



ICAO

International Civil Aviation Organization

**Eleventh Meeting of the Air Traffic Management Sub-Group
(ATM/SG/11) of APANPIRG**

Singapore, 2 – 6 October 2023

Agenda Item 7: AOP, MET, AIM, SAR

OUTCOMES FROM MET SG/27

(Presented by the Secretariat)

SUMMARY

This paper presents relevant outcomes from MET SG/27, including discussions on seminars and exercises to promote the implementation of MET services, the status of implementation of IWXXM, progress on rectifying air navigation deficiencies, the development of regional guidance, planning for MET services, and the future work program of the MET SG.

1. INTRODUCTION

1.1 The ICAO Asia and Pacific (APAC) Office hosted the Twenty-Seventh Meeting of the Meteorology Sub-group (MET SG/27) in Bangkok, Thailand, from 4-8 September 2023. The Meeting included a Seminar on the first day on recent meteorological (MET) service developments for international civil aviation.

1.2 MET SG/27 formulated one (1) Draft Conclusion and one (1) Draft Decision for further consideration by APANPIRG and adopted three (3) Conclusions and two (2) Decisions on technical matters under the MET SG terms of reference.

1.3 The MET SG/27 Report and documentation are available at the ICAO APAC Office website: <https://www.icao.int/APAC/Meetings/Pages/2023-MET-SG-27.aspx>.

2. DISCUSSION

Seminar session on recent developments in MET

2.1 The Seminar provided an opportunity to share recent developments concerning the ICAO provisions for MET service for international air navigation. The Seminar included presentations on the following topics:

- i. Volcanological Notice for Aviation (VONA)
(Paula Acethorp, Civil Aviation Authority of New Zealand)
- ii. Quantitative Volcanic Ash Information
(Nicole Ranger, Meteorological Service of New Zealand)
- iii. Improvements to the World Area Forecast System (WAFS) – 2023 and 2024
(Karen Shorey, Met Office, United Kingdom)
- iv. Space Weather Information Services
(Ashwin Naidu, Australian Bureau of Meteorology).

2.2 A recording of the Seminar presentations and a transcript of the questions and answers will be available on the MET SG/27 Meeting website (above).

ICAO Meteorological Information Exchange Model (IWXXM)

2.3 A package compatibility table shows the versions of IWXXM and its packages (e.g. for METAR/SPECI) and their relationships to ICAO Annex 3 requirements. The IWXXM compatibility table indicates that IWXXM messages issued in Version 3.0 will not comply with the latest amendment (Amendment 80) to ICAO Annex 3. Considering, therefore, that the producers of IWXXM reports should implement or upgrade their systems to support at least IWXXM Version 2021-2, MET SG/27 adopted the following Conclusion:

Conclusion MET SG/27-01: IWXXM VERSION COMPATIBILITY	
What: That, States are requested to ensure that MET service providers, air navigation service providers (ANSPs), airlines and other end users do the following: a) make the necessary system upgrades to support the IWXXM version, which complies with the latest amendment to Annex 3 as stated in the IWXXM compatibility table*; and b) prepare for future system upgrades to support future IWXXM versions driven by further amendments to Annex 3. (*Link to the IWXXM compatibility table: https://github.com/wmo-im/iwxxm/wiki/Package-Compatibility)	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: Most States are generating and exchanging IWXXM OPMET data in version 3.0. With the evolution of ICAO Annex 3, IWXXM version 3.0, which complied with Amendments 78 to Annex 3, is no longer compliant with Amendments 80 to ICAO Annex 3. To avoid the potential impact to operations due to IWXXM version compatibility issues of the systems, States are required to upgrade the systems for generating, exchanging and consuming IWXXM reports to support the IWXXM version which complies with the latest amendment to Annex 3.	Follow-up: <input checked="" type="checkbox"/> Required from States
When: 8-Sep-23	Status: Draft to be adopted by PIRG
Who: <input type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:	

2.4 Updates to the regional document titled IWXXM Implementation in APAC Region – FAQs (IWXXM FAQs) were published to support IWXXM implementation in the APAC Region on the ICAO APAC Office website at <https://www.icao.int/APAC/Pages/eDocs.aspx>.

2.5 The Online Register of APAC IWXXM Exchange Status, which is also available to support IWXXM implementation in the APAC Region via a link on the ICAO APAC Office website at <https://www.icao.int/APAC/Pages/eDocs.aspx>, indicated that the designated APAC Regional OPMET Centres (ROCs) and Inter-regional OPMET Gateways (IROGs) had limited network capability to routinely exchange IWXXM messages, within the APAC Region and inter-regionally.

2.6 Therefore, to facilitate the required global exchange of IWXXM messages, MET SG/27 formulated¹ the following Draft Conclusion:

Draft Conclusion MET SG/27-03: GLOBAL DISSEMINATION OF IWXXM

¹ MET/IE WG/21 formulated a Draft Conclusion, which was subsequently considered, modified and supported by ACSICG/10 and then CNS SG/27 before being adopted by MET SG/27.

What: Expedite the implementation of network circuits and communication services necessary to enable the required global dissemination of meteorological information in the ICAO Meteorological Information Exchange Model (IWXXM) form, both intra-regionally and inter-regionally between APAC Inter-regional OPMET Gateways (IROGs) and IROGs in the ICAO AFI, MID, NAM and SAM Regions (through inter-regional consultation), including support for the Air Traffic Services Message Handling System (AMHS) with File Transfer Body Part (FTBP) and Interpersonal Message Heading Extension (IHE), and backup paths for redundancy purposes..	Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: Following the provisions of ICAO Annex 3 – Meteorological Service for International Air Navigation, States shall ensure that certain meteorological information is disseminated to users in the IWXXM form. However, without suitable communication network connections to support the necessary intra- and inter-regional exchange of IWXXM messages, global dissemination of meteorological information in IWXXM form will not be possible. Consequently, the migration of user and supplier systems from meteorological information in the traditional alphanumeric code (TAC) form to the IWXXM form, as envisaged in the Global Air Navigation Plan (GANP), will remain inhibited.	Follow-up: <input checked="" type="checkbox"/> Required from States
When: 13-Dec-23	Status: Draft to be adopted by PIRG
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: PIRGs in other ICAO Regions	

2.7 OPMET monitoring statistics in the APAC region, explicitly developed for IWXXM messages, demonstrated that several States were disseminating IWXXM messages generated through translating information originally produced in traditional alphanumeric code (TAC) form. Considering that IWXXM translation depended on the quality of the TAC-form source messages, MET SG/27 adopted the following Conclusion:

Conclusion MET SG/27-02: PROVISION OF QUALITY METEOROLOGICAL INFORMATION	
What: That, States are reminded that the provision of specified meteorological information in IWXXM form has been an ICAO Annex 3 standard requirement since 2020. Where a State provides, or arranges the provision of, IWXXM information through translation services (from traditional alphanumeric code (TAC)-formatted information), the TAC-formatted information must be ICAO compliant otherwise translation errors occur, resulting in higher costs for users and preventing the benefits of IWXXM being obtained.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: Most States are now producing meteorological information in IWXXM. However, users will only consider transition from TAC to IWXXM forms when they can reliably access quality IWXXM information from all the required States.	Follow-up: <input checked="" type="checkbox"/> Required from States
When: 8-Sep-23	Status: Adopted by Subgroup
Who: <input type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:	

Seminars and exercises

2.8 Australia and New Zealand conducted an aviation space weather exercise in October 2022 focused on HF communication impacts. MET SG/27 considered plans for a future two-part exercise focusing on GNSS impacts and discussed the possibility of creating a space weather exercise group to develop educational materials and facilitate exercises, which could be a separate group or a modification of the Volcanic Ash Exercises Steering Group (VOLCEX/SG).

2.9 MET SG/27 also considered the demonstrated benefits of using virtual meeting technology to facilitate progress and increase participation by States in the MET SG work plan and adopted the following Conclusion:

Conclusion MET SG 27-04 – METEOROLOGICAL SEMINARS	
What: That, MET SG coordinates the provision of meteorological seminars, covering topics related to ICAO changes, new procedures and policies, future services and information exchange to support States implementing ICAO Annex 3 requirements and education.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: Only a subset of APAC States currently attend ICAO meteorological-related meetings. Attendance (virtually) at ICAO meetings during COVID-19 demonstrated significant demand from States for further information. Attendance at ICAO meetings comes at an environmental and financial cost. The Meteorological Seminars will enable a wider group of stakeholders, from more States, to receive advice and stay informed of the latest ICAO developments, offering financial and environmental benefits.	Follow-up: <input type="checkbox"/> Required from States
When: 8-Sep-23	Status: Adopted by Subgroup
Who: <input type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:	

2.10 A MET/ATM Seminar, held in conjunction with the Twelfth Meeting of the Meteorological Requirements Working Group (MET/R WG/12) in Bangkok, Thailand, on 1 May 2023, allowed States and Organizations to share information, experiences and ideas on planning and implementing MET services to support ATM and ATFM operations.

2.11 The above Seminar focused on collaborative arrangements and integrating MET information into ATM operations. Thirteen (13) presentations were made under three (3) topics covering ICAO provisions and MET/ATM collaboration within States and on a bilateral or multilateral basis between States.

2.12 MET SG/27 noted plans to conduct MET/R WG/13 in conjunction with ATFM/SG/14 and a Seminar on MET/ATM in late April 2024, including the possibility of conducting the MET/ATM Seminar in a hybrid (in-person and online) format to promote greater participation.

Air navigation deficiencies

2.13 Nepal reported significant progress towards rectification of the APANPIRG air navigation deficiency (index no. AP-MET-14) concerning the requirements for issuance and dissemination of SIGMET information for Kathmandu FIR. However, the requirement to disseminate SIGMET information in the IWXXM form (in addition to disseminating SIGMET information in the TAC form) has not yet been implemented.

2.14 Given the above, MET SG/27 agreed to inform and recommend APANPIRG to review the status of the deficiency and remove it from the Open List, subject to Nepal confirming its implementation of regular dissemination of SIGMET information in the IWXXM form in addition to TAC form.

2.15 Following the discussion above, MET SG/27 also considered needing further advice from APANPIRG concerning identifying the lack of implementation of the Annex 3 standards for disseminating MET information in the IWXXM form as an APANPIRG air navigation deficiency.

Regional guidance material

2.16 Proposals for updates to be published in the ROBEX Handbook, Sixteenth Edition, include changes to realign the METAR and TAF bulletins with the meteorological service requirements in the APAC Regional Air Navigation Plan (ANP).

2.17 Proposed updates to the APAC Regional Guidance for Tailored MET Information and Services to Support ATM Operations included post-operational analysis on the effect of tailored MET information on ATM decisions.

2.18 Considering the proposed updates above were also reviewed and supported by the ATFM/SG, MET SG/27 adopted the following Decision:

Decision MET SG/27-05 – Update the Regional Guidance for Tailored Meteorological Information and Services to Support ATM Operations			
What: That, the MET SG approves the proposed updates to the <i>Asia/Pacific Regional Guidance for Tailored Meteorological Information and Services to Support Air Traffic Management Operations, including the example from Australia as an Appendix.</i>		Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical	
Why: To provide States with up-to-date guidance material and make the updated version available on the ICAO APAC eDocuments website		Follow-up: <input type="checkbox"/> Required from States	
When: As soon as practicable		Status: Adopted by Subgroup	
Who: <input type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:			

2.19 Noting the importance of the awareness of the above document by not only ATFM/SG but by wider communities, MET SG/27 recommended presenting a paper at ATM/SG/11 to promote the document further (Ref: ATM/SG/11, IP/23)

2.20 Recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region will also be shared with the ATFM/SG and ATM/SG/11 (Ref: ATM/SG/11, WP/42).

Planning and monitoring

2.21 The Secretariat will coordinate with Cambodia on necessary updates to the ROBEX Handbook to incorporate the MET service requirements for Siem Reap Angkor International Airport (VDSA), which will commence operation in Cambodia on 16 October 2023.

2.22 Proposals to amend the APAC Air Navigation Plan (ANP), Volume I and II, to reflect the current requirements for MET services, included services provided in Australia, Cambodia, China, Hong Kong China, Indonesia, Maldives, Thailand, Timor Leste, the Republic of Korea and Vietnam.

2.23 Proposals for the amendment of ICAO Annex 3, envisaged for applicability on 28 November 2024 or 27 November 2025, were circulated in the ICAO State letters, Ref.: AN 10/1-23/1 dated 26 January 2023 and Ref.: AN 2/36-23/6 dated 13 February 2023.

2.24 States and appropriate international organisations have provided ICAO with comments they wished to make on the amendment proposals above by the deadlines of 26 July 2023 and 14 August 2023. The Secretariat was reviewing the comments in preparation for the Air Navigation Commission's (ANC's) final review of the proposals for the amendment of ICAO Annex 3 during the ANC's 224th Session in early November 2023.

2.25 The proposals above include the development of the restructured Annex 3 and the new PANS-MET and the Annex 3 amendments related to the following services and information:

- a) space weather information services;
- b) quantitative volcanic ash information;
- c) the International Airways Volcano Watch (IAVW);
- d) the ICAO meteorological information exchange model (IWXXM);
- e) the World Area Forecast System (WAFS);
- f) improved definition of meteorological authority and introduction of a new definition of meteorological service provider; and
- g) system-wide information management (SWIM).

Future work program

2.26 MET SG/27 reviewed options for encouraging the organisation and sharing outcomes of exercises simulating high-impact, less-frequent events in the aeronautical meteorology field, such as volcanic ash, space weather and other MET hazards, including reassessing the ongoing role of the VOLCEX/SG.

2.27 After considerable deliberation on the pros and cons of each option, MET SG/27 formulated the following Draft Decision:

Draft Decision MET SG 27-06 – Replacement of the VOLCEX Steering Group by the MET Exercise Advisory Group	
What: That, the Volcanic Ash Exercises Steering Group (VOLCEX SG) be disestablished and instead MET SG includes in its work plan the establishment of a Meteorology Exercises Advisory Group to provide advice and guidance to States undertaking exercises on volcanic ash, space weather or other aeronautical meteorological hazards, reporting back (as necessary) under a new MET SG agenda item for MET exercises. Further, States are encouraged to report under this agenda item on their aviation focused MET exercises activities.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: There is a need for conducting exercises for a range of meteorological hazards, including space weather (SWX), volcanic ash and tropical cyclones. Since the creation of VOLCEX SG in 2014, numerous exercises have been conducted under the remit of the VOLCEX SG. Recently many exercises are being undertaken by States outside of the governance of VOLCEX SG, but based on procedures developed by the VOLCEX SG. It is agreed that the VOLCEX SG has served its	Follow-up: <input type="checkbox"/> Required from States

intended function and is no longer required in its original format. It would still be useful to utilise the experience of those who have conducted exercises previously, along with experts from agencies hosting VAACs and SWX Centres and other experts in the Region, to form a new Advisory Group to provide guidance material and advice to assist States in developing their exercises. States are further encouraged to report useful exercise outcomes to the MET SG (and any other interested APANPIRG WG) on their results.	
When: September 2023	Status: Draft to be adopted by PIRG
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: ROs	

2.28 In addition, to address unnecessary duplication of effort and the resultant expenditure of resources on conducting meetings of both the Meteorological Services Working Group and MET SG, MET SG/27 considered a proposal for the dissolution of the MET/S WG and adopted the following Decision:

Decision MET SG 27-07 – DISSOLUTION OF MET/S WG	
What: That the MET SG: a) dissolves the MET/S WG as a distinct contributory body; b) realigns reporting of the VOLCEX SG (or its proposed replacement group the MET Exercises Advisory Group); c) retains the two expert ad hoc groups that will report to MET SG on: i) Rectification and Identification of Deficiencies; and ii) Regional SIGMET Guide updates; d) retains the expert ad hoc group on SIGMET coordination will report to MET/R WG; and e) Task the ad hoc group leads to report progress, as necessary, to the MET SG and WG Chairs Quarterly Meetings.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: 1) To avoid: i) duplication of effort at MET SG and WGs; and ii) unnecessary travel for participants. 2) To make more effective use of: i) participants resources; and ii) ICAO resources. 3) To improve the coordination and outreach with States, especially in the context of ICAO's No Country Left Behind initiative.	Follow-up: <input type="checkbox"/> Required from States
When: 8-Sep-23	Status: Adopted by Subgroup
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other:	

2.29 MET SG/27 considered the following tentative schedule for future MET-related meetings:

- MET/IE WG/21 – 18-20 March 2024, including a conjoint session with ACSICG/11
- MET/R WG/13 – 22-26 April 2024, in conjunction with ATFM/SG/14 and including a MET/ATM Seminar
- MET SG/28 – 8-12 or 15-19 July 2024

3. ACTION BY THE MEETING

3.1 The Meeting is invited to note the information contained in this paper.

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