

STRATEGY for the FUTURE PROVISION of INFORMATION on HAZARDOUS METEOROLOGICAL CONDITIONS

METWSG Action Agreed 5/1

SUBJECT TO ENDORSEMENT BY THE METEOROLOGICAL WARNINGS STUDY GROUP (METWSG)

1. Overall Objective

To develop a high-level strategic statement relating to the provision of information on hazardous meteorological conditions for international civil aviation, covering the period 2014 to 2025.

This strategic statement is expected to support recommended actions concerning aeronautical meteorological service provision arising from ICAO's 12th Air Navigation Conference (AN-Conf/12 held 19 to 30 November 2012), while recognizing that there is a need for shorter term action in some areas to rectify existing deficiencies in the provision of information on hazardous meteorological conditions to international civil aviation.

This strategic statement is intended to support and align with the programme and timing of the aviation system block upgrades (ASBUs)¹ methodology contained in the Fourth Edition (2013) of ICAO's Global Air Navigation Plan (GANP) (Doc 9750-AN/963). The ASBUs provide target availability timelines for a series of operational improvements – technological and procedural – that will eventually realize a fully-harmonized global air navigation system.

Refer: Agreed Action 5/1, Meteorological Warnings Study Group (METWSG), 5th Meeting, Montréal, 20 to 21 June 2013 – see Appendix 1.

2. Problem Definition

There is a significant and long standing issue regarding deficiencies in some ICAO Regions concerning the provision of SIGMET information and harmonization of such information within the current State meteorological watch office (MWO) flight information region (FIR)-based system².

Deficiencies in SIGMET provision is a major concern, particularly given the programmed migration to performance-based air traffic management principles set out in the GANP. The need to provide better meteorological support for the safety and efficiency of international civil aviation is particularly important.

IATA and its member airlines continue to express concern over the safety and efficiency of operations in areas where SIGMETs are rarely, if ever, issued by MWOs.

Some States have a chronic lack of capacity³ to fully meet their Annex 3 – *Meteorological Service for International Air Navigation* responsibilities. In particular, some smaller developing States have difficulty with SIGMET provision. Some developed States also have significant problems in this area⁴. These

¹ Refer Working document for the Aviation System Block Upgrades, 28 March 2013.

² Where a State has accepted the responsibility of providing air traffic services within an FIR (or control area), SIGMET information is to be issued by an MWO concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations. Such phenomena include severe turbulence, severe icing and others.

³ Capacity includes people, expertise and underpinning infrastructure.

⁴ The acute lack of capacity of some States to meet many Annex 3 responsibilities regarding SIGMET issuance was emphasised during a SIGMET trial conducted by the METWSG in April to July 2011. This trial was aimed at testing the feasibility of regional SIGMET advisory centres (RSAC) assisting MWOs to issue SIGMETs by providing them with SIGMET advisory information.

difficulties result in particular MWOs not being able to issue SIGMETs in a timely, reliable, or accurate manner.

The problem is not unique to any one State or any one ICAO Region. The issues range from State non-compliance in actually issuing SIGMET, non-functional or non-supportive MWO, through to providing SIGMET in incorrect formats. The problem is compounded with the current FIR-based system of SIGMET provision also presenting co-ordination challenges, particularly over areas with small and irregular FIR boundaries, as well as in those ICAO Regions with many small FIRs.

Furthermore, IATA has noted that inconsistent cessation or change of hazardous meteorological conditions information at FIR boundaries, due to differences in methods and working practices between MWOs, creates significant and expensive flight management issues.

Any remedial developments must therefore align meteorological inputs to the evolving technical capacity of modern airline and aircraft operations and the increasing globalization of the civil aviation industry.

3. Statement of Strategic Intent

Reflecting its strategic objectives, and in an increasingly competitive business and technically advancing environment, ICAO recognizes:

- (a) the increasing demand from international civil aviation users for efficient and effective phenomena-based hazardous meteorological condition information, seamlessly covering the globe in a co-ordinated and harmonized way; and
- (b) the limitations, inconsistencies and gaps in the current production of hazardous meteorological conditions information (in the form of SIGMET) required to be produced by each MWO for its associated FIR.

To meet international civil aviation user demands, and make best use of resources (including technology), this strategy proposes to transfer the issue of defined⁵ regional hazardous meteorological condition information to appropriately resourced regional centres, supported by respective meteorological watch offices (MWOs) as may be determined, in a three phased approach and in support of the Aviation System Block Upgrades (ASBUs) methodology of ICAO's Global Air Navigation Plan (GANP), as follows:

3.1 Phase One (2014-2017): The first phase is the establishment of regional hazardous weather advisory centres (RHWACs) to assist MWOs with the existing provision of SIGMET information in those ICAO Regions in need of such support.

Explanatory note: Formal planning and development will begin with a mandate from the ICAO Meteorology Divisional Meeting in July 2014. All planning and arrangements will be in place with formal ratification of the scheme expected in Amendment 77 to Annex 3 (with intended applicability in November 2016), and parallel documentation in Regional Air Navigation Plans. The allocated RHWACs will commence operations at a date to be agreed but no later than December 2017.

3.2 Phase Two (2016-2020): The second phase (including the transition of the RHWACs) will cover the centralization of SIGMET-related responsibilities of MWOs to regional hazardous weather centres (RHWCs) supporting multiple FIRs. This may include the amalgamation of existing volcanic ash advisory

⁵ Part of the first phase would be the identification of exactly what constitutes hazardous meteorological conditions, excluding the contemporary work of VAACs, TCACs and pending the expected future work of space weather centres.

centres (VAACs) and tropical cyclone advisory centres (TCACs)⁶ into these RHWCs, and will include close liaison with users and detailed definition of all products to be supplied by the new centres.

Explanatory note: Formal planning and development will begin in 2016 with the completion of planning for Phase 1. All planning and arrangements will be in place with formal ratification of the scheme expected in Amendment 78 to Annex 3 (with intended applicability in November 2019), and parallel documentation in Regional Air Navigation Plans. Planning will include the development of suitable RHC performance metrics to support Phase 3. The allocated RHWCs will commence operations at a date to be agreed but no later than December 2020.

3.3 Phase Three (2020-2024): This phase primarily covers the review of the performance of the regional hazardous weather centres, making any appropriate recommendations in this regard. The review will also include, inter alia, an evaluation of the efficacy, or otherwise⁷, of consolidating, in a further phase (potentially a Phase Four), hazardous meteorological condition information issued from a few centres conjointly covering the globe⁸, in or after 2025.

Explanatory note: The review will be undertaken in 2023 using performance data compiled for the years 2020 – 2022 inclusive. The review will include evaluation of operations, modelling, logistics, communications and science capability. A final report and recommendations will be provided by the end of 2023. If recommended, a reduced number of regional centres, or a few centres conjointly covering the globe, could be operating in 2025 if mandated in Amendment 80 to Annex 3 (with intended applicability in November 2025). It is noted, however, that any highly significant recommendations from this review process may need to go an ICAO Meteorology Divisional meeting around 2025/2026 for ratification, delaying implementation of any significant changes until after about 2026.

3.4 Note

Notwithstanding the strategic approach outlined above, and in accordance with Annex 3, Chapter 2, States can enter into bilateral arrangements at any time to obtain the support they may need to fulfil their MWO obligations with regard to SIGMET provision. As an interim arrangement, while Phase One of the strategy is implemented, such action is encouraged.

4. Supporting Considerations

This section references the areas of consideration taken into account in the derivation of the statement of strategic intent for the future provision of information on hazardous meteorological conditions.

4.1 ICAO Strategic Objectives

ICAO has established three strategic objectives for years 2011, 2012 and 2013:

- (a) Safety: Enhance global civil aviation safety.
- (b) Security: Enhance global civil aviation security.
- (c) Environmental Protection and Sustainable Development of Air Transport: Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment.

In years 2014, 2015 and 2016 the number of strategic objectives of ICAO will increase to five. Ten key air navigation policy principles⁹ are contained in the GANP, intended to guide global, regional and State air navigation planning consistent with ICAO's strategic objectives.

4.2 General Considerations

Those aspects contributing to the derivation of this document, not covered elsewhere, are:

⁶ VAACs and TCACs have been operating successfully in a regional capacity for the past several decades.

⁷ It is accepted that the review may recommend slowing, delay, or postponement of further consolidation.

⁸ There is a high level expectation of IATA for a better global hazardous weather scheme than exists today, consisting of only a few regional centres conjointly covering the globe, to be fully assessed and implemented in the mid-term.

⁹ Refer Doc 9750-AN/963 — 2013-2028 Global Air Navigation Plan.

- (a) Identification of hazardous meteorological conditions best managed in a consolidated manner;
- (b) Utilization of information within the envisaged data-centric environment¹⁰ as part of the system wide information management (SWIM) concepts.
- (c) Need for evaluation of cost recovery schemes to support regional centres.
- (d) Need for evaluation of relevant airspace sovereignty, liability, and obligations of States - noting the range of political perceptions of regional and global change.
- (e) Need to ensure robust implementation of quality management system (QMS) and safety management system (SMS) principles and requirements in any new system.

4.3 Discussion

Article 28 of the ICAO Convention on International Civil Aviation (Doc 7300) and Annex 3 to that Convention defines meteorological services in support of international air navigation. Over the past six decades, amendments of Annex 3 have been largely centred on meteorological observations and forecasts rather than the nature of the underlying global systems structures.

In the 1980s the international community recognized technological advances and user demand changes (for example, increasing long-haul flights) with the establishment of the world area forecast system (WAFS). The WAFS initially provided global wind and temperature data with planning for significant weather forecasts (as currently provided). In the final phase of WAFS implementation, the WAFS replaced regional area forecast centres (RAFC) which had provided regional forecasts within their defined area of responsibility, operating within the limits of technology and communication networks of the times. The development of the WAFS hinged on global modelling capabilities, the advent of satellite remote sensing techniques, and satellite broadcast of WAFS products to States/users across the globe.

Other changes reflected this on-going development of international civil aviation. An example is the removal of the two-hour rule that restricted dissemination of METAR/TAF reports within a two-hour flying distance from the aerodrome. Just as it was recognized that this two-hour rule was obsolete then, the international civil aviation community recognizes now that future systems and the nature of meteorological information will need to meet new and different requirements within new and different contexts.

Reflecting this perspective, the future vision for aeronautical meteorological service practices was covered at the AN-Conf/12.

The international civil aviation community understands that meteorological conditions are not restricted to the boundaries of a flight information region (FIR) and that there is a need to provide a harmonized assessment of meteorological conditions irrespective of FIR boundaries. This perspective became most apparent in recent years with the provision of volcanic ash information; where there was a lack of information on the location of the hazard in some areas compounded by occasional inconsistency of information from different providers, covering adjacent areas. Within the international airways volcano watch (IAVW) these deficiencies have been well documented, with a wide array of remedial system changes implemented or being implemented. However, the international community has not yet implemented the necessary system and product changes needed for other hazardous meteorological conditions.

If States are to respond to user demands for the provision of better aeronautical meteorological services, there is a need to change how these services are provided in support of the vision provided at

¹⁰ Including inter-alia the achievement of a robust global network based on the principles of Service Oriented Architecture (SOA).

the AN-Conf/12. For example, if States fail to recognize these changes, operators may look to other sources to obtain the necessary information to support their performance based operations. While it is recognized that fundamental services must continue to be provided by States, there is a need to identify which services belong to the State to support operations within their FIR, and which services are required for situations where meteorological conditions are transparent to FIR boundaries

4.4 Working Relationships

To ensure the success of the strategic plan there is a need to develop a co-ordinated working relationship with various organizations, service providers and users of services that includes but not necessarily defines all the stakeholders, including:

- WMO – World Meteorological Organization.
- IATA – International Air Transport Association.
- CANSO – Civil Air Navigation Services Organisation.
- IFALPA – International Federation of Airline Pilots' Associations.
- IFATCA - International Federation of Air Traffic Controllers' Associations.
- ISO - International Organization for Standardization.
- States in general (States in need of assistance, States able to host RHWACs, States likely to be able to provide other assistance, VAAC and TCAC host States)
- ICAO – Regional offices.
- Particular contracting States with capability and capacity to serve as a regional centre.

5. Discussion on Implementation

Consideration will be needed as to the assignment of an expert group to manage the process. This group may need to have overall management responsibilities for the system, reporting on a regular basis to the Secretariat or to the Air Navigation Commission (ANC). Its work will need to include the implementation of appropriate funding systems.

It is recognized that States will continue to have an important role in support of the operation of the intended regional hazardous weather centre concept. States will need to:

- (a) ensure that they provide, through their respective MWOs and requisite communications systems and protocols, local information¹¹ including special air-reports to the regional hazardous weather advisory centres, and eventually the regional hazardous weather centres, in a timely fashion;
- (b) continue to provide so-called flight following services through their respective MWOs, including the relay as appropriate of hazardous meteorological conditions information, monitoring of the regional hazardous weather advisory centres and eventually the regional hazardous weather centre products with formal routine and special feedback to the centres¹²;
- (c) where possible, provide routine evaluation of the hazardous weather information provided by the regional centres; and
- (d) continue to undertake the specified tasks required in the volcanic ash advisory and tropical cyclone advisory schemes.

¹¹ Local information includes data and information from any remote sensing and satellite reception capabilities not directly accessible by the Regional Centres.

¹² Routine feedback to the Regional Centre would include the routine provision of validation and complementary real-time information. Special feedback would include real-time quantitative and qualitative advice on specific quality matters with regard to the Regional Centre products.

MWOs would continue with all other specified requirements as currently set out in Annex 3.

In implementing the strategy care needs to be taken to ensure the voice of all States is represented on the referred expert group. In this regard, it is suggested that there be particular representation from a State or several States in each ICAO Region, and service provider and user representative bodies to supplement the expertise required (including WMO experts). The experience and capabilities of States involved in the development and operation of TCAC, WAFC and VAAC responsibilities should also be represented on the expert group either through membership and/or defined relationships.

Subject to METWSG endorsement

Appendix 1

METEOROLOGICAL WARNINGS STUDY GROUP (METWSG)

FIFTH MEETING, Montréal, 20 to 21 June 2013

EXCERPT OF SUMMARY OF DISCUSSIONS

Further study into a regional SIGMET advisory system (Deliverable 1)

3.1.1 The group recalled that it had formulated Action Agreed 4/1 at the last meeting concerning the development of a concept of operations for a global or multi-regional SIGMET advisory system and criteria for the selection of regional SIGMET advisory centres by the respective ICAO planning and implementation regional groups (PIRGs). In addition, Action Agreed 4/1 was to address the development of a revised format for the advisory information, the development of an amendment proposal to Annex 3 – *Meteorological Service for International Air Navigation*, and the development of a proposal for further study into a regional-based notification system rather than a flight information region (FIR)-based system form the reporting of hazardous meteorological conditions.

3.1.2 The group was pleased to learn that as follow-up to Action Agreed 4/1, an ad-hoc group (A) had prepared a necessary report addressing each of the referred items, intended to assist the group in its further consideration of this issue. The group noted in particular that the concept of operations provided background to the proposed establishment of regional SIGMET advisory centres, current operations and capabilities, concepts for the establishment of such regional centres, expected functional and performance requirements, operational scenarios and an assessment of the impacts of the introduction of regional SIGMET advisories in support of the issuance of SIGMET messages by meteorological watch offices.

3.1.3 To aid the deliberations, the group considered two further reports relating to the establishment of a regional SIGMET advisory system to aid the discussion. The first report concerned an analysis of wider issues and experiences in the provision of information relating to hazardous meteorological conditions, including the need to ensure that a long-term solution to a long-term problem (i.e. the lack of implementation of SIGMET in some parts of the world) was well founded, and the second report concerned issues related to the requirements for regional SIGMET advisory centres based on recent discussions and experiences within the Asia-Pacific Region, including consideration of the tools that may be necessary to assist in a regional SIGMET advisory production process and the need for a suitably established verification framework.

3.1.4 Taking all of these reports into account, the group considered in detail whether the concept of operations for a regional SIGMET advisory system, as developed thus far, was of a sufficient level of maturity to provide a basis for the development of Annex 3 provisions. Appreciating the efforts of the ad-hoc group in the development of the concept of operations, the group reflected that the concept of operations needed to ensure that the views of users and regulatory authorities were taken into account in future iterations. The group noted that some users/operators do not use SIGMET information for volcanic ash and tropical cyclone in flight planning. The group noted that the users (IATA and IFALPA) recorded their disappointment that the issues at hand had not progressed further than they had. The users reported continued inconsistency and lack of issuance of SIGMET information, and that the non-standardized format of the SIGMET information used by some meteorological watch offices was unacceptable. Notwithstanding the need for additional work on the concept of operations, the group noted that the users considered that an action plan that identified when and where the regional SIGMET advisory centres would come into operation was required. The group concurred that the concept of operations would be a “living document” going forwards and that there was a need to ensure that the concept of operations was supported by a high-level strategic statement relating to the short- and long-term vision for the provision of information relating to hazardous meteorological conditions.

3.15 Recognizing the evolving needs of aviation, and in particular the transition to global air traffic management supported by a system-wide information management environment, the group expressed that as meteorological information plays a more integrated role in strategic and tactical decision-making – of airline operators, flight crews, air traffic flow managers, air navigation service providers and others – the existing FIR-based approach to SIGMET provision would likely become a hindrance to progress unless some form of regional-based approach was realized in the longer-term. The group noted emerging issues such as governance and equitable cost recovery would have to be addressed regardless of whether future SIGMET provision was regional, multi-regional or global in nature.

3.1.6 Taking the foregoing into account, the group agreed to the following three-tiered strategy with which to progress this issue. Firstly, that a high-level strategic statement relating to the short- and long-term vision for the provision of information relating to hazardous meteorological conditions was needed in time for the MET Divisional Meeting. Secondly, that the concept of operations for hazardous meteorological conditions should continue to mature as a living document, taking inspiration from the referred high-level strategic statement and with inputs from users and regulatory authorities. And thirdly, that a plan for future governance and equitable cost recovery of such a regionalized-approach to meteorological service provision should be realized. The group formulated the following actions agreed accordingly:

Action Agreed 5/1 — High-level strategic statement relating to the short- and long-term vision for the provision of information for hazardous meteorological conditions

That, Albert, Bill, Colin, Hans-Rudi, Herbert, Juan, Jun, PW, Sue, Patrick, Peter (Rapporteur) and Steve develop a high-level strategic statement relating to the short- and long-term vision for the provision of information for hazardous meteorological conditions, and provide a report to the Secretary by 30 September 2013 for subsequent endorsement by the group through correspondence by 31 October 2013 so that the statement can be forwarded by the **Secretary** to:

- a) the ad hoc group A to assist in the follow-up to Action Agreed 5/2; and
- b) the Meteorology Divisional Meeting in July 2014.

Action Agreed 5/2 — Further development of a concept of operations for a regional SIGMET advisory system

That, an ad hoc group (WG/A) consisting of Albert, Bill, Colin, Hans-Rudi, Herbert, Juan, Jun, PW (Rapporteur), Patrick, Peter and Steve develop a further iteration to the concept of operations for a regional SIGMET advisory system for hazardous meteorological conditions that reflects the views of users and regulatory authorities and the short- and long-term vision provided through Action Agreed 5/1, and provide a report to the Secretary by 30 September 2013 for subsequent endorsement by the group through correspondence by 31 October 2013 so that the concept of operations can be forwarded by the **Secretary** to the Meteorology Divisional Meeting in July 2014 as information.

Action Agreed 5/3 — Plan for the future governance and equitable cost recovery of a regional SIGMET advisory system

That, Colin (Rapporteur), Herbert, Hans-Rudi, Patrick, Peter, Sue and Zhang develop a plan for the future governance and equitable cost recovery of a regional SIGMET advisory system for hazardous meteorological conditions, and provide a report to the Secretary by 15 October 2013 for subsequent endorsement by the group through correspondence by 15 November 2013 so that the concept of operations can be forwarded by the **Secretary** to the Meteorology Divisional Meeting in July 2014 as information.

— END —