



## METEOROLOGICAL AERONAUTICAL REQUIREMENTS AND INFORMATION EXCHANGE PROJECT TEAM (MARIE-PT)

**ATM Requirements - Agreed Action 1: MET capability demonstration document (M&M group through Herbert)**

**A: Draft available for comment by group (May 15, 2012)**

### MET CAPABILITY DEMONSTRATION

(by Herbert Puempel)

#### SUMMARY

This paper presents a demonstration of current and foreseen capabilities in MET information to support ATM.

## 1. INTRODUCTION

1.1 The first meeting of MARIE-PT, held in Montréal 20 to 21 February 2012, formulated the following actions for the demonstration of capability in MET information to support ATM, which is item 1 on the *Action List for MARIE-PT Work on ATM Requirements*:

#### **Item 1: MET capability demonstration document (M&M group through Herbert)**

- A Draft available for comment by group (May 15, 2012)
- B Endorsement of document by group – Neil to pass to ATMRPP for information and initial comment at July meeting (July 1, 2012)
- C Draft MET capability presentation available (31 July, 2012)
- D Endorsement of MET capability presentation by group – Neil to pass to ATMRPP ahead of October meeting (30 September, 2012)

1.2 This paper addresses MARIE-PT action list item 1A: Draft available for comment by group (May 15, 2012). Comments on this draft may be done by using “Track Changes” in this document. They can also be included in an e-mail.

1.3 In both cases comments have to be sent to Herbert Puempel ([hpuempel@wmo.int](mailto:hpuempel@wmo.int)) as MARIE-PT member and to Bart Nicolai ([Bart.Nicolai@belgocontrol.be](mailto:Bart.Nicolai@belgocontrol.be) and Stéphanie Desbios ([stephanie.desbios@meteo.fr](mailto:stephanie.desbios@meteo.fr)), both co-chairs of the Expert Team on Met Services To ATM & Met

Information Exchange, the team who is leading the WMO CAeM initiative for the new MET services to ATM.

1.4 According to the MARIE-PT Action list, the MET capability demonstration document will be passed to ATMRPP for information and initial comment on 1 July 2012, after endorsement by the PT. In case a more consolidated version of this document be requested before passing it to ATMRPP, please provide comments by 17 June 2012.

## 2. MET SUPPORT TO ATM

2.1 Concepts for MET support to ATM are currently documented in several documents but for different scales and with an unequal level of details. In the following, the documentation existing at a global level and at a regional level is presented.

2.2 Concepts for Global Air Traffic Management (ATM) and Performance-based Navigation (PBN) are well documented in:

- PBN concept in ICAO Doc 9613 “*Performance-based Navigation (PBN) Manual*”,
- Global ATM concept in ICAO Doc 9854 “*Global Air Traffic Management Operational Concept*”,
- ICAO Doc 9882 “*Manual on Air Traffic Management System Requirements*”,
- Air Traffic Management Requirements Performance Panel (ATMRPP) document “*Flight and Flow Information for a Collaborative Environment*” (FF-ICE).

2.3 While all the above documents mention or reference “weather” (meteorological services) none specify or identify the meteorological services required for global ATM and PBN.

2.4 Regarding concepts for MET support to ATM, reference should also be made to the Air Navigation Commission proposal for a block upgrade plan for Integrated Weather Information, especially modules B1-105 “Better Operational Decisions through Integrated Weather Information” (Planning and Near-term Service) and B3-105 (Near-term and Immediate Service). These modules describe the weather information supporting automated decision process or aids involving:, weather translation, ATM impact conversion and ATM decision support.

2.5 Meteorological service in support to ATM is currently a major topic for research and development in several regions of the globe, especially those where large-scale initiatives such as SESAR or NextGen have been launched with the objective of moving toward Performance Based Navigation that will provide safe, secure, efficient and environmentally sustainable air transport system..

2.6 Considering emerging needs from the ATM community and other aviation users in their region, several MET/ATM Task Force groups have launched the process of developing a MET strategy in supporting the Global ATM operational Concept. As an example for the European and North Atlantic ICAO region, such a strategy is described in :

- EANPG COG MET/ATM Task Force document “MET Strategy in supporting the Global ATM Operational Concept for the EUR Region. Expected ATM oriented capabilities of MET are documented including a mention of expected benefits for ATM.

2.7 These documents reference evolving MET capabilities, presenting an overview of these for discussion with stakeholders. There will be a need for more details in the MET capabilities so that realistic requirements for the MET services in support to ATM can be established. The objective of this paper is to provide a detailed demonstration of current and foreseen MET capabilities.

### **3. MET CAPABILITY DEMONSTRATION**

3.1 At AMOFSG 9<sup>th</sup> meeting, it was discussed that it could be beneficial to provide the ATM stakeholder community with a clear insight of current and foreseen capabilities from a MET service provision. Benefits to ATM would also be indicated as well as few examples on visualisation aspects be included. The demonstration is provided in the Appendix to this paper as an Excel file. It provides general information on capabilities, support to ATM, information on capabilities with respect to accuracy and assessment of accuracy (verification).

3.2 The Appendix is divided in two parts, one for current or emerging capabilities, one for foreseen capabilities with a 5 to 10-year range.

3.3 In the first part, general information on capabilities are provided: “nominal” weather parameters or adverse weather conditions, resolution -to be compared to scale of phenomena-, gridded and/or object format, availability of probabilistic information.

3.4 The support to ATM is provided in terms of benefits to ATM using the Global ATM Concept Component terminology. Phases of flight that would benefit the MET capability are also mentioned.

3.5 For each MET capability, information on accuracy and assessment of this accuracy is provided in terms of verification methods and metrics and/or performance measurements. Regarding verification and assessment of accuracy, the MET community currently uses several methods that were elaborated or developed from a MET perspective. Nevertheless this community understands the need to move from a pure MET assessment of accuracy towards an ATM impact based or scenario based verification. Several initiatives in that sense currently exist in some States. Some of them are presented in the Attachment1 to the Appendix.

3.6 In this second part of the Excel file, two categories of capabilities are provided: the first one is for capabilities that relate to pure MET forecast techniques with an overview on the expected improvement of these techniques.

3.7 The second category (highlighted rows in the file) is for capabilities that need a technical dialogue between ATS specialists and MET experts. With the perspective of a better integration of weather information into ATM decision tools, the correlation between weather and impact (e.g. airport capacity and flight time error) requires both MET and ATM community to work together to achieve the goal.

### **4. ACTION BY THE PROJECT TEAM**

4.1 The project team is invited to:

- a) Note the information in this paper and its appendix and provide comments on the MET capability demonstration.
- b) Initiate a technical dialogue between ATS specialists and MET experts on the mutual dependencies of MET capabilities, concepts of operations and resulting thresholds and metrics. It is expected that this will be an iterative process between the two communities.
- c) Comments may be done by using “Track Changes” in this document, or if comments are general in nature, they can be included in an e-mail
- d) Send comments to Herbert Puempel ([hpuempel@wmo.int](mailto:hpuempel@wmo.int)) as MARIE-PT member and to Bart Nicolai ([Bart\\_Nicolai@belgocontrol.be](mailto:Bart_Nicolai@belgocontrol.be)) and Stéphanie Desbios ([stephanie.desbios@meteo.fr](mailto:stephanie.desbios@meteo.fr)), both co-chairs of the WMO CAeM Expert Team on Met Services To ATM & Met Information Exchange. **Please provide your comments by 17 June 2012.**

**APPENDIX**

Refer to file :

**MARIE-PT - Action Report No. 1A-Met capability demonstration-v1(15May2012)-HPuempel.xls**

and its Attachment1 on verification techniques, file **MARIE-PT - Action Report No. 1A-Met capability demonstration-Attachment1(15May2012)-HPuempel.doc**

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