

APAC GUIDELINES FOR OPERATIONAL SIGMET COORDINATION

Introduction

1. Inconsistencies in SIGMET information issued by different Meteorological Watch Offices (MWOs) on hazardous weather phenomenon straddling multiple Flight Information Regions (FIRs) pose safety concern to airspace users. Better cross-FIR-boundary coordination and sharing of MET information amongst MWOs is necessary for aligning SIGMET information to achieve seamlessness across borders.

2. A concerted effort within the MET community to improve operational coordination across borders and provide harmonized MET information can help spread the benefits of such initiatives to more airspace users. To this end, APANPIRG adopted the following conclusions in 2015 and 2017:

- **Conclusion APANPIRG/26/62** – Cross-border MET Collaboration and Coordination

Recognising the presence of SIGMET weather phenomena that straddles across boundaries, States/Administrations are encouraged to promote cross-border collaboration and coordination to harmonise the MET products of such phenomena between Meteorological Authorities to enhance MET support for ATM in the Asia/Pacific Region.

- **Conclusion APANPIRG/28/30** – SIGMET coordination in the APAC Region

That, States and Administration are encourages to:

- a) Participate in cross-FIR-boundary SIGMET coordination on a bilateral or multilateral basis for seamless hazardous weather information for the benefit of aviation users, as well as advancing the capabilities of participating MWOs in the issuance of SIGMETs for cross-border hazardous weather phenomena; and*
- b) Continue to share outcomes from SIGMET coordination activities and consider a step-by-step integration of SIGMET coordination activities in the region when operationally ready.*

3. In the Amendment 78 to ICAO Annex 3, a reference to ICAO Doc. 8896 “Manual of Aeronautical Meteorological Practices” was incorporated, which provides guidance on coordination between MWOs on bilateral or multilateral basis to encourage MWOs to adopt a coordinated approach in SIGMET issuance.

4. To aid MWOs in planning for and conducting SIGMET coordination operationally, this document was developed to provide guidelines on SIGMET coordination implementation.

Guiding Principles

5. Prior to implementing coordination, it is important for the participating MWOs to establish the basis for coordination using a set of guiding principles that would apply in the coordination of SIGMET issuance, such as:

- Set common goals amongst participating MWOs. Sharing of information and enhancing cooperation amongst MWOs are for the purpose of providing seamless MET information across borders and improving quality of SIGMET to contribute to enhanced operational efficiency and safety of international air navigation.
- Coordination must be undertaken in as efficient a manner as possible to avoid delays. Coordination cannot be conducted at the expense of the quality and timeliness of SIGMET to be issued.

- Consultation as part of the coordination process facilitates building consensus amongst participating MWOs, but each MWO remains responsible for the SIGMETs issued for the respective area of responsibility. In the event that consensus cannot be arrived at, each MWO retains the right to adjust parameters in the SIGMET to be issued according to its assessment.
- Coordination and subsequent issuance of SIGMET shall be in line with the guidance provided in the ICAO Asia/Pacific Regional SIGMET Guide and ICAO Doc 8896 “Manual of Aeronautical Meteorological Practice”, and comply with relevant provisions on SIGMET content and issuance in ICAO Annex 3 on “Meteorological Service for International Air Navigation”.

Preparation

6. Prior to operationalizing SIGMET coordination, a number of steps should be taken as preparation.

7. Bilateral or multilateral coordination

7.1. In planning for operational SIGMET coordination, MWOs have to determine whether coordination would be conducted on bilateral or multilateral basis. Where significant weather phenomena straddle more than two FIRs, MWOS may participate in multilateral coordination to ensure all MWOs share common situational awareness. However, there may be added complexities arising from diversity of views in multilateral discussions that may affect whether consensus could be arrived at. Bilateral coordination may be more straightforward but in such situations, multilateral coordination will be necessary for the issuance of harmonized SIGMETs for the significant weather phenomena affecting multiple FIRs.

8. Formalizing coordination arrangements

8.1 In general, it may be helpful to formalize the operational arrangements for SIGMET coordination to establish a common understanding amongst participating MWOs on what SIGMET coordination entails. The different modalities include a Letter of Agreement or the Exchange of Letters / Memorandum. Such arrangements can be made on bilateral or multilateral basis, depending on how coordination is conducted.

9. Coordination Procedures

9.1 It is critical for participating MWOs to jointly develop a set of clear procedures for SIGMET coordination, and to endorse and adopt them to facilitate the coordination process. While there are special circumstances for each region / sub-region and different challenges (e.g. availability of communications link, language differences, in-house processes), procedures that are developed based on commonalities shared amongst the participating MWOs (e.g. weather pattern and climatology) are the most helpful in overcoming differences and challenges.

9.2 The procedures may include methodology of coordination, communications protocol, criteria for issuances, and review and evaluation, etc. Each of these is discussed in greater detail in subsequent sections.

Operational Coordination

10. As part of SIGMET coordination, consultation will be conducted between participating MWOs to agree on proposed content, which should include vertical extent, boundaries, direction and speed of movement of SIGMET phenomena observed to be affecting, or expected to affect, two or

more areas of responsibility. The following lists some good practices that can enable effective and efficient coordination.

11. Initiation of SIGMET coordination

11.1 Initiation of coordination should not be limited to any participating MWOs. For practical reasons, coordination can be initiated by any of the participating MWOs. However, in situation when significant weather may develop or move in a direction such that an adjacent FIR can potentially be affected, the MWO that has issued a SIGMET can consult with the neighbouring MWOs to coordinate for the next issuance of SIGMET that would extend across the FIR boundary.

12. Common Interface

12.1 It is helpful to have an access to a common interface (such as a web application) where observation data and model forecast can be shared to promote common situational awareness amongst the operational forecasters. Through the interface, operational forecasters on duty at each MWO can share and discuss their assessment of the weather situation and prognosis, before coming to consensus on the area and parameters to be included in the SIGMET issued. Hence, graphical presentation of observation, model forecast data, and SIGMETs issued on the common interface is particularly helpful.

12.2 If a web application is available, the application should be interactive to enable technical discussions. Hence, any such tools developed should incorporate functionalities that would support technical discussions, in graphical, textual and/or verbal form. Because of the utility of such an interface, it is recommended that such tools be the primary mode of communication amongst the participating MWOs, if used.

13. Communications protocol

13.1 For the efficacy in communications and to facilitate the ease of coming to consensus in a discussion, it may be necessary to develop communications protocol that include preset syntax. This is particularly so for the most commonly encountered weather phenomena. It can help to save time and effort in coordination. In addition, preset syntax can overcome difficulties in communications due to language differences as the mother tongue of operational forecasters from different MWOs may be a different language.

14. Alternative communication modes

14.1 Alternative means of communication for operational coordination can serve as redundancy in the event of non-availability of the primary mode of communication. Participating MWOs can use various communication modes, such as telephone and mobile applications (e.g. WhatsApp), as their common contingency or complementary measure.

14.2 Other channels such as videoconferencing and emails can facilitate more in-depth discussion on issues outside of operational coordination or for long-lived and prolonged weather phenomena (e.g. tropical cyclones, sand storms).

15. Establishing what constitutes consensus

15.1 It may be necessary to identify indicators of consensus arrived at following consultation amongst MWOs. This establishes a common understanding of what constitutes consensus, and can help focus consultation efforts to ensure consensus could be arrived at more often than not.

16. Timeliness in issuance of coordinated SIGMETs

16.1 Certain weather phenomena, such as thunderstorms, can undergo rapid development. Efficiency in coordination becomes critical to ensure coordinated SIGMETs are issued in a timely manner following consultations. Participating MWOs may set time limits for consultations so that technical discussions do not become so protracted that SIGMET issuance is delayed. In most cases, discussions should not take longer than 15 minutes to complete.

17. Record of consultation cases

17.1 It is a good practice to log down all cases of consultation. In the logbooks, the date and time of consultations, whether consensus was reached and the SIGMETs that were issued should be recorded. For cases where there was no consensus, reasons should be logged down. In case there is not enough time to log down all elements on real time basis, participating MWOs can record the remaining elements afterwards or log down only specific cases, such as relevant MWOs were not able to reach consensus. Such records should be compiled and reviewed regularly to identify difficult cases, common causes that affected coordination and arriving at consensus, etc. From such cases, MWOs can draw useful learning lessons for improving coordination procedures and cooperation amongst MWOs. They also help to surface important technical issues which contributed to difficulties in SIGMET coordination. This would be further discussed in a later section.

Post Event Assessment

18. Regular Reviews

18.1 Post event, offline reviews should be conducted regularly. For example, a regular coordination meeting at senior forecasters / chief forecasters' level with input from operational forecasters can work on ironing out persistent coordination issues, refine procedures, and share case studies. This can help improve coordination so that the process becomes more efficient. It can also promote better harmonization of SIGMET information when coordination amongst MWOs becomes more effective. Technical issues hampering consensus can also be raised for discussions at such fora.

19. Evaluation of Performance

19.1 As with all aviation MET products issued, there is a need to verify the forecast and evaluate the quality of the product. Participating MWOs are encouraged to conduct objective verification and evaluation of coordinated SIGMETs issued for the region encompassing their areas of responsibility as a whole to measure the performance of the coordination effort.

20. User / stakeholder engagement

20.1 User feedback is critical to improvement in the SIGMET product. MWOs participating in SIGMET coordination can regularly engage users and stakeholders to solicit feedback on the utility of their SIGMET product, and identify areas of improvement. Verification and evaluation of SIGMET and collection of user feedback should be conducted within the quality management system which each State is required to implement.

Common Technical Difficulties Encountered in SIGMET Coordination

21. Criteria for issuance

21.1 There will be subjectivity in every assessment or forecast. Each MWO will have its own analysis tools and suite of model forecast products to be used for assessment and forecasting. Individual operational meteorologist's assessment will be informed by his or her own experience and

skills. For a given set of weather conditions and model forecast data, the permutation of forecasts that can be issued has considerable spread.

21.2 This element of subjectivity is known to affect the harmonization of SIGMET information. Setting some objective criteria for SIGMET issuance can enable greater consistency in SIGMET information. The ICAO Asia/Pacific Regional SIGMET Guide provides general guidance, but there are no one size fits all guidance. Issuance criteria vary from region to region given each region has its own unique weather and climate characteristics, and challenges.

21.3 SIGMET coordination initiatives have brought MWOs together to discuss such technical issues but the problems are often linked to fundamental meteorological science, which require more focused efforts by the scientific community to resolve. Where appropriate, these issues could be surfaced at related ICAO and WMO meetings for discussion so that the region can develop useful guidance and standardised procedures for SIGMET issuance. In addition, conducting a stock take of the practices and assessment methodology amongst the MWOs would help form the basis for the development of a common set of criteria for issuance.

22. Harmonization of SIGMET across regions with different weather characteristics

22.1 As the network of MWOs participating in SIGMET coordination expands, the likelihood of coordination with an MWO with different weather characteristics increases. MWOs will have to factor in the different climatology of the different FIRs when drawing up coordination procedures.
