



## **METEOROLOGY GROUP OF THE EANPG (METG)**

### **TWENTIETH MEETING**

*(Paris, 6 to 10 September 2010)*

**Agenda Item 5:** MET support to Air Traffic Management (ATM)

### **UPDATE ON OPMET MIGRATION TOWARDS TABLE-DRIVEN DATA REPRESENTATION**

*(Presented by the Secretariat)*

#### **SUMMARY**

This information paper updates the METG on activities within the WMO Commission for Basic Systems and ICAO MET/AIM Section concerning the migration of operational meteorological (OPMET) data towards table-driven data representation.

#### **1. Introduction**

1.1 In accordance with ICAO Doc 7475 – *Working arrangements between the International Civil Aviation Organization (ICAO) and the World Meteorological Organization (WMO)* – WMO is the organization responsible for developing aeronautical meteorological (MET) codes and data representation, which are to be based on the aeronautical requirements stated by ICAO.

1.2 During the next 10 years, it may be expected that all the codes used today for operational meteorological (OPMET) data will be replaced by table-driven data representation (i.e. table-driven code-form) in the extensible mark-up language (XML), which will be the code used also in the weather information exchange model (WXXM) – an essential enabler for the NEXTGEN/SESAR programmes.

1.3 In October 2009, the WMO Commission for Basic Systems (CBS) Expert Team on OPMET Data Representation (ET-ODR) and ICAO MET/AIM Section met to discuss the harmonization of migration plans related to the use of XML for OPMET data, in order to ensure that the specific needs of aviation were taken into account.

1.4 This paper summaries the main outcome of those discussions and follow-up action being undertaken for the information of the METG.

(4 pages)

## 2. Discussion

### *Pilot project for the presentation of OPMET data in XML*

2.1 A pilot project ('proof of concept') was undertaken by Belgocontrol in July 2009 in close coordination with WMO, to demonstrate the feasibility of sending OPMET (specifically METAR) coded in XML on the AFTN and for the receiver to visualize the message in the form prescribed in Annex 3 – *Meteorological Service for International Air Navigation* – i.e. as if it were an alphanumeric message.

2.2 In coordination with receivers at LIDO (Lufthansa) and Hong Kong Observatory (Hong Kong, China), XML-coded METAR were dispatched through the NATS (United Kingdom), Singapore COM Centre (Singapore) and Bangkok AFTN Centre (Thailand). The 1800 characters limit imposed by the AFTN was not exceeded.

2.3 The results of the trial were considered successful, with messages displayed by the receiver identical to the ones sent by the originator. The pilot project demonstrated that the AFTN can be used for the dissemination of XML-coded messages provided that:

- a) The full IA-5 (International Alphabet No. 5) character set be supported by the AFS equipment; and
- b) The message be kept small (less than 1800 characters).

2.4 The group realized that the model used for creating the XML-coded METAR messages exchanged during the pilot project had been based on BUFR templates developed earlier by WMO. In the future however, the operational OPMET data exchanges would be based on the NEXTGEN/SESAR WXXM.

### *Models for the representation of OPMET data*

2.5 In view of the expected future use of the WXXM, it was considered that there was no need to pursue developing models based on BUFR code tables for the representation of OPMET data in the XML within the ET-ODR.

### *Future work programme*

2.6 When considering its future work programme, the group took in to account the following milestones envisaged by ICAO (years in brackets):

- a) replacement of the BUFR code form by XML as far as the bilateral use of table-driven codes for METAR/SPECI and TAF are concerned (2013);
- b) endorsement of the future use of WXXM by the planned conjoint ICAO/WMO MET/AIM Divisional Meeting (2014);
- c) start of implementation of WXXM (2016); and
- d) completion of implementation (2019/2022).

2.7 The group concurred that a number of steps would be required to enable the above transition. In particular, the following intermediate milestones (completion dates and the responsible organization in brackets) were considered necessary for:

- a) Air Navigation Commission to consider the results of the pilot project and to agree that the BUFR code form, used on a bilateral basis for METAR/SPECI and TAF, be replaced by XML as of Amendment 76 to Annex 3 (first half of 2010; ICAO);
- b) CBS IPET-MDI (Inter-Programme Expert Team on Metadata and Data Interoperability) to undertake further tests using various models, including the WXXM, and to prepare documentation for the CBS-Ext. (2010) (second half of 2010; WMO);
- c) CBS-Ext.(2010) to endorse the XML model(s) for MET data in general, including OPMET, and to agree that WMO be responsible for the future governance and maintenance of these data models (second half of 2010; WMO);
- d) WMO Executive Committee to approve the use of the XML model(s) (first half of 2011; WMO); and
- e) CBS IPET-DRC (Inter-Programme Expert Team on Data Representation on Codes) to begin the maintenance of the data models, ensuring that appropriate provisions and/or references be included in the *Manual on Codes* (WMO – No. 306) (second half of 2011; WMO).

### 3. Conclusions

3.1 In view of the above, the group concluded that the ET-ODR had attained its objectives (by completing the successful pilot project) and that its work could thus be discontinued. The ET-ODR may be re-activated in the future, as and when necessary.

3.2 In the short term, (2010-2013), ICAO is planning for the introduction of *enabling clauses* in Annex 3 to use XML for OPMET (METAR/SPECI and TAF), and also for tropical cyclone and volcanic ash advisories and SIGMET in graphical format. This will have little impact on telecommunications facilities since the XML-code form will be used on a bilateral basis only (most likely exchanged over the internet). Consequently, planning for the implementation of the use of XML for OPMET at this stage is considered to be too premature, and should not be initiated before the planned MET/AIM Divisional Meeting in 2014 – which is expected to endorse the transition plan which would have its first milestone in 2016 (Amendment 77 to Annex 3). There will be ample time after the Divisional Meeting to undertake the necessary regional planning.

3.3 Given the significant progress being made, as well as the extensive work programmes being carried out under the NextGen and SESAR programmes, the Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG) has formed an ad-hoc group to assess the impact of these programmes on Annex 3 and associated guidance material. The impact on Annex 3 of the data-oriented environment is expected to be very significant and therefore a roadmap of expected changes is necessary for planning purposes. The AMOFSG ad-hoc group (WG/5) will prepare a roadmap for consideration ahead of the next AMOFSG meeting (AMOFSG/9, September 2011), in order for the Secretary to develop an amendment proposal to Annex 3 replacing the use of BUFR by non-proprietary code formats such as XML for METAR/SPECI and TAF.

3.4 Lastly, it may be envisaged that the BUFR-code used today for WAFS medium and high level significant weather forecasts will eventually be replaced by the GRIB code form in the medium-term (i.e. by 2016). There are no plans at this stage to replace the GRIB-code form by XML, say, in the WAFS.

However, that may happen as part of the final phases of transition to the data-centric environment in the 2019/2022 time frame.

**4. Action by the METG**

4.1 The METG is invited to note the contents of this information paper.

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