International Civil Aviation Organization

WORKING PAPER

Twenty-fifth Meeting of the Meteorology Sub-group (MET SG/25)

Online, 18 – 22 October 2021

Agenda Item 2: Review outcomes from previous meetings

REVIEW OUTCOMES FROM MET/IE WG/19

(Presented by the Chair of MET/IE WG)

SUMMARY

This paper presents a summary of the 19th meeting of the Meteorological Information Exchange Working Group (MET/IE WG), including a conjoint session with Meteorological Services Working Group, held 22 - 24 March 2021. It includes a revised terms of reference and work plan of the MET/IE WG.

1. INTRODUCTION

1.1 The ICAO Asia and Pacific (APAC) Regional Office hosted the Nineteenth Meeting of the Meteorological Information Exchange Working Group (MET/IE WG/19) and Eleventh Meeting of the Meteorological Services Working Group (MET/S WG/11), conjointly, by web-conference from 24 to 26 March 2021.

1.2 The meeting was attended by 132 participants from 24 States and Administrations and 3 international organisations. Mr. Tim Hailes, National Manager, Aviation Service Development, Bureau of Meteorology, Australia presided over the meeting in the role as chairperson and was assisted by Mr Peter Dunda, Regional Officer Aeronautical Meteorology, ICAO Asia and Pacific Office, as secretariat. During the conjoint session Mr. Chan Pak Wai, Assistant Director, Hong Kong Observatory, Hong Kong China, chairperson of the MET/S WG, and Mr. Hailes were co-chairs.

1.3 The meeting considered seventeen (17) Working Papers (WPs), ten (10) Information Papers and one (1) Flimsy on the first two days of the meeting. The conjoint session between MET/IE WG/19 and MET/S WG/11 considered an additional two (2) WPs and two (2) IPs. This paper will focus on the outcomes of MET/IE WG and the conjoint session of the MET/IE and MET/S. A separate paper details the outcomes of the MET/S meeting.

2. DISCUSSION

2.1 A copy of the full meeting report, and all related meeting documentation, is available at the following website:

https://www.icao.int/APAC/Meetings/Pages/2021-MET-IE-WG19.aspx

2.2 The meeting adopted the following agenda:

MET/IE WG/19
Agenda Item 1: Organizational matters
Agenda Item 2: Review of follow-up from previous meetings
Agenda Item 3: Meteorological information exchange schemes
Agenda Item 4: Meteorological information exchange in digital form
Agenda Item 5: Quality control, monitoring and management of meteorological information exchange
Agenda Item 6: Guidance material related to meteorological information exchange
Agenda Item 7: Future work programme and terms of reference
Agenda Item 8: Any other business
Agenda Item 9: Next meeting

Conjoint MET/IE WG/19 and MET/S WG/11

Agenda Item 1: Volcanic ash advisory centre (VAAC) backup tests
Agenda Item 2: SIGMET tests

Review of follow-up from previous meetings

2.3 The meeting reviewed the status of actions from the previous MET/IE WG/18 and MET/S WG/10. This included 33 new actions from these meetings. In addition, follow-up on 20 actions from previous MET/IE WG meetings are yet to be completed.

2.4 The consolidated updates to the status of follow-up on action items as agreed by the meeting is presented in the Task List at the **Appendix A** to this Report.

2.5 The meeting reviewed the outcomes from the Twenty-Fourth Meeting of the Meteorology Sub-group (MET SG/24). This included:

- Decision MET SG/24-18: *Updates to terms of reference and work plan of and MET/R WG, MET/IE WG and MET/S WG*, MET SG 24 approved the updated terms of reference and work plan of the MET/IE WG .
- Conclusion MET SG/24-11: *IWXXM Exchange Approach*, the meeting proposed an action to update the ROBEX Handbook to ensure clarity of the guidance concerning the ROCs' responsibilities for the distribution of IWXXM formatted OPMET data.
- In relation to the MET SG/24 outcomes concerning further development of the ROBEX Handbook, in order to support States with the process of coordinating on changes to the ROBEX scheme, the meeting also proposed an action to update the ROBEX Handbook to ensure the availability of the AFTN addresses for the designated APAC ROCs and RODBs

2.6 The meeting also reviewed outcomes of relevance to MET/IE WG/19 from APANPIRG/31, including:

- APANPIRG/31 Decision 31/16 – *Updates to Terms of Reference and Work Plan of MET SG*, the meeting proposed to update the MET/IE WG terms of reference and work plan to reflect

the requirement for quarterly coordination meetings for the Chairs of MET SG and its contributory working groups (including MET/IE WG).

- APANPIRG/31 Conclusion 31/18 – *Implementation of IWXXM*, the meeting proposed to update the MET/IE WG work plan to further support States with the planning and implementation of the dissemination of the required meteorological information in IWXXM form, in particular at the designated APAC Regional OPMET Centres (ROCs) and Regional OPMET Databanks (RODBs).

Meteorological information exchange schemes

2.7 The Inter-Regional OPMET Gateways (IROG) at Bangkok and Singapore conducted annual mutual backup tests of IROG operations in September 2020. Results from the tests demonstrated the IROGs' capabilities to successfully provide operational backup service for the transmission of required OPMET data

2.8 Performance Indices (PI) as computed and analysed by the Regional OPMET Data Bank (RODB) Bangkok, from the annual OPMET monitoring activity conducted by the 5 APAC RODBs, identified

- 11 out of 301 (3.6%) aerodromes did not distribute METAR
- 14 out of 284 (4.93%) aerodromes did not distribute TAF
- 3 out of 301 (0.99%) aerodromes with low availability index for METAR (< 0.9)
- 4 out of 284 (1.40%) aerodromes with low availability index for TAF (< 0.9)
- 101 out of 301 (33.55%) aerodromes with low Compliance index for METAR (< 0.9)
- 23 out of 284 (8.1%) aerodromes with low Compliance index for TAF (< 0.9)

2.9 These results were an improvement over previous years, but they highlight that significant improvements are still required.

2.10 The distribution of data of RODB Nadi remains below other RODBs. Recalling previous discussion and agreed action by the MET/IE WG/17 to ensure the dissemination of APAC OPMET bulletins to all APAC RODBs, the meeting proposed to update to the ROBEX Handbook to ensure RODB Nadi is included in each entry within ROBEX Handbook Tables A and B.

2.11 In order to use the results to facilitate improved availability, compliance and regularity of OPMET in the APAC Region, the Secretariat will inform States with low PI and advise the States to take appropriate corrective actions, as per existing actions.

2.12 On 5 November 2020, the World Meteorological Organization (WMO) updated the message headers (TTAAii CCCC) for space weather advisory information disseminated in traditional alphanumerical code (TAC), and in ICAO Meteorological Information Exchange Model (IWXXM), form to enable the use of separate headers for each space weather advisory impact type: GNSS, HF COM, Radiation and SATCOM.

2.13 The meeting agreed to update the ROBEX Handbook to include the WMO message headers for each type of space weather advisory information (GNSS, HF COM, Radiation and SATCOM) in both TAC- and IWXXM-form.

2.14 Vietnam NOC has been established and is in last step to become operational. With supportive collaboration of Bangkok ROC, Vietnam NOC will be integrated into Bangkok ROC/RODB framework. This will efficiently improve international OPMET data exchange regarding Vietnam's

OPMET data, supporting international flight operations to/from Vietnam, at the same time facilitate Vietnam's IWXXM implementation to be aligned with APAC region

Meteorological information exchange in digital form

2.15 As of 25 February 2021, New Zealand has been translating METAR, SPECI and TAF from TAC to IWXXM on behalf of eleven (11) South Pacific States. In order to then disseminate the OPMET internationally, ROC Wellington requires the ROBEX scheme bulletins for the South Pacific METARs and TAFs to be reorganised to separate out the OPMET requiring TAC to IWXXM translation

2.16 The meeting agreed to request the Secretariat to update the ROBEX Handbook with changes to the corresponding OPMET bulletins.

2.17 required the MET/IE WG to investigate the development of an online repository for ROBEX data in which States would share and maintain up to date information on the IWXXM-capabilities of the ROBEX scheme and the AMHS addresses to support the required dissemination of IWXXM messages. WP/09 presented the proposed online register of current IWXXM exchange status.

2.18 In accordance with MET SG/24, Conclusion MET SG/24-12: *Development of Online Register of the status of IWXXM Exchange*, and Decision MET SG/24-15: Updates to ROBEX Handbook and Action Item 14 from MET/IE WG/18 - *ROBEX Handbook updates – IWXXM-related data*, the meeting reviewed a proposed online register of current IWXXM exchange status.

2.19 The meeting also discussed the merits of different technical approaches to the Online Register, including the use of the current Google Sheet and a Github solution, and agreed to continue with the current solution. The online register can be accessed via the following link:

https://docs.google.com/spreadsheets/d/1WEcGfMRZq2dgHsfdpFhiefJEcA8OeMhfbCJHTqA7NX0/edit#gid=0

2.20 The meeting proposed an action to update the ROBEX Handbook to include a link to the online register of APAC IWXXM exchange status.

2.21 The meeting noted that the ROBEX Handbook, Appendix I, provides contact details for States' designated ROBEX Focal Points and that this should be the first point of contact in a State for communication on matters to facilitate the exchange of OPMET information (including in IWXXM form) between the ROCs. The Online Register of the status of IWXXM Exchange also provides a useful tool for understanding each States' support for the exchange of IWXXM information.

2.22 Furthermore, the meeting recognized that, in order for the online register of APAC IWXXM exchange status to be an effective tool for facilitating States' implementation of IWXXM exchange, the register should contain up to date information provided by all APAC States. To this end, the meeting supported the following Draft Conclusion for further consideration by MET SG/25:

Draft Conclusion MET SG/25/xx: Updating Online Register of IWXXM Exchange Status

That, the MET SG requests States to provide timely updates to the online register regarding the latest status of AMHS capability for IWXXM exchange among ROCs and NOCs and availability of IWXXM MET reports to facilitates the Region-wide implementation of IWXXM exchange.

2.23 China provided the meeting with an update on China Russian Consortium progress with testing Space Weather Exchange and progress towards becoming an operational Space Weather Centre.

2.24 Hong Kong China, the Chair of MET/IE WG and the Secretariat presented a draft version of a Frequently Asked Questions (FAQs) resource to support IWXXM implementation in APAC Region.

2.25 In order to more thoroughly consider the merit in publishing the current draft FAQs, the meeting proposed an action to obtain additional feedback from States on the draft FAQs and present a proposal for MET SG/25 to possibly approve the publication of the FAQs (as either a standalone document or incorporated in another document) for use by States. ICAO made available a word version of the draft FAQs via the meeting website to enable States' to efficiently provide feedback.

2.26 Recently, IATA provided feedback, recommending some simple introductory questions and refinements to the details. No other feedback was received. The MET-IE WG Chair & the task lead (Marco Kok) subsequently refined the document. Whilst the MET-IE WG has an ongoing task to review and refine the FAQs, it is felt the document is sufficiently mature to publish. The revised set of FAQ's in contained in Attachment 1 to this paper.

2.27 In view of the discussion above, the meeting may wish to formulate the following MET SG Draft Decision:

> **Draft Decision MET SG/25/x: *Publishing of IWXXM Frequently Asked Questions***
>
> That, the MET SG approves the updates to the *IWXXM Frequently Asked Questions*, and requests the Secretariat to arrange its publishing on the ICAO APAC Office e-Documents website.

2.28 Australia, China, Hong Kong China, Japan, Mongolia, Singapore and Thailand provided updates on their progress with the implementation of the ICAO Meteorological Exchange Model (IWXXM). Hong Kong, China also provided results of the monitoring of IWXXM report dissemination, statistics of translation and validation services, updated AMHS dissemination paths and observations in AMHS message heading.

Guidance material related to meteorological information exchange

2.29 The MET/IE WG has a role in reviewing and updating the ROBEX Handbook on an annual basis and noted that the published version of the BOBEX Handbook was dated March 2019.

2.30 In order to make available to States the latest approved updates to the ROBEX Handbook without delay, the meeting agreed to an action for the Secretariat to publish the MET SG/24-approved updates to the ROBEX Handbook as presented at Appendix 10 to the MET/SG/24 Report, including the corrections to AFTN addresses provided by Fiji.

2.31 The meeting also agreed that the following updates to the ROBEX Handbook were required in the following release:

- Changes requested by Japan including:
    - to reflect the inclusion in the ROBEX scheme of Hanamaki Airport (RJSI), changes to aerodrome names at Kitakyushu Airport (RJFR) and New Ishigaki Airport (ROIG), the

actual filing time and start of validity of TAF in Japan and the actual available time of METAR in Japan.

- Changes to align with the actual official observation time of the METAR bulletins in Republic of Korea.
- A New International Airport (VVVD) Vietnam.
- Space Weather Advisory dissemination scheme.

Future work programme and terms of reference

2.32 The meeting briefly reviewed the MET/IE WG Terms of Reference and Work Program. Based on the outcomes of the discussion on the agenda items, the meeting proposed several updates to the MET/IE WG Terms of Reference and Work Plan as highlighted at the **Appendix B** to this paper.

Any other business

2.33 IATA provided a comprehensive update on key SWIM activities being undertaken in Asia & Pacific Region including topics discussed in the SWIM Task Force/4 meeting in November 2020.

2.34 The meeting also discussed whether follow-up actions should be recorded as actions (in an action/task list) or simply tasks within the workplan. It was agreed that we should continue with the existing approach of managing actions separately to the workplan activities to be consistent with other MET SG Working Groups.

2.35 Recently, it was identified that these actions are being tracked in a "Task List" and it proposed this should be relabelled an "Action List", to avoid confusion with individual tasks/activities contained within the Work Plan. A review of terminology across METSG and its working Groups is recommended.

2.36 In view of the discussion above, the meeting may wish to formulate the following MET SG Draft Conclusion:

Draft Conclusion MET SG/25/x: ***Review of Working Action/Task Terminology***

That, the MET SG Chair/s and its subsidiary Working Group Chair/s, undertake a review of terminology used to track meeting actions and manage activities/tasks within its workplan.

Conjoint session of the MET/IE WG and the MET/S WG

Volcanic Ash Advisory Centre (VAAC) Backup tests

2.37 VAAC Wellington and VAAC Darwin conducted a scheduled mutual VAAC back-up test on 18 December 2020. The test demonstrated the routine back-up arrangements for the VAACs including the requirements of VAAC Wellington to enable issuance of the VAA message with the VAAC Darwin VAA bulletin header.

2.38 A lower than expected number of VAA users participated in the test by confirming receipt of the back-up test VAA messages. Therefore, the VAACs recommended a review of the AFTN address list used for dissemination of the VAA messages.

2.39 In order to increase the participation of end users, i.e., confirming receipt of the VAA sent by VAAC Wellington and VAAC Darwin, in future back-up tests, the meeting requested that ICAO distribute via State letter a request to user States to ensure the relevant operational units participate in the tests and provide the VAACs with their current, valid AFTN addresses for receipt of the VAA messages.

SIGMET Tests

2.40 The meeting reviewed results of a WS SIGMET test that was performed on 16 December 2020.

2.41 Fiji informed the meeting that, due to the activation of emergency operations at MWO Nadi in response to severe tropical cyclone Yasa, Fiji did not participate in the SIGMET test. The meeting agreed, the non-issuance of the WS SIGMET test message by Nadi MWO on 16 December 2020 be excluded from the analysis.

2.42 The meeting noted that WS SIGMET test messages:

- were not received from six (6) of the twenty-nine (29) expected participant States, namely: Afghanistan, DPR Korea, Papua New Guinea, Maldives and Nauru. The rate of State participation was 79% in 2020, compared with 83% in 2019.
- were received from forty-eight (48) of the fifty-four (53) expected participant MWOs. The overall level of receipt of expected SIGMET test messages was 89% in 2020, compared with 91% in 2019.
- The average rate of reception of the available SIGMET test messages at the five APAC RODBs and ROC London was 96% in 2020, which was the same level as 2019.

2.43 The meeting also reviewed results of a WC/WV SIGMET test that was performed on 2/9 December 2020.

2.44 The meeting noted that WC SIGMET test messages were received from forty (40) of the forty-nine (49) expected participant MWOs. The overall level of receipt of expected SIGMET test messages was 82% in 2020, compared with 72% in 2019

2.45 The meeting noted that WC SIGMET test messages were received from fifty-one (51) of the fifty-six (56) expected participant MWOs. The overall level of receipt of expected SIGMET test messages was 91% in 2020, compared with 85% in 2019.

2.46 Some WC/WV SIGMET test and VAA test messages demonstrated the incorrect use of the message priority indicator GG (for SIGMET and VAA, it should be FF) and typographical errors. Some WC/WV test messages were disseminated in duplicate, with identical or different Date Time Group (DTG).

2.47 To further assist States with the analysis of their performance in the SIGMET tests, the meeting recommended an investigation of possible improvements to the template for the SIGMET test summary table. The proposed improvements should enable a more detailed analysis of the SIGMET tests, including analysis of more than one WC and/or WV SIGMET test message issued by the same MWO for the same FIR (which receives TCA and/or VAA from more than one TCAC and/or VAAC).

Next meeting

2.48 The meeting proposed the following (tentative) dates for the next meeting of the MET/IE WG:

21 to 23 March 2022 – MET/IE WG/20
23 March 2022 – conjoint session of MET/IE WG/20 and MET/S WG/12

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the information in this paper;

b) Consider the draft Decisions in para 2.22 and 2.27; and

c) Consider the draft Conclusion in para 2.36;

d) Propose further updates (as necessary) to the

a. Action/task list (Appendix A);
b. terms of reference and work programme of MET/IE WG (refer Appendix B); and
c. IWXXM FAQ (Attachment 1).

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APPENDIX A

TASK LIST – MET/IE WG/19 and MET/S WG/11 conjoint session

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
01	State letter request to user States to ensure the relevant operational units participate in the VAAC back-up tests and provide the VAACs with their current, valid AFTN addresses for receipt of the VAA messages.*[Ref: para. 1.1.-1.3., MET/IE WG/19 and MET/S WG/11 conjoint session]*	Before next scheduled test	Australia, New Zealand, Secretariat	To commence
02	Investigate possible improvements to the template for the SIGMET test summary table to enable a more detailed analysis of the SIGMET tests, including analysis of more than one WC and/or WV SIGMET test message issued by the same MWO (which receives TCA and/or VAA from more than one TCAC and/or VAAC). *[Ref: para. 2.16., MET/IE WG/19 and MET/S WG/11 conjoint session]*	Before next scheduled test	SIGMET test Focal Points, Secretariat	To commence

TASK LIST – MET/IE WG/19

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
01	**Propose updates to the ROBEX Handbook:** to ensure clarity of the guidance concerning the ROCs' responsibilities for the distribution of IWXXM formatted OPMET data [ref: para. 2.5.]	May 2021	WG	To commence
02	**Propose updates to the ROBEX Handbook**: to ensure the availability of the AFTN addresses for the designated APAC ROCs [ref: para. 2.6.]	May 2021	WG	To commence
03	**Propose appropriate updates to the ROBEX scheme and ROBEX Handbook**: to include the requirement for ROBEX centres to send OPMET bulletins to all RODBs (Including updates to Tables A and B) [ref: para. 3.5.]	May 2021	WG	To commence
04	**Propose updates to the ROBEX Handbook**: to include the WMO message headers (TTAAii CCCC) for each type of space weather advisory information (GNSS, HF COM, Radiation and SATCOM) in Traditional Alphanumerical Code (TAC)- and ICAO Meteorological Information Exchange Model (IWXXM)-form [ref: para. 3.8.]	May 2021	Secretariat	To commence
05	**Propose updates to the ROBEX Handbook**: to include the necessary consequential changes to OPMET bulletins described in WP/08 (SAPS31 NFFN, SAPS32 NWWW, SAPS33 NTAA, SANG31 YBBN, FTPS31 NFFN, FTPS32 NWWW, FTPS33 NTAA, FTNG31 YBBN) and presented in Attachment A to WP/08 and to include information on the (KWBC) bulletins containing Pago Pago METAR and TAF [ref: para. 4.3.]	May 2021	Secretariat	To commence
06	**Propose updates to the ROBEX Handbook**: to include a link to the online register provided by the APAC ROCs for IWXXM-exchange-capability (in accordance with MET SG/24, Decision MET SG/24-15: *Updates to ROBEX Handbook*, and Conclusion MET SG/24-12: *Development of Online Register of the status of IWXXM Exchange)* [ref: para. 4.6.]	May 2021	Marco, Tim	In Progress
07	a) Provide additional feedback on the draft **"FAQs of IWXXM implementation"** (MET/IE WG/19, WP/17); and b) Present a proposal for MET SG/25 to possibly approve the publication of the FAQs (as either a standalone document or incorporated in another document) for use by States [ref: para. 4.11.]	a) Apr 2021 b) May 2021	a) WG members, b) Marco, Tim, Secretariat, IATA	Completed. This paper.
08	**Publish the MET SG/24-approved updates to the ROBEX Handbook:** as presented at Appendix 10 to the MET/SG/24 Report, including the corrections to AFTN addresses provided by Fiji and presented at Appendix A to MET/IE WP/19, WP/12 – *ROBEX Handbook Updates* [ref: para. 6.2.]	Mar 2021	Secretariat	To commence
09	**Propose updates to the ROBEX Handbook**: to include the changes to data in Appendix A, Appendix B and Appendix I of the ROBEX Handbook, as advised by Japan and presented in MET/IE WG/19, WP/13 – *Updates to ROBEX Handbook*. [ref: para. 6.5.]	May 2021	Secretariat	To commence

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
10	**Propose updates to the ROBEX Handbook**: to include the changes to data in Appendix A of the ROBEX Handbook, as advised by Republic of Korea and presented in MET/IE WG/19, WP/14 – *Update to ROBEX Handbook*. [ref: para. 6.8.]	May 2021	Secretariat	To commence
11	**Propose updates to the ROBEX Handbook**: to include the OPMET exchange information for Van Don International Airport (VVVD), as advised by Viet Nam and presented in MET/IE WG/19, WP/15 – *A new international airport (VVVD) to join ROBEX network for international OPMET data exchange*. [ref: para. 6.11.]	May 2021	Viet Nam and Secretariat	To commence
12	**Propose updates to the ROBEX Handbook:** to include the Space Weather Advisory dissemination scheme (MET/IE WG/19, Flimsy/01) [ref: para. 6.14.]	May 2021	Secretariat	To commence

OUTSTANDING TASK LIST – MET/IE WG/18 and MET/S WG/10
The following action items are applicable to one or both of the MET/IE WG and MET/S WG

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
Terms of Reference and Work Program				
01	**Terms of Reference and Work Program – online coordination:** Make use of regular online coordination meetings to facilitate progress on follow-up on the action items in the Task List/s [ref: para. 2.3. and 7.3.]	As necessary	Secretariat and WG Chairs and members	IN PROGRESS 13 August 2020, 10 December 2020 Work in progress
02	**Terms of Reference and Work Program – meeting documentation deadlines:** Propose updates to the terms of reference documents to reflect the desirable deadlines, as adopted by the MET SG, for submission and publication of meeting papers and reports (i.e., submit papers >=28-days before the meeting, publish papers >=14-days before the meeting and publish reports <=21-days after the meeting) [ref: para. 2.4. and 11.5.]	At MET SG/24	Secretariat and WG Chairs	COMPLETED Ref: MET/IE WG and MET/S WG, 3. Communication Strategies
03	**Terms of Reference updates – MET/IE WG:** Include the proposed updates (at para. 5.1-5.4 of the report) in the terms of reference document for inclusion in the meeting report for further review and approval by MET SG/24 [ref: para. 5.5.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/IE WG, 1. Membership and 2. Description
04	**Terms of Reference updates – MET/S WG:** Include the proposed updates (at para. 11.1-11.3 of the report) in the terms of reference document for inclusion in the meeting report for further review and approval by MET SG/24 [ref: para. 11.4.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/S WG, 1. Membership and 2. Description
05	**Work Program – MET/IE WG:** Update the work program document to reflect the outcomes of the meeting discussions and for inclusion in the meeting report for further review and approval by MET SG/24 [ref: para. 5.6.]	Before MET SG/24	Secretariat and MET/IE WG	COMPLETED Work in progress
06	**Work Program – MET/S WG:** Update the work program document to reflect the outcomes of the meeting discussions and for inclusion in the meeting report for further review and approval by MET SG/24 [ref: para. 11.6.]	Before MET SG/24	Secretariat and MET/S WG	COMPLETED Work in progress
OPMET Monitoring				
07	**OPMET performance indices – States' follow-up:** Inform States concerned of the locations with low performance indices and advise the States to take appropriate corrective actions; address the above communication also the Regional OPMET Centres (ROCs) responsible for the collection of OPMET messages from the originating stations [ref: para. 3.4. and 3.5.]	Sep 2020	Secretariat	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 1 and Activity 2

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
08	**OPMET performance indices – RODBs' review:** Review and propose update/s to the MET/IE WG work program as necessary to ensure the APAC RODBs review the results of the OPMET monitoring activities prior to submission of the results to the MET/IE WG meetings [ref: para. 3.6.]	Before MET SG/24	MET/IE WG	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 1 (1.4) and Activity 2 (2.3)
IWXXM implementation				
09	**IWXXM implementation – registering testing activities:** Proposal on how best to support APAC States with coordinating and sharing information on their IWXXM exchange testing activities [ref: para. 3.12.]	At IWXXM Webinar	MET/IE WG	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 7 IWXXM Webinar Presentation #17
10	**IWXXM implementation – survey:** Respond to the online survey questionnaire at the link provided in WP/07 (and in State Letter Ref: T 4/3.2.5- AP155/20 (MET)) [ref: para. 3.26.]	7 Aug 2020	Meeting participants' States	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 7 IWXXM Webinar Presentation #01
11	**IWXXM implementation – FAQs:** Prepare and publish an "FAQ"-type resource taking into consideration the IWXXM-related matters discussed in the meeting and the considerable information collated from previous IWXXM workshops and related activities [ref: para. 3.28.]	Before and (update) after IWXXM Webinar	Secretariat and MET/IE WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 7
Regional Guidance Materials				
12	**ROBEX Handbook updates – Focal Points:** Prepare the proposal to update the ROBEX Handbook based on the proposed updates to the Focal Point information (Appendix I), as presented in WP/08 and proposed by Australia, China and New Zealand [ref: para. 4.2.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 6
13	**ROBEX Handbook updates – Update process:** Propose options for a more streamlined process for updating the ROBEX Handbook data, such as through the development of a more dynamic, online repository for ROBEX data [ref: para. 4.4.]	Before MET SG/24	MET/IE WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
14	**ROBEX Handbook updates – IWXXM-related data:** Investigate the development of an online repository for ROBEX data in which States would share and maintain up to date information on the IWXXM-capabilities of the ROBEX scheme and the AMHS addresses to support the required dissemination of IWXXM messages [ref: para. 4.6.]	Before MET SG/24	MET/IE WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
15	**ROBEX Handbook updates – IWXXM-related flexibility:** Propose updates, as necessary, to reflect APAC States' requirement for flexibility of the ROBEX scheme structure during the transition to Region-wide implementation of IWXXM exchange [ref: para. 4.7.]	Before MET SG/24	MET/IE WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
16	**ROBEX Handbook updates – METAR and TAF bulletins:** Prepare the updates to the Appendices A and B, concerning Thailand and Australia, as presented in WP/09 and WP/15 [ref: para. 4.8.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 6
17	**ROBEX Handbook updates – METNO procedures:** Coordinate further development of the METNO procedures (wording and mechanisms) as proposed in WP/10, including the scheduled time for implementing OPMET Bulletin changes in the APAC Region, and develop the associated proposal to update the ROBEX Handbook [ref: para. 4.12.]	Before MET SG/24	Chair MET/IE WG and Secretariat	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 6

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
18	**ROBEX Handbook and SIGMET Guide updates – Legacy FASID information:** Prepare the consequential updates of the required information from the legacy FASID Tables relating to meteorology, apart from Table MET 1A, Table MET 1B and Table MET 3C, and the existing ICAO APAC regional guidance documentation, according to the proposal in WP/11 and the Draft Decision [ref: para. 4.16.]	Before MET SG/24	Secretariat and States	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
19	**ANP and ROBEX Handbook updates – Vietnam NOC:** Coordinate on the implementation of the Vietnam NOC, including development of proposed updates to the APAC ANP and ROBEX Handbook [ref: para. 3.7.]	As necessary	Vietnam and Thailand	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
20	**ANP and ROBEX Handbook updates – Indonesia new aerodromes:** Determine any requirement (based on IP/09) to update the ICAO APAC ANP and/or ROBEX Handbook [ref: para. 8.27.]	Before MET SG/24	Secretariat and Indonesia	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 6
21	**ANP updates – State Volcano Observatories:** Designate an ad-hoc group consisting of the Secretariat and members from the VAACs and RODBs to identify the APAC States with active or potential active volcanoes, which do not have a designated State volcano observatory listed in the APAC ANP, Vol I, Table MET I-1; conduct the necessary coordination to facilitate the States concerned with the designation of a State volcano observatory and listing it in the APAC ANP; coordinate the action above with the development of a comprehensive proposal for amendment of the ANP to reflect APAC States' current requirements for State volcano observatories [ref: para. 4.17., 8.3. and 8.4.]	Before MET SG/24	MET/S WG and Secretariat	SUPERCEDED by MET/S WG activities Ref: MET/IE WG, 5. Work Plan, Activity 6
22	**SIGMET Guide updates – MWOs in Australia:** Incorporate the required changes related to MWOs in Australia in the APAC Regional SIGMET Guide, Appendices C, D and E, and in the legacy FASID Table MET 3A and 3B information, as proposed in WP/12 [ref: para. 4.22.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/S WG, 5. Work Plan, Activity 4
23	**SIGMET pamphlets – requirements for updates:** Consider the States' requirements for, and the viability of producing further updated versions of the SIGMET pamphlets; remove the outdated SIGMET pamphlets from the ICAO APAC Office website [ref: para. 7.5. and 7.6.]	Before MET SG/24	MET/S WG and Secretariat	COMPLETED Ref: MET/S WG, 5. Work Plan, Activity 4
	SIGMET test			
24	**SIGMET test – notification to States:** Disseminate the invitation letter to States two-months in advance of the annual SIGMET test and a follow-up reminder email message approx. two-weeks prior to the first day of the test; request Sri Lanka to provide ICAO with the appropriate contact details to ensure the SIGMET test invitation is received by the participating MWO [ref: para. 6.2. and 6.13.]	Prior to SIGMET test	Secretariat	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 3 Invitation letter [Ref.: T 4/7.5-AP218/20(MET), 04 Nov 2020] Reminder Email [02 Dec 2020]
25	**SIGMET test results – corrective action plan:** Develop an action plan to assist States concerned with rectification of the (WP/14 and WP/27) identified SIGMET-related errors and deficiencies; the action plan referred should utilize the (Annex 3) SIGMET "TEST" provision to conduct state-specific SIGMET test to assess whether the corrective actions have been successful [ref: para. 6.3., 6.6. and 6.11.]	Before MET SG/24	MET/IE WG in conjunction with MET/S WG	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 3 AND Ref: MET/S WG, 5. Work Plan, Activity 3 [Ref.: T 4/7.5 - AP226/20 and AP227/20 (MET), 10 Nov 2020]

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
26	**SIGMET test results – follow-up with States:** Inform, by ICAO State letter, the States concerned of the SIGMET-related errors and deficiencies identified by the annual SIGMET test as presented in WP/14 and WP/27 and urge the States concerned to take the proposed corrective actions; inform Fiji, by ICAO State letter, of the incomplete data provided by RODB Nadi to the SIGMET test focal point in Singapore and lack of participation in the OPMET monitoring activities [ref: para. 6.4., 6.9. and 6.14.]	Before MET SG/24	Secretariat	COMPLETED Ref: MET/IE WG, 5. Work Plan, Activity 3 AND Ref: MET/S WG, 5. Work Plan, Activity 3 [Ref.: T 4/7.5 - AP226/20 and AP227/20 (MET), 10 Nov 2020]
27	**SIGMET test results – corrective action plan:** Support Mongolia with conducting a follow-up SIGMET test to facilitate rectification of the SIGMET-related dissemination deficiency as identified in the SIGMET test results in WP/27 and share with the MET/IE WG and MET/S WG the results of Mongolia's follow-up SIGMET test [ref: para. 6.10.]	Before MET SG/24	Singapore	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 3 AND Ref: MET/S WG, 5. Work Plan, Activity 3
28	**SIGMET test results – corrective action plan:** Investigate the reason for the reduced reception of SIGMET test messages at Regional OPMET Centre (ROC) London compared to APAC RODB's and share the results with MET/S for potential corrective action [ref: para. 6.12.]	Before MET SG/24	MET/IE WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 3 AND Ref: MET/S WG, 5. Work Plan, Activity 3
SIGMET Coordination activities				
29	**SIGMET Coordination activities – integration and expansion:** Consider the proposals presented in WP/19 and the results of the SIGMET coordination project presented in WP/20 when developing the work program on coordinating the next steps to promote integration and expansion of SIGMET coordination activities in the APAC Region [ref: para. 8.8. and 8.11.]	Before MET SG/24	MET/S WG	COMPLETED Ref: MET/S WG, 5. Work Plan, Activity 8
Other				
30	**VAAC back-up test procedures – review and update:** Refer to the pertinent information from IP/08 and determine appropriate action for the next review and update of the VAAC back-up test procedures [ref: para. 8.25.]	Before MET SG/24	MET/IE WG and MET/S WG	IN PROGRESS Ref: MET/IE WG, 5. Work Plan, Activity 4
31	**Special air-reports – promoting issuance of:** Continue to coordinate the required follow-up action (outstanding action item no. 8) concerning promoting the issuance of special air-reports; publicise by way of State letter (and/or other channels) the importance of exchanging special air-reports between airlines, ATS units and MWOs (and aerodrome meteorological offices) [ref: para. 7.2. and 8.21.]	Before MET SG/24	Secretariat	CLOSED MET/S to resolve via Action 31 Not in MET/IE WG or MET/S WG Work Program [Action Item MET/R WG 9/1]
32	**Air navigation deficiencies – resolution of:** Continue to support States, as necessary, such as Nepal, with developing and implementing their corrective action plans for the resolution of air navigation deficiencies [ref: para. 9.4.]	Before MET SG/24	Secretariat	CLOSED MET/S to resolve via Action 32 Ref: MET/S WG, 5. Work Plan, Activity 6

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILTY	STATUS/ REMARKS
33	**WAFS and SADIS – preparation for proposed changes:** Develop appropriate actions in the work program to facilitate States' awareness of and planning for the proposed (WP/25) WAFS and SADIS changes in November 2023 [ref: para. 10.5.]	Before MET SG/24	MET/S WG	CLOSED MET/S to resolve via Action 33 Not in MET/IE WG or MET/S WG Work Program

OUTSTANDING TASK LIST – MET/IE WG/17

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
17/1	Coordinate all necessary notifications concerning the planned handover of the provision of SIGMET service valid for Phnom Penh FIR from MWO Chengdu to MWO Phnom Penh, including the following: (a) changes to the routing of the SIGMET and advisory information at the responsible VAAC, TCAC and the RODBs; and (b) updates to the ANP, including the legacy FASID tables, and the Regional SIGMET Guide. *[Report of MET/IE WG/17, para. 3.1 – 3.4, refers]*	TBA	Cambodia and Secretariat	**TO COMMENCE** Action should be completed before handover of SIGMET service
17/2	Update the ICAO APAC Office website to clearly indicate to users which of the legacy FASID documents are replaced by the tables in the ANP. *[Report of MET/IE WG/17, para. 3.5, refers]*		Secretariat	Superseded by action item 18 ~~**IN PROGRESS**~~
17/3	Coordinate all necessary notifications concerning the planned provision by China of OPMET information for the new Beijing Daxing International Airport, from 15 August 2019, including the following: (a) updates to the ROBEX Handbook and notification to States via "METNO"; and (b) updates to the ICAO Doc. 7910 and APAC ANP, including AOP and MET tables. *[Report of MET/IE WG/17, para. 3.6 – 3.8, refers]*	17 Jun 2019	China and Secretariat	**TO COMMENCE** Action should be completed before commencement of new OPMET service
17/4	Coordinate a proposal to update the ROBEX Handbook to enable the regular exchange of several international OPMET bulletins to the ROBEX Centre Beijing and present it for further review and possible endorsement by MET/SG/23. *[Report of MET/IE WG/17, para. 3.9 – 3.12, refers]*	17 Jun 2019	China	**TO COMMENCE**
17/5	Submit a paper to MET/SG/23 providing guidance on the applicability of each IWXXM version to support States' implementation of the Annex 3 IWXXM provisions. *[Report of MET/IE WG/17, para. 4.9 – 4.11, refers]*	17 Jun 2019	Hong Kong, China	Redundant – Ref: IWXXM Guidelines doc. and ICAO Doc. 10003 ~~**TO COMMENCE**~~
17/10	Liaise with the SADIS Provider concerning obtaining OPMET availability statistics on SADIS for future meetings of the MET/IE WG. *[Report of MET/IE WG/17, para. 4.21, refers]*	Next meeting MET/IE WG	Secretariat	**IN PROGRESS**
17/11	Present a consolidated proposal for updates to the ROBEX Handbook, to reflect the establishment of an NOC (within the ROBEX scheme) in Vietnam, for further review and possible endorsement by MET/SG/23. *[Report of MET/IE WG/17, para. 5.9 – 5.10, refers]*	17 Jun 2019	Vietnam, Thailand and Secretariat	**IN PROGRESS**
17/12	Propose any necessary updates to the ROBEX Handbook to reflect the actual requirements for OPMET information. *[Report of MET/IE WG/17, para. 5.11 – 5.13, refers]*	17 Jun 2019	States with low PIs for OPMET	**IN PROGRESS**

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
17/13	In conjunction with the outstanding action item 16/5: (a) Prepare a checklist to assist States in systematically addressing the OPMET issues at locations with low PIs in the monitoring data; and (b) Provide the checklist as guidance to the States concerned. *[Report of MET/IE WG/17, para. 5.11 – 5.14, refers]*	Next meeting MET/IE WG	Secretariat and Thailand	**IN PROGRESS**
17/14	In order to ensure availability of OPMET bulletins at all RODBs: (a) Propose appropriate updates to the ROBEX scheme and ROBEX Handbook to include the requirement for ROBEX centres to send OPMET bulletins to all RODBs; and (b) Requested all ROBEX centres to send their associated OPMET bulletins to all RODBs. *[Report of MET/IE WG/17, para. 5.11 – 5.17, refers]*	17 Jun 2019	MET/IE WG	**IN PROGRESS**
17/16	Coordinate the requirements for all additional, new updates to the ROBEX Handbook and consolidate these into an update proposal for further review and possible adoption by MET/SG/23. *[Report of MET/IE WG/17, para. 6.5, refers]*	17 Jun 2019	Secretariat	**IN PROGRESS** Related to action items: 17/3, 17/4, 17/11, 17/12 and 17/14
17/17	Upload the *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* (Second Edition – 2018) on the ICAO APAC Office website and publicize the document with relevant National units. *[Report of MET/IE WG/17, para. 6.6 – 6.7, refers]*	17 Jun 2019	Secretariat and MET/IE WG	Superseded by Guidelines doc. 4th Edition on APAC website ~~**IN PROGRESS**~~
17/19	Review the reminder email in the VAAC back-up procedures and revise the contents, as necessary, to ensure the recipients are able to clearly and easily identify and understand the required actions. *[Report of conjoint session of MET/IE WG/17 and MET/S WG/9, para. 1.3 – 1.4, refers]*	Next VAAC back-up test	VAAC back-up test organizer/s	Superseded by action item 30 ~~**IN PROGRESS**~~
17/20	Propose updates to all required APAC documentation regarding the originating address of Australian WV SIGMETs (i.e., YMMC, rather than AMMC). *[Report of conjoint session of MET/IE WG/17 and MET/S WG/9, para. 2.24, refers]*	17 Jun 2019	Secretariat and Australia	**IN PROGRESS**

OUTSTANDING TASK LIST – MET/IE WG/16

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
16/4	Review the usage of the request-reply service provided and, where appropriate, arrange for the routine provision of OPMET bulletins as an alternative to the usage of the request-reply service for routine access to the stored OPMET data [Report of MET/IE WG/16, para. 5.8, refers].	Mar 2019	APAC RODBs	**IN PROGRESS**
16/5	Notify States concerned (as indicated in MET/IE WG/16, WP/06) of the requirement for appropriate corrective action to ensure the ongoing availability and compliance of the required OPMET data. Include reference to the corresponding ROBEX Centre contacts to assist States with identifying any distribution errors [Report of MET/IE WG/16, para. 5.10, refers].	Jun 2018	Secretariat	Superseded by MET/IE WG work plan Activity 1 and Activity 2 ~~**IN PROGRESS**~~
16/7	Coordinate with IATA the ongoing provision of OPMET monitoring information to assist the work programme and future meetings of the MET/IE WG [Report of MET/IE WG/16, para. 5.13, refers].	Jun 2018	Secretariat	Superseded by MET/IE WG work plan Activity 1 and Activity 2 ~~**IN PROGRESS**~~

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/ REMARKS
16/10	Notify States/Organizations of the availability of the current version of the ROBEX Handbook at the ICAO APAC Office website [Report of MET/IE WG/16, para. 6.6, refers].	Jun 2018	Secretariat	Superseded by MET/IE WG work plan Activity 1 and Activity 2 ~~**IN PROGRESS**~~
16/14	Promote, within the appropriate forum/s of the Pacific Meteorological Council (PMC), the need for MWOs in the Pacific Island States to participate in the Regional SIGMET tests [Report of MET/IE WG/16 and MET/S WG/8 conjoint session, paragraph 2.11 refers].	Aug 2018	Secretariat and Chair PIAWS Panel	**COMPLETE** ~~**IN PROGRESS**~~

OUTSTANDING TASK LIST – ROBEX WG/13

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
13/7	Investigate feasibility of including provisions in the regional guidance material related to the issuance of routine TAF at intervals of three (3) hours; present draft material to MET SG/21 [Ref: ROBEX WG/13 Decision 13/7].	June 2017	Secretariat and ROBEX WG	**IN PROGRESS** Coordinate necessary follow-up through the ICAO ANP working group [Ref: MET/IE WG/16 Report para. 2.9].

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APPENDIX B

ICAO ASIA AND PACIFIC METEOROLOGICAL INFORMATION EXCHANGE WORKING GROUP (MET/IE WG)

TERMS OF REFERENCE AND WORK PLAN

TERMS OF REFERENCE

1. MEMBERSHIP
The MET/IE WG is made up of experts from the following bodies: • APAC Regional OPMET Data Banks (RODBs): Brisbane, Nadi, Tokyo, Singapore and Bangkok; • APAC Regional OPMET Centres (ROCs); • World Area Forecast Centres (WAFCs), London and Washington; • Secure Aviation Data Information Service (SADIS) and WAFS Internet File System (WIFS) Provider States, United Kingdom and United States; • APAC Volcanic Ash Advisory Centres (VAACs): Darwin, Tokyo and Wellington; • Designated focal points for SIGMET tests and regional OPMET bulletin exchange (ROBEX); • Pacific Islands Aviation Weather Services (PIAWS) Panel; and • International Air Transport Association (IATA).

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2. DESCRIPTION	
Objective	Increase OPMET availability and reliability needed for flight planning (efficiency) and in-flight re-planning (safety) in support of the Global Air Navigation Plan (GANP) framework and the Aviation System Block Upgrade (ASBUs) methodology.
Benefits	Increase in safety and efficiency (time and fuel savings).
Functions of the group	Under guidance from the ICAO APAC Secretariat: a) Review the OPMET exchange schemes in the APAC and other regions and develop proposals for their optimization, taking into account the requirements by the aviation users and global OPMET exchange;

	b) Review and update of the procedures for inter-regional OPMET exchange and ensure the availability of the required APAC OPMET data for SADIS and WIFS; c) Report on deficiencies in the format and dissemination of OPMET messages; d) Monitor and participate in inter- and intra-regional trials of aeronautical meteorological information exchange in support of the implementation of IWXXM and SWIM; e) Conduct trials and develop standardized quality control, monitoring and management procedures related to exchange of IWXXM and TAC OPMET information; f) Participate in the implementation and promote awareness of the transition to digital exchange of OPMET (IWXXM) and System Wide Information Management (SWIM); g) Conduct regular regional VAAC back-up and SIGMET tests; h) Provide support for the APAC Volcanic Ash Exercises; i) Review and update the regional guidance material related to OPMET exchange, including relevant material on IWXXM, AMHS and SWIM; j) Liaise and consult with other appropriate bodies within ICAO and WMO dealing with communication and/or management aspects of the OPMET exchange; and k) Provide advice and report to the MET Sub-group on the above issues for further co-ordination through the ICAO Secretariat with other appropriate bodies.

3. COMMUNICATION STRATEGIES				
Description	**Target Audience**	**Delivery Method**	**Frequency / Date**	**Responsibility**
Interim Work Program Progress Report	MET/IE WG Members	Web-conference E-mail	Quarterly/as determined by Chair	Chair and Secretariat
MET Chairs Coordination Meeting	Chairs of MET SG and its contributory working groups	Web-conference E-mail	reflect the requirement for an annual (quarterly) schedule of c	Chair and Secretariat
Major Work Program Progress Report	MET/IE WG Members	Working Paper (MET/IE WG meeting)	Annually/published 14-days or more before the meeting	Chair and Secretariat
General correspondence	MET/IE WG Members	E-mail	As required	MET/IE WG Members
New, specific proposal for action (WP)	MET/IE WG Meeting	Working Paper (MET/IE WG meeting)	Annually/submitted 28-days or more before the meeting (published 14-days or more before the meeting)	MET/IE WG Members or States
New, specific information (IP)	MET/IE WG Meeting	Information Paper (MET/IE WG meeting)	Annually/submitted 28-days or more before the meeting (published 14-days or more before the meeting)	MET/IE WG Members or States
Working Group Meeting Report	MET/IE WG Members and all APAC States	MET/IE WG Meeting Report	Annually/published 21-days or less after the meeting	Chair and Secretariat
Working Group Progress Report	MET SG Meeting	Working Paper (MET SG meeting)	Annually/submitted 28-days or more before the meeting (published 14-days or more before the meeting)	Chair and Secretariat

WORK PROGRAM

Activity	**Time Frame**	**Responsibility**	**Status**
Activity 1: Availability of OPMET information	Ongoing	MET/IE WG	
Activity 2: Timeliness, compliance and regularity of OPMET exchange	Ongoing	MET/IE WG	
Activity 3: SIGMET and Advisory Tests	Ongoing	MET/IE WG	
Activity 4: VAAC Backup Tests	Ongoing	MET/IE WG	
Activity 5: IROG Backup Tests	Ongoing		
Activity 6: Regional guidance material related to data exchange	Ongoing	MET/IE WG	
Activity 7: IWXXM implementation	2020~~1~~-2021~~3~~	MET/IE WG	
Activity 8: MET information exchange scheme	2020~~1~~-2026	MET/IE WG	
Activity 9: MET information in SWIM	2020~~1~~-2026		

5. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1: Availability of OPMET information				
Activity 1.1: Perform real time monitoring if required	IATA	-	If required	
Activity 1.2: Monitor and score SADIS/WIFS OPMET reception.	IATA	-	Annually Jan	
Activity 1.3: Capture OPMET monitoring,	RODBs	1.2	Annually Oct/Nov	
Activity 1.4: Assess TAC OPMET monitoring results and share results with RODBs	RODB Bangkok	1.3	Annually Oct/Nov	
Activity 1.~~5~~6: Prepare paper reporting results and deficiencies to MET/IE WG meeting.	IATA and RODB Bangkok	1.4	Annually Feb	
Activity 1.~~6~~7: Report summary of OPMET availability results to MET SG	Secretariat and Chair	1.5	Annually May	
Activity 1.~~7~~8: Advise States of OPMET deficiencies and corrective actions.	Secretariat	1.6	Annually Jun	
Activity 1.~~8~~9: Actively engage States with corrective against deficiencies.	ROCs	1.7	As required	
Milestone 1: Achieve 95% (90%) or greater OPMET availability for AOP (non-AOP) aerodromes at RODBs and WAFS.	MET/IE WG	1.8	Annually Jun	
Activity 2: Timeliness, compliance and regularity of OPMET exchange				
Activity 2.1: Monitor and collate OPMET data.	RODBs and IATA	-	Annually Dec	
Activity 2.2: Score RODB OPMET reception against PI thresholds.	RODB Bangkok	-	Annually Jan	
Activity 2.3: Analyse data and share results with RODBs	RODB Bangkok	2.2	Annually Jan	
Activity 2.4: Prepare paper report results to MET/IE WG meeting and identify corrective actions	RODB Bangkok	2.3	Annually Feb	
Activity 2.5: Report summary of OPMET timeliness, compliance and regularity results to METSG	Chair	2.4	Annually May	
Activity 2.6: Inform States of non-compliance and corrective actions	Secretariat	2.5	Annually Jun	
Activity 2.7: Provide support for States to rectify deficiencies if requested.	RODBs	2.6	As required	
Milestone 2: Achieve 95% (90%) or greater OPMET timeliness, compliance and regularity for AOP (non-AOP) aerodromes at RODBs, SADIS and WIFS.	MET/IE WG	2.7	Annually Jun	
Activity 3: SIGMET and Advisory Tests				
Activity 3.1: Review SIGMET Test procedures	MET/IE WG	-	Annually Aug	

5. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 3.2: State Letter regarding SIGMET Tests	Secretariat	3.1	Annually Sep	
Activity 3.3: Email States regarding SIGMET Tests	Secretariat	3.2	Annually	Last Wed in Oct
Activity 3.4: Conduct and collate data for WC SIGMET Tests	RODBs	3.2	Annually	2nd Wed in Nov
Activity 3.5: Conduct and collate data for WV SIGMET Tests	RODBs	3.2	Annually	3rd Wed in Nov
Activity 3.6: Conduct and collate data for WS SIGMET Tests	RODBs	3.2	Annually	4th Wed in Nov
Activity 3.7: Analyse test data	RODB Singapore and Tokyo	3.4 - 3.6	Annually Jan	
Activity 3.8: Assess SIGMET test results to identify corrective actions from Nov tests	RODB Singapore and Tokyo	3.4 - 3.6	Annually Feb	
Activity 3.9: Report to MET/IE WG	RODB Singapore and Tokyo	3.8	Annually Mar	
Activity 3.10: Report on SIGMET Test Results to MET SG.	Chair	3.9	Annually May	
Activity 3.11: Advise States of SIGMET deficiencies	Secretariat	3.9	Annually Jun	
Milestone 3: Improved issuance and compliance of SIGMETs	MET/IE WG	3.11	Annually Jun	
Activity 4: VAAC Back-up Tests				
Activity 4.1: Review and Update VAAC Back-up Test procedures	MET/IE WG and VAACs		Annually	2 months prior to test
Activity 4.2: Issue Notice of VAAC Back-up Tests	Secretariat/VAACs	4.1	Annually Aug	
Activity 4.3: Conduct VAAC Back-up Test between Darwin and Tokyo	VAACs	4.2	Annually Oct – TBC	
Activity 4.4: Conduct VAAC Back-up Test between Darwin and Wellington	VAACs	4.2	Annually Oct – TBC	
Activity 4.5: Collect test results and send to VAAC Provider State members	RODBs	4.3	Annually Oct – TBC	
Activity 4.6: Analyse Test results	VAAC Back-up Focal Points Members	4.5	Annually Nov	
Activity 4.7: Report to MET/IE WG	VAAC Back-up Focal Points Members	4.6	Annually Feb	
Activity 4.8: Report to MET SG.	Chair	4.7	Annually May	
Activity 4.9: Advise relevant States, VAACs and RODBs of any deficiencies.	Secretariat	4.7	Annually Jun	
Milestone 4: VAAC Back-up Tests conducted, analysed and report complete.	VAAC Back-up Focal Points Members	4.8	Annually Jun	

5. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 5: IROG Back-up Tests				
Activity 5.1: Investigate the feasibility and benefits of back-up arrangements of IROG Tokyo, Nadi and Brisbane	IROG Nadi, Tokyo and Brisbane	-	Nov 2020~~0~~1	
Activity 5.2: Review IROG Back-up Test procedures to include all IROG.	IROG Bangkok and Singapore	-	Apr 2019, Annually Feb	
Activity 5.3: Updated IROG Back-up Procedures in ROBEX Handbook.	Secretariat	5.2	Annually May	
Activity 5.4: Identify list of MET Bulletins to monitor.	IROG Bangkok and Singapore	-	Annually Jan/Feb	
Activity 5.5: Conduct IROG Back-up Test of Bangkok and analyse results	IROG Bangkok and Singapore	5.4	Annually Sept/Oct	
Activity 5.6: Conduct IROG Back-up Test of Singapore and analyse results	IROG Bangkok and Singapore	5.4	Annually Jan/Feb	
Activity 5.8: Report to MET/IE WG	IROG Bangkok and Singapore	5.7	Annually Mar	
Milestone 5: IROG Back-up Tests conducted, analysed and report complete.	IROG Bangkok and Singapore	5.7	Annually Mar	
Activity 6: Regional guidance material related to data exchange				
Activity 6.1: Review monitoring procedure in ROBEX Handbook and update as necessary.	All RODBs	-	Annually Apr	
Activity 6.2: Changes to RODB monitoring procedures and updates to Appendix A and B in ROBEX Handbook.	Secretariat	6.1	Annually May	
Activity 6.3: Document roles for monitoring IWXXM performance in APAC	WG		Nov 2021	
Activity 6.4: Define quality threshold for translated data	IATA, Chair WG		Nov 2021	
Activity 6.~~3~~5: Advise Secretariat of changes to ROBEX Handbook.	All States	-	Annually Apr	
~~Activity 6.4: Incorporation of AMHS and Addressing in ROBEX Handbook.~~	~~Pierre and Marco~~		~~Sep 2020~~	
Activity 6.~~5~~6: Complete update of ROBEX Handbook including Table MET 2A.	Secretariat	-	Annually May	
Activity 6.~~6~~7: Review ANP Tables (initially MET II-2) and ensure all necessary aerodromes are contained in OPMET bulletins	WG	-	May Annually	
Activity 6.~~7~~8: Seek MET/SG endorsement of the updated ROBEX Handbook.	Secretariat	-	Annually Jun	
Activity 6.9. Support MET SG with development of MET-specific requirements in the ANP, Volume III	WG		As required	
Milestone 6: RODB Monitoring procedures published in ROBEX Handbook	Secretariat	6.7	Annually Sep	
Activity 7: IWXXM Implementation				

5. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 7.1: Monitor migration to IWXXM.	WG	-	As required	
Activity 7.2: Conduct survey to determine status of IWXXM Implementation.	Secretariat		~~July 2020,~~ May 2021	
Activity 7.3: Report to MET SG on APAC States' IWXXM implementation status and need/timing for another APAC IWXXM Workshop.	Secretariat/Chair, WG	7.2	Next meeting MET SG	
Activity 7.4: Increase awareness of the requirement for States to exchange of OPMET data in IWXXM format and the impact of inability to do so.	WG		As required	
Activity 7.5: Support States with the planning and implementation of the dissemination of the required meteorological information in IWXXM form, in particular at the designated APAC Regional OPMET Centres (ROCs) and Regional OPMET Databanks (RODBs).	WG		As required	
Activity 7.~~5~~6: Conduct IWXXM tests and report to MET/IE WG and RODB Singapore on the status of the testing and implementation of digital OPMET exchange.	WG		Annually Mar	
Activity 7.~~6~~7: Maintain a register of IWXXM tests conducted, detailing Met software, UAs and MTAs tested	RODB Singapore	7.5	As required	
Activity 7.~~7~~8: Arrange provision for the next IWXXM Workshop in APAC	Secretariat/Chair, WG	7.2	Sep 202~~0~~1	
Activity 7.~~8~~9: Actively participate in the next APAC IWXXM Workshop	Secretariat/Chair, WG	7.7	Oct 202~~0~~1	
Activity 7.~~9~~10: Prepare information (e.g. issues, CONOPS) for MET/P WG-MIE	WG		As required	
Activity 7.~~10~~11: Development and Publishing AMHS/FTBP network map	Pierre, Secretariat		Monthly	
Activity 7.~~11~~12: State IWXXM status register	Secretariat		Monthly	
Milestone 7: Report to MET/IE WG and MET SG on IWXXM exchange and testing.	Secretariat and Chair	7.5, 7.6 and 7.8	Annually May	
Activity 8: MET Information Exchange Structure				
Activity 8.1: Review ROBEX Scheme diagram.	All RODBs, Secretariat		May Annually	
Activity 8.2: Review the structure of the ROBEX exchange in light of the introduction of SWIM.	WG		Annually Feb	
Activity 8.3: Review use of the Request/Reply service	RODBs	-	May 2021	
Activity 8.4: Improve the efficiency of Request/Reply service	RODBs	8.3	Sep 2021	
Milestone 8: Improved efficiency and effectiveness of ROBEX Scheme	MET/IE WG	-	2021	
Activity 9: MET information in SWIM				

5. WORK PLAN				
Activity / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 9.1: Assist in the definition of the APAC SWIM Met service catalogue	WG	-	As required	
Activity 9.2: Assist in the definition of the APAC SWIM Met data catalogue	WG	-	As required	
Milestone 9: Participated in the development of SWIM Meteorological services for APAC	MET/IE WG	-	2023	

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IWXXM IMPLEMENTATION IN APAC REGION

Frequently Asked Questions
(FAQs)

Working Draft (October 2021)

Introduction

The majority of the information contained below are answers to questions raised during previous ICAO APAC IWXXM workshops or webinar:

- Hong Kong, China (10 – 12 October 2017)
- Bangkok, Thailand (12 – 14 June 2019)
- Nuku'alofa, Tonga (04 – 06 December 2019)
- Webinar (27 – 29 October 2020)

These FAQs are categorized into the following topics:

1. What is IWXXM?
2. The role of IWXXM in the international air navigation system
3. IWXXM production
4. IWXXM exchange
5. IWXXM exchange testing
6. IWXXM compression
7. IWXXM versions
8. IWXXM translation
9. IWXXM validation and QC
10. IWXXM extensions
11. Guidance, education, capacity building
12. End-user considerations
13. Cyber security

For further details, please refer to the aforementioned technical presentations and the following ICAO documentation:

- ICAO Doc 10003 – *Manual on the Digital Exchange of Aeronautical Meteorological Information*
- ICAO IWXXM Guidelines - *Guidelines for the Implementation of OPMET Data Exchange using IWXXM* (Refer https://www.icao.int/APAC/Pages/eDocs.aspx > MET)

1. What does the acronym IWXXM stand for?

1.1 What does the acronym IWXXM stand for?

- ICAO Meteorological Information Exchange Model (commonly mistakenly pronounced as ICAO Weather Information Exchange Model due to the WX in the acronym).

1.2 What actually is IWXXM?

- It is a form of human-readable and machine-readable computer code in Extensible Markup Language (XML). It also uses Geography Markup Language (GML) which is a way of writing geographic information in Extensible Markup Language (XML) in order to share, store and display geographic information.

1.3 What will IWXXM be used for?

- IWXXM products are used for operational exchanges of meteorological information for use in aviation. It includes XML/GML-based representations for current products standardized in International Civil Aviation Organization (ICAO) Annex 3 and World Meteorological Organization (WMO) No. 49, Vol II, such as METAR/SPECI, TAF, SIGMET, AIRMET, Tropical Cyclone Advisory, Volcanic Ash Advisory and Space Weather Advisory, but will expand the scope significantly beyond these legacy formats for meteorological data.

1.4 Why change to IWXXM?

- Using XML and GML formats allows significantly more richer data to be shared more efficiently between modern systems. This will contribute to greater efficiency and safety in air traffic both for Aircraft Operators (AOs) and Air Navigation Service Providers (ANSPs).

1.5 Who will use IWXXM?

- Because IWXXM is for sharing aviation meteorological data, all stakeholders in the aviation value-chain, in particular Air Traffic Management, will gain value from having IWXXM capable systems. This includes airlines, ANSPs, airports and of course MET service providers.

2. The role of IWXXM in the international air navigation system

2.1 What's the relationship between the role of IWXXM and GANP?

- We are migrating from product-centric to data-centric in accordance with the Global Air Navigation Plan (GANP). For more information on the latest GANP, refer to https://www4.icao.int/ganpportal/

2.2 We need to transition from traditional alphanumeric code (TAC) form to IWXXM. Specifics to this transition include:

- Introduction of IWXXM.
- Proposal to remove generation of TAC as an Annex 3 standard from 2026.
- States should consider necessary systems changes to migrate to IWXXM data as an alternate information service by 2026.
- These Annex 3 changes do not preclude a State from generating TAC but there will be no ICAO requirement for international distribution or distribution to other States.

2.3 What's the next plan of ICAO on IWXXM in detail?

- Refer to presentation on GANP
- Following the initial IWXXM implementation, ICAO is planning to migrate IWXXM away from being product oriented (e.g. METAR, TAF) to be more service oriented. As a result, it is expected that new IWXXM reports for aerodrome observations and aerodrome forecasts will likely be

introduced

2.4 How does the ICAO Meteorological Panel (METP) roadmap envisage architecture for exchange of IWXXM after 2026? AMHS or SWIM?

- The architecture will migrate into a SWIM architecture. The exact architecture is still being developed but here is the current draft proposal of timeframe and capabilities:

	Block 0 2013-2018	**Block 1 2019-2024**	**Block 2 2025-2030**	**Block 3 and Beyond >2031**
Communication Protocols	AFTN AMHS Basic	AFTN AMHS Basic AMHS FTBP AMQP/HTTP (optional)	AMHS FTBP AMQP/HTTP	AMQP/HTTP
Information Exchange Services	RODB TAC request/reply RODB IWXXM request/reply	RODB TAC request/reply RODB IWXXM request/reply RODB IWXXM notification (optional) WFS, WCS, WMS (optional)	RODB IWXXM request/reply RODB IWXXM notification (optional) WFS, WCS, WMS	WFS, WCS, WMS Other web services
Data Types	Gridded Objects	Gridded Objects	Gridded Objects	Gridded Objects
Data Addressing	AFS Addressing	AFS Addressing IP (optional) SWIM Registry (optional)	AFS Addressing IP SWIM Registry	IP SWIM Registry

2.5 How to manage TAC from now until 2026?

- No different to today

2.6 The timetable of IWXXM development in the future?

- The timetable is still being developed. Eventually all text Annex 3 products will either be migrated to IWXXM or they will be decommissioned. Annex 3 products are being implemented in IWXXM-form in a priority order. The remaining order is currently being reanalysed. The next products to be developed in IWXXM are SIGWX (high/mid & low). Regional Hazardous Weather Advisory products may follow.

2.7 Will future ICAO provisions for METAR/SPECI enable automated data via IWXXM?

- Yes
- While IWXXM provides opportunities for exchange of high-fidelity MET observation data, the MET Panel is capturing user requirements which will either result in updates to existing IWXXM schema or more likely introduction of new IWXXM reports to meet these new needs.

2.8 How to transmit MET information (beyond Annex 3 products) in IWXXM (Radar, LLWAS, ATM-tailored Met Info, etc.)

- IWXXM is well suited to supporting point, line and polygon-based features. Other formats such as gridded (e.g. GRIB) formats and image (e.g. PNG) are better suited for some products and these will

be implemented through SWIM which is beyond the scope of IWXXM.

- These requirements and services are being developed in ICAO METP and will be discussed further at other ICAO APAC forums such as the System Wide Information management (SWIM) Task Force (SWIM/TF) and other workshops.

2.9 What is the global/regional plans for transition to SWIM – roles of MET in SWIM?

- METP/4, Recommendation 5/5, endorsed the MET-SWIM Plan and MET-SWIM Roadmap and invited ICAO to upload the draft MET-SWIM Plan and draft MET-SWIM Roadmap to the ICAO METP website (both public and secure) and to distribute it to the Planning and Implementation Regional Groups (PIRGs).
- "Plan for MET in SWIM" is available at: https://www.icao.int/APAC/Pages/eDocs.aspx > MET

2.10 Will displaying historic data become an issue for any tool in the future? It will need to be able to handle TAC as well as all IWXXM editions that may have been used.

- Potentially. This is being considered by both ICAO and WMO. This should also be considered by States. Often historic records are not kept in their WMO/ICAO format but instead as records in a database.

~~2.11 Meteorological services do more than just supply aviation data so will METAR format remain for non-aviation use?~~

- ~~METAR/SPECI formats are used more broadly than aviation.~~
- ~~WMO is discussing the introduction of IWXXM with its members and will do the same for removal of METAR. It's likely that IWXXM will be adopted more broadly than aviation~~.

2.12 What if meteorological fields evolve far faster than the standard IWXXM format wants to handle?

- Yes, this is possible. If users have local requirements, they can extend the IWXXM schema through extensions, as they do with the TAC today through remarks
- If the same extensions capability is required by multiple States, a regional extension or global optional parameter may be implemented
- Extending the schema does however come with a range of other requirements and costs for States and users, so careful consideration should occur before a State chooses to extend the schema.

2.13 Can we use TAC format (current format) before implementing IWXXM?

- TAC for OPMET is an ICAO standard in Annex 3 and will continue to be until 2026 (at least). So you will need to continue to provide TAC.
- IWXXM became an ICAO Annex 3 standard in November 2020.

2.14 If a State is yet to implement IWXXM, what should they do?

- If implementation of IWXXM is delayed (due to COVID or any other reason), a State should register a difference against the relevant Annex 3 provisions in the Electronic Filing of Differences (EFOD) system with an estimated date of implementation.
- Please use the EFOD to file the differences including with Am. 79. Please note that, with reference to ICAO State Letter AN 11/55-20/50, ICAO created a COVID-19 Contingency Related Differences (CCRD) sub-system in the existing EFOD system to capture any differences from ICAO Standards on certification and licensing that may arise from mitigation measures due to the COVID-19 pandemic. It is accessible via the USOAP dashboard. The CCRD specifically facilitates recognition or validation of licenses or certificates affected by the special measures.
- States can also look to arrange another State to perform TAC to IWXXM translation to support expedited IWXXM implementation.

2.15 Is the flexibility in the implementation timelines sufficient to allow for the impact of COVID 19.

applicable to both MET providers, COM and all users?

- Annex 3 amendment cycle changed to a 3-year cycle. Next main amendment is 2023 then 2026 etc.
- METP, in conjunction with WMO and IATA, are looking at impacts of COVID-19 - particularly on when Annex 3 provisions become applicable and how we will implement IWXXM and SWIM in a cost-effective manner.
- ICAO & IATA are encouraging earlier adopters.

2.16 Any insight on what will be included in Annex 3, Amd. 80, 81, and 82?

- Amd 80 (2021) is only introducing changes to State of the Runway (no other changes).
- Amd 81 (2023), IWXXM and TAC are still standards. Procedures for Air Navigation Services – Meteorology (PANS-MET) is likely to be introduced.
- Amd 82 (2026), IWXXM is still a standard. ICAO & IATA are still looking at whether TAC remains as a standard (and a means of compliance if PANS-MET is implemented). Another critical thing we need to look at is the implementation of SWIM in this timeframe - particularly given COVID-19.

3. IWXXM production

3.1 Is it mandatory for IWXXM to be from source?

- No, but the best implementation is IWXXM generated at source
- Preference for IWXXM generated at source (best implementation), but IWXXM converted from TAC is better than no IWXXM
- In the future IWXXM will contain information not present in TAC, so it will not be possible to generate this from TAC.

3.2 If a parameter is missing in TAC (e.g., WX is missing in METAR) how to generate the report in IWXXM?

There are all sorts of examples at IWXXM translation repository in the Github of WMO Information Management for IWXXM: https://github.com/wmo-im/iwxxm-translation

- Is it possible to make the IWXXM element "translatedBulletinID" mandatory for easy reference to the TAC bulletin?
- While the attribute "translatedBulletinID" is optional, it's presence will be checked by schematron rule Common.Report-3 in iwxxm.sch. See the one for IWXXM 3.0.0 at official schema repository of the World Meteorological Organization (WMO): http://schemas.wmo.int/iwxxm/3.0/rule/iwxxm.sch

3.3 Is there any experience or suggestions about how to convert the location of the significant weather in TAC report to latitude and longitude (or polygons) in IWXXM?

- It's always easier to start with a polygon in the TAC SIGMET message. So where possible it is preferred that a polygon is used. However, Annex 3 still allows us to write "S OF", W OF", "ENTIRE FIR" etc. In that case the FIR boundary needs to be used to help make up the polygon.
- The line will intersect with the FIR and together they will form a closed polygon covering the meteorological phenomenon involved. There are many software libraries out there to help you do the intersection and return the polygon to you.
- There is also a wiki page summarizing the way geometric objects are described in different IWXXM reports. You may want to take a look at https://github.com/wmo-im/iwxxm/wiki/Geospatialobjects-in-IWXXM

3.4 When we would like to disseminate IWXXM reports, is it always necessary to aggregate the reports? I wonder whether we must use <collect:...> schema even if we would like to send non-regular reports,

such as SIGMET, SPECI and TAF AMD.

- Only METAR and TAF needs to be aggregated.
- All IWXXM messages, no matter aggregated or not, will have to be encapsulated with COLLECT before sending out through AMHS.

4. IWXXM exchange

4.1 Should TAC over AMHS be distributed independently of IWXXM, or part of IWXXM?

- TAC and IWXXM should be distributed independently, in parallel
- For every TAC message, there should be corresponding IWXXM report, and visa-versa
- Inclusion of TAC inside (the comments part of) IWXXM is not recommended. WMO have done this in their examples such that users can clearly see the corresponding TAC and IWXXM information
- Note: When producing IWXXM from TAC, and the translation cannot be reliably performed, the original TAC is included in the message with no further information

4.2 How to manage exchange of TAC and IWXXM concurrently within COM networks?

- The TAC and IWXXM messages have different (but correlated) headers, such that they will not be confused e.g. an Australian TAF TAC bulletin and IWXXM collective would have the WMO headers of FTAU31YBBN and LTAU31YBBN, respectively.

4.3 Will IWXXM be disseminated by Regional OPMET Centres (ROCs) in the same way as ROBEX Handbook?

- IWXXM exchange shall differ from traditional OPMET exchange, whereby:
  - There is no distributing responsibility for originating stations and National OPMET Centres other than to get their products to their Regional OPMET Centre (ROC);
  - Originating ROC distributes every type of IWXXM OPMET to all other ROCs in the APAC region; and
  - ROCs will distribute received IWXXM messages to the NOC and users in their respective area of responsibility.

4.4 How will ROCs identify whether recipients are capable of receiving IWXXM?

- Refer to Online Register of APAC IWXXM Exchange Status, which will be included in the ROBEX Handbook. This online register records the implementation status of IWXXM exchange, including their readiness to receive IWXXM, corresponding AMHS addresses, supported AMHS capability and the status in disseminating IWXXM reports to other ROCs or National OPMET centres (NOCs).

4.5 What is the status and capability States with respect to AMHS with FTBP in the APAC region?

- Refer to the Online Register of APAC IWXXM Exchange Status
- Refer to papers, presentations, discussions, reference material, networking contacts in the previous IWXXM workshops and MET/IE WG meetings

4.6 What protocol is used between the MET/IWXXM generation system and the AMHS for exchange of IWXXM?

- Entirely the prerogative of the State, but AMHS/FTBP is preferred. A secure method of transfer is recommended. ICAO does not require AMHS/FTBP for exchange within the State.

4.7 What is the bandwidth requirement for exchange of IWXXM using AMHS Extended services?

- Depends on amount of IWXXM reports exchanged and what other data is sent on the link, but IWXXM is approximately 10x data volume of TAC and IWXXM will be sent in addition to TAC and other data

- States should ensure there is adequate capacity in their communication links to support the new IWXXM data

4.8 What is the dependency of the exchange of IWXXM within the Region and Globally?

- The exchange of IWXXM within the Region and Globally is dependent on the ROCs and RODBs being IWXXM-exchange capable and therefore ROCs and RODBs need to be the first to implement support for IWXXM and AMHS+FTBP+IHE.

4.9 What is the technical specification for gateways system that will translate TAC to IWXXM format?

- There is no single technical specification. There is a functional description of the capability with the IWXXM Guidelines but interface specification may vary between different solutions/vendors and may include web service, AFTN links, or various other interfaces.

4.10 How do we ensure that there is no message lost in the AMHS when handling TAC & IWXXM format during the Transition period (mixed environment)?

- This has been designed into the system architecture for this transition period. Once IWXXM is implemented, there shall be one IWXXM message for every TAC message. If converting from TAC to IWXXM and poorly formed TAC is identified, then a partially translated IWXXM will be generated. Refer to IWXXM Guidelines.

4.11 Do we need to save all of the converted data in IWXXM to our disk storage? Since the size of the converted data in IWXXM is larger than TAC format but the content is same.

- ICAO requires States to archive all aviation products for at least 28-days. Longer is recommended for various reasons, including investigations and verification.

4.12 What is the maximum size permissible for IWXXM attachments in AMHS?

- AMHS network should support the transfer of IWXXM messages with a maximum file size of 4 MB including FTBP of up to 2 MB [*Guidelines for the implementation of OPMET data exchange using IWXXM*, 4.1.5, refers]

4.13 What if the bandwidth of a comms link is insufficient to satisfy IWXXM requirements in some existing AMHS circuits?

- Yes, bandwidth is likely to be insufficient in some APAC links
- Upgrades of these links may be required and can be addressed through either through capacity changes of the existing links or the use of the CRV
- Higher than 64 Kbps is recommended, and the required bandwidth is dependent on the use on the link.

4.14 May I know who is actually responsible for technical implementation of AMHS in a particular member country? Is it responsibility of MET or COM?

- Annex 3 [2.1.4] requires that each Contracting State shall designate the authority, hereinafter referred to as the meteorological authority (MA), to provide or to arrange for the provision of meteorological service for international air navigation on its behalf. Therefore, the MET Authority has a clear role and responsibility in ensuring the dissemination of MET information in IWXXM form. It follows that the MA has a responsibility in ensuring that the required mechanism/s are in place (e.g., AMHS + FTBP) to enable the State to disseminate the required MET information in IWXXM GML form. It will almost undoubtedly require close liaison between those concerned with the supply (e.g., MET service provider, COM service provider) and those concerned with the use of meteorological information.

4.15 The exchange of IWXXM requires full path of FTBP-capability communications from originator to

destination. It's hard to ensure the whole path is FTBP-ready especially during interruption or reply to an RQX.

- Agree. This is the case until all of the AFS network is AMHS FTBP.

4.16 Is there any document describe more detail about RQX and RQM, which explain the IWXXM step before passing AMHS?

- Please refer to IWXXM Guidelines:
  - 2.8 International OPMET Databank, Operational principles: - OPMET Databank Requests
  - 5.1.5 International OPMET Databank, Operational principles: - DB Requests

4.17 Can AFTN links support the relay of IWXXM?

- Due to technical differences between the old and new formats, aeronautical meteorological information in IWXXM form cannot be transmitted in the same way as it is in Traditional Alphanumeric Code (TAC) form via the Aeronautical Fixed Telecommunication Network (AFTN). Instead, the ICAO guidance identifies the Air Traffic Services Message Handling System (AMHS) as a mechanism for the exchange of IWXXM information using the extended AMHS File Transfer Body Part (FTBP) feature over the Aeronautical Fixed Service (AFS).
- In addition, due to the much larger file sizes associated with IWXXM, the ICAO guidance indicates that the total size of an AMHS message (including FTBP) should be up to 4 MB.

4.18 When the IWWXM bulletin is needed to be disseminated to many destinations, could all of the addresses be added in one AMHS message (like sending an e-mail)?

- Many addresses can be added in one AMHS message. For your system it will just be one message being sent out, but it may end up at 20 destinations.

4.19 Are there any ICAO procedures or guidelines that any NOC has to follow if there is a need to request IWXXM translation services from ROC? If so, any template or predefined form that could be used?

- Please refer to IWXXM Guidelines, including sections 6.3.1: Prerequisites for Translation Centres; and 6.3.7: Translation Agreement.

4.20 Our system now sends out 2 body parts for IWXXM message, one as ATS headers with no message and second as FTBP. Are ATS Headers needed for Basic AMHS with FTBP as originators/recipients.

- IHE and FTBP should be used for the IWXXM exchange over AMHS.
- IWXXM messages should be exchanged using extended AMHS FTBP (single body part) with IPM Heading Extension (IHE). You may refer to ICAO document 'Guidelines for the implementation of OPMET data exchange using IWXXM'.

5. IWXXM exchange test

5.1 TEST message addresses: is anyone considering being a test (AMHS) endpoint for any parties/countries to send their test IWXXM?

- It is recommended that the RODBs plus any additional volunteer States conduct coordinated testing of IWXXM exchange of AMHS+FTBP as early as possible, if not already done so. It would also be beneficial for airlines to undertake test with ANSP and MET agencies to understand user needs and potential system solutions.

5.2 How to conduct simulations (tests) of sending/exchanging OPMET data thru AMHS in IWXXM format?

- As answer to Q43 above
- Ref: *Guidelines for the implementation of OPMET data exchange using IWXXM*

5.3 Where can one find the knowledge of Tests Performed?

- A log of international IWXXM exchange test on behalf of MET/IE WG is being maintained by
  - MET/IE WG Activity 7.2: Undertake IWXXM tests with other centres
  - MET/IE WG Activity 7.6: Maintain a register of IWXXM tests conducted, detailing Met software, UAs and MTAs tested

5.4 What are the common issues observed during IWXXM exchange test over AMHS?

- Two body parts are observed, while IWXXM shall contain single body part which is an FTBP
- Required fields are missing or in incorrect format, such as Precedence, Precedence-policy-identifier 1.3.27.8.0.0 and Authorization Time (should ends with "Z")
- Reference: Appendix A of "Guidelines for the Implementation of OPMET data exchange using IWXXM "

6. IWXXM compression

6.1 Will compression always be required?

- Gzip compression has been adopted for IWXXM compression
- Compression shall always be done unless a specific agreement has been reached with the corresponding NOC or ROC to perform the compression on behalf of the originating State
- Basic AMHS might provide an acceptable alternate solution (To be confirmed) where there are difficulties implementing the FTBP, the link has ample capacity to support the transmission of uncompressed IWXXM data and an agreement is in place for the aggregator to preform compression/decompression on behalf of the originator

6.2 Is there any rough estimate on the file size of IWXXM for METAR or TAF? Wondering if AMHS/ROC/NOC/RODB in APAC be able to support IWXXM messages exchange with large file size.

- a sample METAR bulletin with 6 reports in it makes a ~30k IWXXM file - which becomes ~3.7k compressed

7. IWXXM versions

7.1 What version of IWXXM is recommended to be used?

- ICAO Doc 10003 – Manual on the Digital Exchange of Aeronautical Meteorological Information, stipulates that to meet the requirements of Amendment 79 to Annex 3, only Version 3 of IWXXM, or later, shall be exchanged on operational networks from 5 November 2020
- WMO envisage limited changes to version 3 in the coming few years.

7.2 Is IWXXM version 3 supporting image data? How it works?

- IWXXM will not support image data, but it will support SIGWX forecasts (i.e. object data).
- Other formats GRIB/PNG will support image data.

7.3 How is IWXXM version be upgraded?

- Versions of IWXXM are independent of changes to Annex 3, therefore whilst Amendment to ICAO Annex 3 occur every 3-years, updates to IWXXM are not expected to occur every 3-years
- WMO manage the version of IWXXM
- Typically, multiple versions of IWXXM will be allowable at any one time, and future versions of the Guidelines for the implementation of OPMET data exchange using IWXXM will specify which versions are acceptable to meet Annex 3 requirements

8. IWXXM translation

8.1 How are Translation Centres are established?

- Translation Centres will likely be required
- ROCs, RODBs are encouraged to provide translation services
- Each State is responsible for arranging the provision of IWXXM, and where required, an agreement with another State to provide TAC to IWXXM translation on their behalf
- Formal agreement is required
- More information on translation function, Translation Centre pre-requisites and Translation Centre Agreement is in the presentation on translation from TAC to IWXXM in the IWXXM Guidelines.

8.2 After translation (from TAC to IWXXM), can the data be sent direct to the aggregator or does it need to be returned to the originator to then send it to the aggregator?

- Either scenario is acceptable, depending on the arrangement between the originator and the translator

8.3 Will the conversion apply in both formats at the RODB?

- Translation of TAC to IWXXM is OK, if necessary, but the distribution of IWXXM to TAC is not permitted when the original TAC from source is available

8.4 What happens to regional countries that will not be able to change to IWXXM?

- Each State is responsible to arrange translation services as necessary
- Translation Centres will likely be required
  Caution: National extensions can be implemented (for differences to Annex 3), but this requires additional effort and cost by the State and should only be implemented in the globally agreed standard way
  Caution: Original TAC must be well structured and reliably structured for it to be reliably converted to IWXXM
- Refer to presentations on Translation of TAC to IWXXM in IWXXM workshops for more details

8.5 To provide translation for other States, it is understood that agreement is required. Is there any agreement form/example which State can refer to?

- For guidance on what an agreement should contain, please refer to the IWXXM Guidelines, including the following:
  - Section 6.3.7: Translation Agreement - Provides a list of elements that should be contained in the service agreement between the Translation Centre and applicant State
  - Section 5.1.3: Data Translation Centre - A data translator converts TAC data into IWXXM on behalf of their State and/or another State (i.e. when the data producer is unable to do so). A bi-lateral or regional agreement should be defined for such circumstances.
  - Section 6.3.1: Pre-requisites for Translation Centres - Provides a list of items considered pre-requisite for data translation centres.
  - Reference could be made to the translation service request form available in ICAO EUR/NAT region website

8.6 When could the IWXXM attribute "translationfailedTAC" be used?

- If the wrong codes in TAC lead to incomplete (partial) translation, it should be considered as translation failure and indicated by "translationfailedTAC".

8.7 Where can we obtain converted file that including TAC and XML (TAC to XML)? We need to check (validation) translator of IWXXM (TAF/TAF AMD, METAR, SPECI, SIGMET, AIRMET).

- Apart from some examples under http://schemas.wmo.int/iwxxm/3.0/examples/, there are some additional examples at https://github.com/wmo-im/iwxxm-translation which may want to try with your translator.

8.8 Some bulletins contain METARs and TAFs from multiple States. If some of these States require translation services and others generate their own IWXXM, what are the options for aggregation - or, if not possible due to current ROC capabilities, creating new bulletins?

- It is recommended that the existing bulletin gets split into two separate bulletins, one containing IWXXM generated as source, the other containing data for sites that are generated in TAC and translated to IWXXM. An aerodrome (METAR or TAF) data should only exist in one bulletin.
- The ICAO APAC Region has an opportunity, through the MET/IE WG, to develop a proposal/s to update or revise the current ROBEX scheme and ROBEX Handbook to guide States towards the most appropriate solution for ICAO APAC OPMET bulletins.

8.9 For an incomplete TAC to IWXXM (Partial) translation, where does the error message send to if the ROBEX generated TAC bulletin is generated from a ROC noting that NOC is the originator of the TAC message?

- The error message should be sent to the TAC originator if it is confirmed that the incomplete translation is caused by invalid TAC format.

9. IWXXM validation and quality control

9.1 How will IWXXM extensions pass validation?

- Extensions should be implemented in a consistent way
- States implementing extensions are also required to develop a schema and recommended to develop Schematron. The schema and Schematron need to be web-accessible such that validation of extensions can be performed.
- Validation should be performed on the extended data

9.2 At this stage, do we need some other IWXXM validation apart from schema and schematron, such as bulletin is out of period or correction received but no prior initial message?

- As this moment the team considers it more important to deal with integrity of IWXXM messages. There will likely be separate checks of business rules as part of a mature QC process.

9.3 Where can I find a tool to validate IWXXM?

- There are a number of open source and commercial tools to validate IWXXM messages. One open source tool you may want to check out is CRUX from NCAR at https://github.com/NCAR/crux

10. IWXXM extensions

10.1 How to deal with differences to Annex 3 / IWXXM extensions?

- ICAO does not recommend States extend the IWXXM schema to include additional information Caution: National extensions can be implemented (for differences to Annex 3), but this requires additional effort and cost by the State and should only be implemented in the globally agreed standard way

10.2 Can IWXXM Extension be used to transfer information outside State? If so, is there any specific body like FIXM CCB to validate such Extension for wider user?

- There is no Change Control Board (CCB) for IWXXM. Changes are managed through WMO and ICAO.

- The Meteorology Panel Working Group on Meteorological Information Exchange (WG-MIE) has been looking at the topic of Extensions. There are a number of WMO Task Team on Aviation Data (TT-AvData) experts that are also experts on WG-MIE.

10.3 Is there a mechanism to indicate that an IWXXM Extension must be understood by the consuming system? That is, the extension cannot be ignored as there are possible safety issues.
- Yes. There is indeed a directive in the extension part of the IWXXM schema requesting validators/parsers to have access to external schemas being used, otherwise it will return an error.
- This is also why a producer needs to think twice before producing an IWXXM message with extensions requiring external schemas. Downstream users will get an error when trying to consume the message if they cannot get hold of the schemas of the extension.

11. Guidance, education, capacity building

11.1 Will the ROBEX handbook be updated to support the exchange of IWXXM at the RODB?
- Yes; MET/IE WG, Activity 9.4: Review and update ROBEX HB and ICD, including aligning with OPMET bulletin contents and changes associated with IWXXM
- Note, much of the IWXXM related technical detail will not be incorporated into the ROBEX Handbook but instead be contained within the *Guidelines for the implementation of OPMET data exchange using IWXXM* is the main source of guidance

11.2 Where can I find the sharing of lesson learnt from States that have progress on the IWXXM implementation on challenges faced & recommended solutions for best practice?
- Refer to presentations, discussions, reference material, networking contacts
- Refer to the log of testing, coordinated by Singapore

11.3 Are there any guidelines on IWXXM Visualisation & display?
- METP Working Group on Meteorological Requirements and Integration (WG MRI) has this within their scope and its likely to be included within the new ICAO *Procedures for Air Navigation Services for Meteorology* (PANS MET)

12. End-user considerations

12.1 As an end-user, how will IWXXM format affect us?
- As the TAC will continue at least until 2026, initially there will be no effect on users. However, users wishing to benefit from utilizing IWXXM will be required to either develop new capability or upgrade their systems to support the ingestion of IWXXM data.
- Some solutions may be as simple as acquiring off-the-shelf software that can process IWXXM and translate TAC, and be usable on a standard computer screen.
- IWXXM is based on XML and will simplify the development of new airline and pilot applications
- Data volumes are substantially larger than TAC and the use of IWXXM may impact some users and their communication links (e.g. to aircraft)

12.2 Some airlines have flight planning departments. How will IWXXM be integrated into their flight planning systems?
- Users are required to:
  - Arrange access to IWXXM from one or many sources
  - Manage non-translated TAC in IWXXM
- Users are recommended to:

    - Take appropriate malware and anti-virus precautions if ingesting compressed files
    - Validate received IWXXM
    - Manage off-line copies of all required schema's & code tables
- IWXXM is considered to be beneficial to users, flight planning systems, but TAC will remain available until at least 2026

12.3 What is the implication for States & RODB that unable to comply with the IWXXM implementation timeline?

- In November 2020, it became an ICAO requirement to implement and exchange IWXXM
- Depends on the State and their required function. RODBs are critical in the ROBEX scheme – so consequences of non-compliance will be significant
- States should file not compliance with Annex 3 in the Electronic Filing of Differences (EFOD)

12.4 On consumers' aspect, I think consumer (e.g. airlines) will not be able to connect to AMHS, where and how can they get IWXXM information?

- Quite a few airlines are connected to the AFS via their domestic COM Centre; others connect to the AFS via SITA gateways. The airlines can upgrade their AFTN connections to local COM Centre to AMHS FTBP, but this might be an investment that is hard to commit to at this moment. Some States also provide access to OPMET information via web services or similar. Alternative source of IWXXM data will be through WIFS and SADIS.

13. Cyber security

13.1 What is the recommended/appropriate cyber security strategy for IWXXM?

- Scan attachment at Message Transfer agent and isolate/remove infected file before distributed further (e.g. to end users)
- Users systems should scan at either user server or terminals depending on implementation architecture and risk appetite
- Testing should be conducted to assess the impact of scanning at various stages in the ROBEX scheme