International Civil Aviation Organization

INFORMATION PAPER

SIXTEENTH MEETING OF THE ASIA/PACIFIC METEOROLOGICAL INFORMATION EXCHANGE WORKING GROUP (MET/IE WG/16)

Bangkok, Thailand, 19 – 21 March 2018

Agenda Item 4: Meteorological information exchange in digital form

WORKSHOP ON THE IMPLEMENTATION OF IWXXM FOR THE EXCHANGE OF OPMET DATA, 2017

(Presented by Hong Kong, China)

SUMMARY

This paper presents the IWXXM workshop organized in collaboration with WMO Voluntary Cooperation Programme (VCP), ICAO Asia and Pacific (APAC) Office and the Hong Kong Observatory (HKO) which was held in Hong Kong, China during 10-12 Oct 2017.

1. INTRODUCTION

1.1 In MET/IE WG/15, a workshop on the implementation of IWXXM was proposed by Hong Kong, China. The meeting concurred that the experience sharing aspect of the workshop would help build capacity among States through the exchange of lessons learned in the IWXXM implementation initiatives of States. The proposal was also discussed and supported by MET SG/21. With the support of WMO and ICAO, the jointly organized workshop was finally held in Hong Kong, China from 10 to 12 Oct 2017.

2. DISCUSSION

Participants

2.1 The workshop was attended by a total of 52 participants from 22 States/Countries and Territories and 2 Organizations (WMO and ICAO). Approximately 40 percent of the participants were mainly involved in the provision of meteorological services and 60 percent in the exchange of aviation meteorological messages.

Highlights of activities

2.2 A total of 13 presentations on overview and technical aspects of IWXXM were delivered by representatives from WMO, ICAO and international IWXXM experts. Sharing sessions were also arranged and all participating States, Countries and Territories were invited to present their current status, plans for implementation and any experience they had in creating, exchanging and using

IWXXM. In the last session of the workshop, the speakers were invited to have a round table discussion with the participants focusing on open items, comments and feedbacks, knowledge/information gaps, further assistance required, and suggestions to relevant parties.

Details of the workshop

2.3 The Summary of Discussions of the workshop is attached as **Appendix 1** to this paper. It is also available together with the presentations on ICAO APAC Office's web site[1].

Conclusion

2.4 The workshop provided an opportunity for experts in the meteorological and communication fields to meet experts on IWXXM and discuss important items in the implementation of IWXXM for the exchange of OPMET data. It also provided valuable inputs for relevant WMO and ICAO groups to consider.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

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[1] https://www.icao.int/APAC/Meetings/Pages/2017-IWXXM-OPMET.aspx

WMO VCP/ICAO Workshop on the
Implementation of ICAO Meteorological Information Exchange Model (IWXXM)
for the exchange of Operational Meteorological (OPMET) Data

(Hong Kong, China, 10-12 Oct 2017)

SUMMARY OF DISCUSSIONS

INTRODUCTION

- The WMO VCP/ICAO Workshop on the Implementation of IWXXM for the exchange of OPMET data was held in Hong Kong, China from 10 to 12 Oct 2017. The event was jointly organized by the Hong Kong Observatory (HKO), the World Meteorological Organization (WMO) and International Civil Aviation Organization (ICAO) with focus on capacity building to kick start States/Countries and Territories in their own IWXXM implementation projects.

- The workshop was attended by a total of fifty-two (52) participants from twenty-two (22) States/Countries and Territories and two (2) Organizations (WMO and ICAO). Approximately 40 percent of the participants were mainly involved in the provision of meteorological services and 60 percent in the exchange of aviation meteorological messages. A group photo is at **Appendix A** and the list of participants is at **Appendix B** to this Summary of Discussions.

DISCUSSION

Opening:

- The Director of the Hong Kong Observatory, Mr. Chi-ming Shun gave an opening speech to welcome all participants to attend the first IWXXM workshop in ICAO Asia Pacific Region and WMO Regional Association II.

- All States, Countries and Territories were then invited to brief other participants their expectations from joining the workshop. Salient points include:

    - How to specify necessary requirements in tender specifications for procurement of relevant facilities.
    - Would like to discuss more on the actual implementation, challenges and details.
    - How to adopt effective methods with limited country resources.
    - Whether there will be coordination among MET services on implementation and testing.
    - Any available tools which help implementation of IWXXM.
    - Would like to share others' experience on implementing IWXXM.

- How will IWXXM be applied in SWIM environment and exchanged between COM centres.
- Would like to know which version of IWXXM for use in 2020.

- The workshop adopted the Agenda as provided at **Appendix C**.

Overview:

- Five presentations were delivered on this topic:
  - Global aspects – IWXXM and its importance to Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU) (Sue O'Rourke, via Webex)
  - Regional aspects – Roles and responsibilities of ICAO APAC groups involving IWXXM (Peter Dunda)
  - Regional considerations with respect to the "Guidelines for the implementation of OPMET Data Exchange using IWXXM" (Tim Hailes)
  - IWXXM Experience in EUR Region (Patrick Simon, via Webex)
  - Collaboration of WMO and ICAO in the development and governance of IWXXM (Steve Foreman)

Technical aspects:

- Seven presentations were delivered on this topic:
  - Introduction to IWXXM – Development of an XML/GML representation of OPMET information (Aaron Braeckel)
  - Introduction to IWXXM – The WMO Code Registry providing web-accessible resources of authoritative terms for IWXXM (Boon-leung Choy)
  - Introduction to IWXXM – Message encoding examples including METAR/SPECI, TAF and SIGMET (Boon-leung Choy)
  - Validation of IWXXM bulletins and available resources (Aaron Braeckel)
  - Translation of TAC to IWXXM & generation of bulletins (Boon-leung Choy)
  - Infrastructural and operational requirements for IWXXM bulletin exchange, current implementation status and future plan in APAC (Peter Dunda)
  - Further evolution of IWXXM (Aaron Braeckel)

Sharing sessions:

- All participating States, Countries and Territories were invited to present their current status, plans for implementation and any experience they had in creating, exchanging and using IWXXM in this session.

Presentation materials:

- All presentations are available on ICAO APAC Office's web site[1].

Round table discussion:

[1] https://www.icao.int/APAC/Meetings/Pages/2017-IWXXM-OPMET.aspx

- The speakers were invited to have a round table discussion with the participants after the presentations focusing on:
  - Open items, comments and feedbacks
  - Knowledge / information gaps
  - Further assistance required
  - Review of suggestions to relevant parties

- The following is a summary of the outcomes of the discussion:

  Notable Discussion Items:

  - Momentum with the implementation of IWXXM and AMHS (with FTBP) has increased substantially recently, however a significant amount of work remains for all States who participated at the workshop.

  - The lack of AMHS (with FTBP enabled) remains a major constraint with implementing and distributing IWXXM messages.

  - As the implementation of AMHS including FTBP is necessary to support MET exchange using IWXXM, coordination between national MET service provider and COM service provider is essential. This is especially apparent in some States where MET and COM are provided by separate institutions. Furthermore, where these are separate institutions, the method of transfer of IWXXM between these institutions needs to be determined and implemented.

  - Some concerns were raised about the management of cybersecurity threats, particularly those associated with the exchange of IWXXM messages as FTBP (affects all users that open the attachments). There are mitigations identified. EUR AMHS manual seems to be more mature than the APAC equivalent; APAC may want to "borrow" ideas from it.

  - Information sharing on the availability of off-the-shelf solutions for generation of IWXXM messages and the associated vendors would be helpful.

  - Community effort would help in developing a repository of examples of TAC and associated IWXXM messages which may be used by developers to demonstrate their systems' capability. Open access to such a repository and an indication of which meteorological phenomena are not covered by the examples would assist the meteorological community in gathering examples and therefore addressing these gaps.

  - IWXXM messages generated at the source are recommended (rather than translation from TAC). It is understood that TAC-to-IWXXM translation may be an interim solution until new systems with IWXXM (generation at source) capabilities are available.

  - Procurement processes for new systems handling aeronautical messages takes time (typically 1-2 years but can up to 5 years).

- Individual message type formats (e.g. TAF format) may remain unchanged between successive versions of IWXXM. Need advice on the validity of using earlier version(s) of IWXXM.

- Official reference documents for IWXXM published are often outdated (such as ICAO Doc 10003 – Manual on the Digital Exchange of Aeronautical Meteorological Information) even when recently published due to developing standard and publishing delays. Need an "authentic" reference source where implementers and vendors can make reference to.

- Non-compliance with Annex 3 of TAC messages may have a significant impact on the level of complexity and the success rate of TAC-to-IWXXM translation and may result in additional costs for translation services (compared with translation of Annex 3 compliant TAC).

- Where translation from TAC to IWXXM is necessary, the Guidelines for the Implementation of OPMET Data Exchange using IWXXM, Version 1.0, 01/10/2016, indicates that the existing collection and dissemination centres of TAC (e.g. Regional OPMET Centre or ROC) should perform the function of Data Translation centre, as well as Data Aggregator and Data Switch functions. Furthermore, a bilateral or regional agreement should be defined where TAC-to-IWXXM translation is required to be performed on behalf of another State/s. It was noted that such formal arrangements for TAC-to-IWXXM translation may also be a mechanism to help improve compliance of TAC messages with Annex 3.

- The recent APAC survey (on IWXXM and AMHS implementation) demonstrated some good progress, but again the response rate was poor, and it was agreed the survey should be redistributed to all attendees and if possible distributed via WMO channels.

- SWIM environment of APAC, in particular the part involving MET, needs further discussion and elaboration. More participation of MET experts in SWIM TF would be beneficial.

- It was noted that the use of extensions within the IWXXM is discouraged.

Knowledge Gap:

- How users are going to utilize and access IWXXM.

Further assistance required:

- ICAO/WMO to coordinate more workshops globally and in APAC.

Suggestions to relevant parties:

- Feedback to ICAO on cyber security concerns.

- ICAO/WMO to consider maintaining or hosting a list of vendors of IWXXM solutions and a location (online) for vendors to provide updated information on their systems.

- WMO to consider producing a validity table or matrix showing the validity of all available IWXXM versions with respect to each Annex 3 product.

- ICAO's advice on how to handle the case when an Aggregator (e.g. ROC) finds that they haven't received all IWXXM counterparts of TAC messages to be consolidated into a bulletin (e.g. no IWXXM generated from that State or a temporary unavailability). Should they prepare a COLLECT bulletin with NIL messages in place of the missing IWXXM messages or otherwise?

Suggestions for States' IWXXM systems procurement and implementation processes:

- Refer to ASIA/PAC Technical Specification of the Air Traffic Services Message Handling System (AMHS), Version 1.0 (September 2011) for information on Security Management, AMHS Security, Internet Protocol Security and virus management.

- Take into consideration the timing and future schedule for Annex 3 and IWXXM version developments and releases. It's recommended that rather than refer to a specifications version of a document, tender documentation should refer to the "latest released version of Annex 3 and IWXXM" and support for upgrades to the latest version of IWXXM is included for the life of the system.

- Make reference to official sources for IWXXM message specifications, i.e., ICAO Annex 3, schemas.wmo.int, WMO No.306 Vol I.3 and ICAO Guidelines for the Implementation of OPMET Data Exchange using IWXXM, rather than relying on examples for the development of products.

- Software systems designed to ingest IWXXM (including forecaster display systems and operational units performing the function of Data Aggregator) need to have the capability to handle all valid (likely multiple) IWXXM versions.

Closing:

- The Assistant Director of the Hong Kong Observatory, Ms Sharon Lau, thanked the delegates for participating in the workshop. She wished them all the success in the implementation of IWXXM in their States, Countries or Territories.

- The workshop was concluded at 1pm on 12 Oct 2017.

CONCLUSION

- The workshop provided an opportunity for experts in the meteorological and communications fields to meet experts on IWXXM and discuss important items in the implementation of IWXXM for the exchange of OPMET data. In addition,

participants exchanged information on the status of implementation of IWXXM in their States, difficulties encountered and experience gained.

- Notable items raised at the round table discussion session were summarized in this Summary of Discussions and, in addition to the participants, this Summary will also be passed to relevant parties for their information and consideration.

WMO VCP/ICAO Workshop on the
Implementation of IWXXM for the exchange of OPMET Data

(Hong Kong, China, 10-12 Oct 2017)

Group Photo

WMO VCP/ICAO Workshop on the
Implementation of IWXXM for the exchange of OPMET Data

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Participant List

Invited through the WMO Voluntary Collaboration Program:

China	Ms. Li Xia Wang	wanglx@cma.gov.cn
Iraq	Mr. Ali Hamid Alwan Yaseen	alihamid.1987@yahoo.com
	Mr. Meqdam Adel Neamah Albasri	miqdam.adel@yahoo.com
Japan	Mr. Kentaro Tsuboi	k-tsuboi@met.kishou.go.jp
Kenya	Mr. Gideon Okubasu Alubia	gideonalubia@yahoo.com
Lao PDR	Mr. Khambai Saypaseuth	khambai1@hotmail.com
	Ms. Akhom Thamalangsy	akhomet@yahoo.com
Macao, China	Mr. Cheng Hou Chan	chchan@smg.gov.mo
	Mr. Chi Hei Lau	hayeslau@ada.com.mo
	Mr. Sio Kuong Pun, Samson	samsonpun@aacm.gov.mo
Malaysia	Mr. Norlisam Lias	norlisam@met.gov.my
Maldives	Mr. Ahmed Rasheed	rasheed@meteorology.gov.mv
Morocco	Ms. Hanane Kamil	hanane.kamil@gmail.com
Philippines	Mr. Eric Lanuzo	erlanuzo@gmail.com
Qatar	Mr. Nasser AL-Marri	Ahoud.Alsulaiti@caa.gov.qa
	Mr. Omar AL-Obaidan	Omar.Obaidan@caa.gov.qa
Seychelles	Ms. Chantale Ruth Bijoux	c.bijoux@meteo.gov.sc
Thailand	Mr Warapong Noothong	pui-74@hotmail.com
	Mr Aphinya Chitchaeng	tmd_inter@tmd.go.th

Invited through the ICAO Asia and Pacific Office:

Australia	Mr. Tim Hailes	t.hailes@bom.gov.au
	Ms. Susan O'Rourke (via Webex)	sue.orourke@bom.gov.au
Bangladesh	Mr. Mohammad Manzurul Hoque Khan	mhkhan1953@gmail.com
	Mr. Kshitindra Chandra Baisya	baisyadelip@gmail.com
China	Ms. Zou Juan	zoujuan@atmb.net.cn
	Mr. Pian Xiaochuan	pianxc@126.com
	Mrs. Zhu Yun	zhuyun@ait.cn
	Mr. Chen Hongyuan	chenhongyuan@ait.cn
France	Mr. Patrick Simon (via Webex)	patrick.simon@meteo.fr

Hong Kong, China	Mr. Boon-leung Choy	blchoy@hko.gov.hk
	Mr. Marco Kok	mhkok@hko.gov.hk
	Mr. William Shum	ctshum@hko.gov.hk
	Ms. Miranda Ng	wmng@cad.gov.hk
	Mr. Calvin Lai	kclai@cad.gov.hk
	Mr. Patrick Lam	hhlam@cad.gov.hk
	Ms. Shirley Sit	smsit@cad.gov.hk
New Zealand	Mr. Humphrey Elton	humphrey.elton@metservice.com
Philippines	Mr. Jose V. Festejo, Jr.	jadper_fr@yahoo.com
	Mr. Arnold A. Santamaria	arnoldsaint102@gmail.com
Republic of Korea	Mr. Song Chul, Lee	ifsc59@korea.kr
	Ms. Soon Young, Joo	end1ove@korea.kr
Sri Lanka	Mr. Asanga Senarath Bandara	asanga.eane@airport.lk
Thailand	Mr. Somchai Yimsricharoenkit	somchai.y@caat.or.th
	Mr. Watcharin Thongthubthim	watcharin.t@caat.or.th
	Mr. Wanchai Rattanasing	wanchai.ra@aerothai.co.th
	Ms. Amornrat Jirattigalachote	amornrat.ji@aerothai.co.th
	Mr. Worapong Jirojkul	worapong.ji@aerothai.co.th
	Mr. Supachai Jiamwijitkul	supachai.ji@aerothai.co.th
USA	Mr. Aaron Braeckel	braeckel@ucar.edu
Vietnam	Ms. Nguyen Lan Oanh	lanoanh@caa.gov.vn lanoanh@gmail.com
	Mr. Nguyen Hong Hiep	nguyenhonghiepbk@vatm.vn

Organizations:

WMO	Dr. Steve Foreman	sforman@wmo.int
ICAO APAC Office	Mr. Peter Dunda	PDunda@icao.int

WMO VCP/ICAO Workshop on the
Implementation of IWXXM for the exchange of OPMET Data

(Hong Kong, China, 10-12 Oct 2017)

Agenda (Updated on 6 Oct 2017)

Day 1 – 10 October 2017

Time	Agenda	Speaker
0900 - 0930	*Registration*	All participants
0930 - 0940	*Opening:* • Opening ceremony	
0940 - 1015	*Coffee break*	
1015 - 1215	*Opening (continue):* • Delegates introducing themselves and expectations *Overview:* • Global aspects – IWXXM and its importance to Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU) • Regional aspects – Roles and responsibilities of ICAO APAC groups involving IWXXM	All participants Sue O'Rourke (via Webex) Peter Dunda
1215 - 1345	*Lunch*	
1345 - 1515	*Technical aspects:* • Introduction to IWXXM – Development of an XML/GML representation of OPMET information • Introduction to IWXXM – The WMO Code Registry providing web-accessible resources of authoritative terms for IWXXM	Aaron Braeckel B.L. Choy
1515 - 1530	*Coffee break*	
1530 - 1700	*Sharing Session:* • Plans and experiences on IWXXM implementation and exchange	All participants

Day 2 – 11 October 2017

Time	Agenda	Speaker
0900 - 1030	*Overview (continue):* • Regional considerations with respect to the "Guidelines for the implementation of OPMET Data Exchange using IWXXM" *Technical aspects (continue):* • Introduction to IWXXM – Message encoding examples including METAR/SPECI, TAF and SIGMET	Tim Hailes B.L. Choy
1030 - 1045	*Coffee break*	
1045 - 1215	*Technical aspects (continue):* • Validation of IWXXM bulletins and available resources • Translation of TAC to IWXXM & generation of bulletins	Aaron Braeckel B.L. Choy
1215 - 1330	*Lunch*	
1330 - 1515	*Technical aspects (continue):* • Infrastructural and operational requirements for IWXXM bulletin exchange, current implementation status and future plan in APAC *Overview (continue):* • IWXXM Experience in EUR Region	Peter Dunda Patrick Simon (via Webex)
1515 - 1530	*Coffee break*	
1530 - 1700	*Sharing Session:* • Plans and experiences on IWXXM implementation and exchange[1]	All participants

Day 3 – 12 October 2017

Time	Agenda	Speaker

0900 - 1030	*Overview (continue):*
	
	• Collaboration of WMO and ICAO in the development and governance of IWXXM, including:
	  • WMO groups involved
	  • Transparency of the development process
	  • Summary of resources available for IWXXM implementation and training
	
	Technical aspects (continue):
	
	• Further evolution of IWXXM, including:
	  • Versioning and expected release cycle
	  • A preview of the contents of the next version of IWXXM (IWXXM-3)
	  • The MET-SWIM plan
		Steve Foreman
		
		Aaron Braeckel

1030 - 1045	*Coffee break*	

1045 - 1230	*Closing:*
	
	• Round table discussion / forum including:
	  • Open items, comments and feedbacks
	  • Knowledge / information gaps
	  • Further assistance required
	  • Review of suggestions to relevant parties
	
	• Closing ceremony
		All speakers and participants