



International Civil Aviation Organization

**THIRD MEETING OF THE METEOROLOGICAL REQUIREMENTS
TASK FORCE (MET/R TF/3)**

28 – 29 November 2013, Bangkok, Thailand

Agenda Item 3: MET and ATM Requirements and Information Exchange:

- a) Current and future requirements for MET information in support of ATM;
- b) Integration of MET information in ATM, airspace user systems and decision support tools;
- c) Sub-regional exchange of MET information that facilitates ATM operations;
- d) The role of MET information in the development of CDM/ATFM;
- e) MET information supporting ATM contingency planning; and
- f) Current and future requirements for ATM in support of MET services

MET INFORMATION IN SUPPORT OF ATM

(Presented by the Secretary)

SUMMARY

This paper presents a summary of MET and ATM Requirements and Information Exchange.

1. Introduction

1.1 The International Civil Aviation Organization's (ICAO) provisions for aeronautical meteorological (MET) information, required to support air traffic management (ATM), including air traffic services (ATS), airspace management (ASM) and air traffic flow management (ATFM), are expressed in terms of international standards and recommended practices (SARPs) in Annex 3 – *Meteorological Service for International Air Navigation*. These global MET provisions are supplemented by regional operational requirements, which are determined by regional air navigation agreement and published in regional air navigation plans, e.g., *Asia and Pacific (APAC) regional air navigation plan* (Doc 9673), Part VI – MET.

1.2 The global provisions in Annex 3 and regional operational MET requirements in Doc 9673 are subject to periodical amendment to keep pace with evolving global and regional requirements. Annex 3 amendments are usually adopted based on proposals formulated by dedicated ICAO global expert groups, while amendments to regional air navigation plans are typically initiated by States or international organizations, or through the APANPIRG framework, when it becomes apparent that they are no longer consistent with current and foreseen requirements of international civil aviation.

1.3 The overall strategic direction for development and implementation of ICAO provisions for MET information is provided by the *Global Air Traffic Management Operational Concept* (Doc 9854) (paragraphs 2.9.17 to 2.9.19) and the *2013-2028 Global Air Navigation Plan* (GANP) (Doc 9750) adopted by the 38th Session of the Assembly (Resolution A38-2), ensuring MET information and MET service is developed and implemented to support the transition to an integrated and collaborative ATM system.

1.4 The GANP includes the rolling, 15-year strategic approach to improvements organized in five-year time increments, or ‘blocks’, known as Aviation System Block Upgrades (ASBUs), which start in 2013 and continue through 2028 and beyond. MET is represented by the ASBU MET (AMET) modules in the performance improvement area titled “globally interoperable systems and data”. MET will also be a key enabler to operational improvements through the future system-wide information management (SWIM) environment. ASBU modules in Block 0 represent existing capabilities for implementation over the next five years (e.g., B0-AMET), while Block 1, 2 and 3 modules represent improvements commencing in 2018, 2023 and 2028 (e.g., B1-AMET and B3-AMET). *Note: there is no Block 2 AMET module; B1-AMET extends across both the Block 1 and Block 2 time increments.*

1.5 The APAC Seamless ATM Plan V1.0, developed by the APAC Seamless ATM Planning Group (APSAPG) and endorsed by the 24th Meeting of the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG/24) (Conclusion 24/54) as a regional implementation plan intended to facilitate APAC Seamless ATM operations, recognizes B0-AMET as a recommended ASBU upgrade in the APAC region.

2. Discussion

Current requirements for MET in support of ATM

2.1 In accordance with the GANP and ASBU module B0-AMET, 2018 is the target implementation deadline for the current provisions for MET information (i.e., the Annex 3 SARPs and regional operational requirements). Therefore, over the next 5 years, depending on operational requirements, implementation of global, regional and local MET information provided by world area forecast centres, volcanic ash advisory centres, tropical cyclone advisory centres, aerodrome meteorological offices and meteorological watch offices will be necessary to support flexible airspace management, improved situational awareness and collaborative decision making, and dynamically optimized flight trajectory planning.

2.2 The regional strategy adopted in the APAC Seamless ATM Plan is expected to be implemented in two phases: Phase I and Phase II. With respect to the current provisions for MET information identified in ASBU module B0-AMET, Phase I of the APAC Seamless ATM Plan (expected implementation by 12 November 2015¹) requires that:

- all high density aerodromes should provide MET forecasts, aerodrome warnings and alerts that support efficient terminal operations (paragraph 7.26); and
- ATM systems should be supported by implementation of appropriate MET information reporting systems, providing, inter-alia, observations, forecasts, warnings and alerts (paragraph 7.39).

Future requirements for MET in support of ATM

¹ APAC Seamless ATM Plan phases are for guidance only and are non-binding.

2.3 Future requirements for MET information in support of the air traffic system will be guided by the operational concepts in Doc 9854, the GANP framework and ASBU methodology (e.g., provision of MET information will be an integrated function of the ATM system, tailored to meet ATM requirements in terms of content, format and timeliness).

2.4 The medium-term strategies for operational improvements in the ASBU methodology include B1-AMET: *Enhanced Operational Decisions through Integrated Meteorological Information (Planning and Near-term Service)*; implementation expected from 2018 onwards, which will require MET information supporting automated decision processes or aids involving: MET information, MET translation, ATM impact conversion and ATM decision support. This module also acknowledges the need for space weather information services in support of safe and efficient international air navigation.

2.5 B1-AMET (and B1-DATM: *Service Improvement through Integration of all Digital ATM Information*) promotes the establishment of standards for global exchange of MET information. The first evolutionary step in the provision of MET information to support integration includes the provisions already adopted in Amendment 76 to Annex 3 that facilitate the exchange of OPMET information (specifically METAR, SPECI, TAF and SIGMET) in a digital form (XML/GML), accompanied by the appropriate metadata, in accordance with the globally interoperable information exchange model. These developments were designed to foster the future system wide information management (SWIM) environment, which would include MET, aeronautical and flight information, amongst others. The next steps are anticipated with Amendment 77 to Annex 3 (intended applicability in November 2016), which is expected to upgrade these particular provisions to a recommendation, and Amendment 78 to Annex 3 (intended applicability in November 2019), which is expected to make it standard practice for States to exchange such OPMET information in digital form. During Amendments 77 and 78 of Annex 3, and beyond, a significant portion of current MET products would transition to supporting digital information exchange within SWIM. In addition, there would be an increased reliance on the automated relay of MET information to and from aircraft, including enhanced aircraft-based MET reporting capabilities (supporting B2-SWIM: *Enabling Airborne Participation in Collaborative ATM through SWIM*).

2.6 In the longer-term, B3-AMET: *Enhanced Operational Decisions through Integrated Meteorological Information (Near-term and Immediate Service)*; intended to be available for implementation in 2028, aims to enhance global ATM decision making in the face of hazardous MET conditions through: a) tactical avoidance of hazardous MET conditions in especially the 0-20 minute timeframe; b) greater use of aircraft based capabilities to detect MET parameters (e.g. turbulence, winds, and humidity); and c) display of MET information to enhance situational awareness. This module also promotes further the establishment of standards for the global exchange of MET information.

Integration of MET information

2.7 The meeting may wish to consider the examples of current practices involving MET integration discussed in the MET/ATM Seminar 2013 and possibly recommend improvements in the APAC Region to enable integration of meteorological information into ATM, airspace user systems and decision support tools.

Sub-regional exchange of MET information

2.8 Based on the discussions in the MET/ATM Seminar 2013 on MET information provided in support of ATM in the APAC Region, the meeting may wish to further discuss the possibilities for

sub-regional exchange of MET information and associated agreements that facilitate ATM operations particularly over busy routes that overlap different FIRs.

MET information in CDM/ATFM

2.9 An information paper (IP/4) presented by Australia in this meeting discusses a CDM trial incorporating the MET service provider, ANSP and operators. The meeting may wish to consider the lessons learnt from this example, as well as examples discussed in the MET/ATM Seminar 2013, and discuss the future application of MET information in CDM/ATFM in the APAC Region.

MET information supporting ATM contingency planning

2.10 The meeting is reminded of the requirement for the MET/R TF to coordinate with the Meteorological Hazards Task Force (MET/H TF) on a framework for contingency plans for specific phenomena including volcanic ash, radioactive cloud, tropical cyclone and tsunami, and may wish to consider developing tasks related to determining the regional requirements for MET information to support ATM contingency planning.

ATM in support of MET

2.11 Currently, Annex 3 contains provisions that require air-reports of prescribed MET elements or conditions observed by aircraft on international air routes to be recorded, reported and exchanged between specified units. Supporting the implementation of these provisions, Phase I of the APAC Seamless ATM Plan requires that, in addition to being supported by implementation of appropriate MET information, ATM systems should also provide information to MET authorities or offices where required.

3. Action by the Meeting

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) discuss issues relevant to the APAC regional air navigation plan and regional guidance material to assist States to develop MET services to meet the current and future requirements of ATM;
- c) discuss regional issues in relation to the integration of MET information in ATM, airspace user systems and decision support tools;
- d) discuss issues relevant to the sub-regional exchange of MET information that facilitates ATM operations;
- e) discuss regional issues in relation to the role of MET information in the development of CDM/ATFM;
- f) discuss regional requirements for MET information supporting ATM contingency planning; and
- g) discuss current and future requirements for ATM in support of MET services in the APAC region.