Regions. It was agreed that the normal contact with the CP will be through the IMP, however short term issues and questions requiring a more immediate response can be forwarded to CP Secretariat via the MET Secretariat.

4.3 It was understood and agreed that the job card as currently drafted left out some important implementation details. Notwithstanding, the WG-MIE agreed that it was best to try to move on from this job card and address these issue separately.

4.4 It was understood that, other than responding to any specific questions that the CP may wish to ask, the MET/P's work on this task is complete.

5. WG-MIE WORK STREAMS

5.1 In order to progress matters in the most efficient method METP WG-MIE has broken the required tasks into 6 work streams, with each Work Stream having a coordinator to manage and report on progress.

5.2 Details of the work streams can be found in Attachment B.

6. ACTION REQUIRED BY THE MEETING

6.1 The meeting is invited to:

- a) note the information contained in this papers;
- b) consider the work of the METP WG-MIE when developing the MET/IE WG workplan; and
- c) discuss any relevant matters as appropriate.

ATTACHMENT A – ICAO MET/P WG-MIE JOB CARDS

ANWP Job-card

Title	Inclusion of aeronautical meteorological information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology	Reference:	MEPT.004.01						
Source	MET Divisional Meeting 2014 (Recommendations 2/2, 3/2 and 3/3)								
Problem Statement	Aeronautical meteorological information needs to be integrated into the SWIM-enabled environment which introduces unique issues relating to governance and data management.								
Specific Details (including impact statements)	<p>It was recommended by the MET Divisional Meeting (Recommendations 2/2, 3/2 and 3/3) that an appropriate ICAO expert group, in close coordination with WMO, develop provisions to enable the inclusion of aeronautical information in the future system-wide information management (SWIM) environment consistent with the Doc 9750, <i>Global Air Navigation Plan</i>. Further principles were also identified to guide the development of the SWIM concept relating to meteorology as provided in Appendix B of Agenda Item 3 of the Meteorology Divisional Meeting 2014 (Doc 10047). The transition from the Internet-based SADISWIFS system is an integral part of these considerations as are the intermediate steps towards full SWIM by making the Annex 3 products IWXXM-compliant.</p> <p>This will involve the resolution of institutional issues that solely relate to the management and use of aeronautical meteorological information and the necessary links between information supporting other domains in the aviation field and in meteorology supported by the World Meteorological Organization.</p> <p>Further development should take into consideration the main legacy tasks from the meteorological aeronautical requirements and information exchange project team (MARIE-PT), Satellite Distribution System for Information Relating to Air Navigation Operations Group (SADISOPSG) and the World Area Forecast System Operations Group (WAFSOPSG) that relate to information exchange.</p> <p>The full integration of aeronautical meteorological information into the SWIM environment will enable the full benefits to be derived relating to safety and efficiency.</p>								
Expected Benefit									
Reference Documents	<p>ICAO Annex 3 - Meteorological Service for International Air Navigation</p> <p>ICAO Doc 8896 - Manual of Aeronautical Meteorological Practice</p> <p>ICAO Doc 9750 - Global Air Navigation Plan</p> <p>ICAO Doc 10003 - Manual on the Digital Exchange of Aeronautical Meteorological Information</p> <p>ICAO Doc 10045 - Report of the Meteorology Divisional Meeting 2014</p>		Attachments						
Primary Expert Group:	METP								
WPE No.		Description of Amendment proposal or Action	Expected dates:						
	Annex 3	Standards for IWXXM compliant METAR, SPECI, TAF and SIGMET exchange	<table border="1"> <tr> <th>Expert Group</th> <th>Effective</th> <th>Applicability</th> </tr> <tr> <td>Sep 2016</td> <td>Jul 2018</td> <td>Nov 2018</td> </tr> </table>	Expert Group	Effective	Applicability	Sep 2016	Jul 2018	Nov 2018
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Sep 2016	Jul 2018	Nov 2018							
	Annex 3, PANS-MET	Amendment to facilitate the introduction of the meteorological component of SWIM.	<table border="1"> <tr> <th>Expert Group</th> <th>Effective</th> <th>Applicability</th> </tr> <tr> <td>Sep 2016</td> <td>Jul 2018</td> <td>Nov 2018</td> </tr> </table>	Expert Group	Effective	Applicability	Sep 2016	Jul 2018	Nov 2018
Expert Group	Effective	Applicability							
Sep 2016	Jul 2018	Nov 2018							
	Docs 8896, 10003.	Update related guidance material to support the implementation of Annex 3 Amendments.	<table border="1"> <tr> <th>Expert Group</th> <th>Effective</th> <th>Applicability</th> </tr> <tr> <td>Sep 2016</td> <td>Jul 2018</td> <td>Nov 2018</td> </tr> </table>	Expert Group	Effective	Applicability	Sep 2016	Jul 2018	Nov 2018
Expert Group	Effective	Applicability							
Sep 2016	Jul 2018	Nov 2018							
Initial Issue Date:	17 June 2015	Supporting Expert Group	IMP						
		Session/Meeting:	199-9						
			Date approved by ANC: 17 June 2015						

ANWP Job-card

Title	Testing of the ATS message handling system (AMHS) in relation to the exchange of digital aeronautical meteorological information.	Reference:	CP.008.01
Source	MET Divisional Meeting 2014 (Recommendation 2/3 c)		
Problem Statement	The satellite distribution system for information relating to air navigation (SADIS), which is used to disseminate global operational meteorological (OPMET) and world area forecast system (WAFS) information, is expected to be withdrawn before November 2019. Whilst Internet-based facilities are in place for the dissemination of this information there is an urgent need to conduct formal testing of the ATS message handling system (AMHS) to ensure the future global dissemination of this information in an IWXXM compliant format as an initial step towards the future system-wide information management (SWIM) environment.		
Specific Details (including impact statements)	It was recommended by the MET Divisional Meeting (Recommendation 2/3 c) that an appropriate ICAO expert group, undertake, as a matter of urgency, formal testing of the exchange of global OPMET information and WAFS forecasts on the AMHS in an IWXXM compliant format with a view to determining the capability and minimum specifications required to distribute such data to States/users in the future. Priority should be given to testing IWXXM compliant exchange of METAR, SPECI, TAF and SIGMET.		
Expected Benefit	Enable the AMHS for IWXXM compliant meteorological information exchange.		
Reference Documents	ICAO Doc. 10003 - <i>Manual on the Digital Exchange of Aeronautical Meteorological Information</i> ; WMO No. 306, Volume 1.3 – <i>Manual on Codes</i> .		
Primary Expert Group:	CP		
WPE No.	Document affected	Description of Amendment proposal or Action	Supporting Expert Group
(Action)		Assist ICAO in the coordination of the arrangements between the States/Provider States, international organizations and other stakeholders in order to complete exchange tests as required for the IWXXM compliant exchange of METAR, SPECI, TAF and SIGMET.	METP
(Action)		Assist ICAO in the coordination of the arrangements between the States/Provider States, international organizations and other stakeholders in order to complete exchange tests as required for all IWXXM compliant exchange of OPMET.	METP
Initial Issue Date: 17 June 2015	Date approved by ANC: 17 June 2015	Session/Meeting: 199-9	Expected dates: Expert Group: Jan 2016 Effective: Ongoing Applicability: Ongoing

ATTACHMENT B – MET/P WG-MIE WORK STREAMS AND STATUS

The METP WG-MIE agreed to form six work streams to manage the ongoing work.

Work Stream 1 related to extensions (“Extensions” work stream).

A work stream to undertake and coordinate progress on the following matters:

- 1.1 to consult with users and the WG-MRI to identify and document optional parameters included in the current 7 TAC products for the WG-MIE group members to consider and, where agreed, develop a consolidated list of required optional (as opposed to extensions) of TAC for IWXXM;
- 1.2 assemble a list of currently used TAC additional parameters mainly through consultations with the extended METP group contacts;
- 1.3 investigate the most appropriate way to manage additional information and extensions and to propose a method to limit the use of these parameters and extensions to ensure they do not have a negative impact on the overall system or impose any onerous cost; and
- 1.4 develop a document discussing the pro’s and con’s of how extensions (inline versus end) are treated in IWXXM.

Work Stream 2 on Annex 3 and associated documents (“Annex 3” work stream)

A work stream to propose an:

- 2.1 amendment to Annex 3 to clearly separate TAC and IWXXM. These are different things and any possible ambiguity suggesting that IWXXM is a TAC dissemination mechanism should be removed. Target date is for Amendment 78;
- 2.2 revision of the Job Card: MEPT.004.01 as follows:
 - i. Delete one of the first two lines;
 - ii. PANS-MET timeframe is not achievable and will need to be modified (probable 2 year delay);
- 2.3 updates to Docs 8896 and 10003 in support of the 7 products and IWXXM (to replace WXXM);
- 2.4 minor revision to the Annex 3 SIGMET table to allow UIR or FIR for review by the MIE and the METP;
- 2.5 additional chapter in Annex 3 on data and when/how extensions be used in IWXXM ; and
- 2.6 updates to Doc 10003 to provide guidance on the use of optional and extensions and ensure these do not conflict with ICAO requirements.

Work Stream 3 on the MET SWIM plan (“SWIM Plan” work stream)

A work stream to sketch out the future MET for SWIM and develop a MET-SWIM plan with the goals of:

- 3.1 presenting a mature plan to the METP at its October 2016 meeting; and
- 3.2 delivering a detailed implementation plan to the IMP.

Work Stream 4 on the implementation plan (“Implementation Plan” work stream)

A work stream formed to:

- 4.1 develop a new document based upon the document formally referred to as the CONOPS for the Transition of OPMET Data Exchange using IWXXM;

- 4.2 define the format of translation centre information to be contained in all IWXXM messages;
- 4.3 Elaborate requirements related to the validation of the IWXXM schema;
- 4.4 develop best practice for utilising test IWXXM messages; and
- 4.5 draft an information paper on the pro's and con's of using SI units and Annex 3 units in IWXXM messages.

Work Stream 5 on Governance and coordination with the IMP (“Governance and IMP” work stream).

A work stream to:

- 5.1 to ensure all ICAO documents are updated to refer to IWXXM rather than WXXM
- 5.2 work with IMP on SWIM related governance issues
- 5.3 may attend the IMP governance working group as advisors

Work Stream 6 related to Support and external coordination (“Support and Coordination” work stream).

A work stream to provide support and coordinate progress on “one off” action items and matters which require coordination with parties external to the working group on the following actions:

- 6.1 Work with ASIAPAC, in the March/April 2016 timeframe, to determine whether EUR/Global terminology could be utilised within ASIAPAC ROBEX;
- 6.2 to confirm whether WG-MRI supports provision of SIGWX information in XML format, with commencement of service aligned with AMD79 to Annex 3;
- 6.3 to request WG-MRI to confirm need for low-level SIGWX charts in XML format;
- 6.4 With respect to OPMET databases, to provide a manual update of the databases as soon as is practicable, and no later than the end of 2015,
- 6.5 The draft test plan and the information in WG-MIE/1 WP16, related to message packing and unpacking, will be forwarded to the CP secretary, along with appropriate technical contacts from the WG-MIE group. This will be distributed to appropriate persons to mature the document, as deemed necessary, and to carry out the work of the job card.
- 6.6 A MET based test plan should be distributed to Regions to validate interoperability (6 months);
- 6.7 An update on the findings related to the AMHS test will be requested prior to our next face-to-face meeting, for the record; and
- 6.8 Discuss with ICAO (ie. METP) issues relating to the required lead time in Annex 3 of 18 months for XML schema updates.
