



International Civil Aviation Organization

**THE SEVENTH MEETING OF AERONAUTICAL
TELECOMMUNICATION NETWORK (ATN)
TRANSITION TASK FORCE OF APANPIRG**

Shanghai, China, 18-22 April 2005.



Agenda Item 7: Review State's ATN Implementation/Operational Activities and Issues

**REGIONAL PLANNING FOR THE TRANSITION TO
BUFR-CODED OPMET INFORMATION**

(Presented by the Secretariat)

SUMMARY

This paper presents a summary of the discussions by the third meeting of the OPMET Management Task Force of the CNS/MET Sub-group of APANPIRG, held in March 2005, on the subject. It contains a proposal for a conjoint meeting of the OPMET/M TF and the ATN Transition Task Forces in early 2006.

1. INTRODUCTION

1.1 This paper discusses the transition from the traditional alphanumeric codes (TAC) used for coding/decoding of the OPMET information, such as METAR/SPECI and TAF, to the so-called table-driven code formats (TDCF). Since it has been identified that the TDCF suitable for the OPMET information would be the Binary Universal Form for the Representation of meteorological data (BUFR), the expression *BUFR Transition* would be used for the sake of brevity.

1.2 The meeting may wish to recall that the BUFR transition for OPMET data stems from a recommendation by the MET Divisional Meeting (2002) and from the plan of the World Meteorological Organization (WMO), endorsed by its 14th Congress in May 2003, for the transition from TAC to TDCF for all types of meteorological information including the OPMET data. It should be noted in this regard, that according to the *Working Arrangements between ICAO and WMO* (Doc 7475), matters related to meteorological codes are prerogative of the WMO, thus ICAO is obliged to follow the WMO plan for replacement of the alphanumeric codes with digital ones.

1.3 It is also recalled that the 15th meeting of APANPIRG, 23 – 27 August 2004, Bangkok, discussed the need for regional planning of the BUFR transition. The meeting adopted the following Decision:

Decision 15/40 – Planning for migration to BUFR-coded aeronautical meteorological messages

That,

- a) *the ATN Transition Task Force and the OPMET Management Task Force be tasked to address the issues related to the transition to BUFR-coded aeronautical meteorological messages by conducting studies, as necessary;*
- b) *the two Task Forces develop in coordination a regional plan for migration to BUFR-coded aeronautical meteorological information by the end of 2005.*

1.4 APANPIRG advised also that, in order to foster the coordination between the groups, one of the next regular meetings of the ATN Transition TF and the OPMET/M TF should be held jointly.

2. DISCUSSION

2.1 The third meeting of the OPMET/M TF held from 2 to 4 March 2005 at Bangkok reviewed the current status of the planning for BUFR transition. It was recognized that there were global and regional aspects of the transition. The global framework and guidance should be provided by the ICAO HQs and the ACP; the regional aspects, including a number of technical issues should be addressed by the specialized contributory bodies of APANPIRG, such as OPMET/M TF and ATN Transition TF.

2.2 OPMET/M TF reviewed the report of the EUR BUFR Transition Assessment TF prepared in late 2004. The report addressed the whole complex of issues and served as a very useful material for the further planning of the transition. The executive summary of this report is provided in the attachment to this paper for information.

2.3 The group agreed that the findings and conclusions of the EUR BUFR Transition Assessment TF were to a great extent valid also for the ASIA/PAC region. It was recognized that there were a number of operational and technical issues to be addressed, such as:

- The implementation of communication infrastructure capable of handling digital data;
- Development and implementation of TAC/BUFR and BUFR/TAC conversion software;
- Preparation/adaptation of national and regional OPMET exchange schemes/facilities to handle digital data, including a transition period of dual exchange (TAC and BUFR simultaneously).

2.4 In view of the complexity of the issues, it was evident that the work on the regional migration plan could not be completed by the end of 2005, as initially envisaged by APANPIRG (Decision 15/40 refers). In order to progress with the planning and to ensure the necessary COM expertise, OPMET/M TF/3 meeting proposed that the next meeting of the Task Force, scheduled for February/March 2006 (exact dates to be decided), should be held conjointly with the ATN Transition Task Force.

2.5 It is proposed that the Rapporteur of the OPMET/M TF and the Chairman of the ATN Transition TF, assisted by the Secretariat, should coordinate the agenda of the conjoint meeting, to be held in February/March 2006, and report it to the ninth meeting of the 9th meeting of CNS/MET Sub-group in July 2005 and to the 16th meeting of APANPIRG in August 2005.

3. ACTION BY THE MEETING

3.1 The ATN Transition Task Force is invited to:

- a) note the information provided in this paper; and
- b) agree with the proposal of the OPMET/M TF for conducting a joint meeting in February/March 2006 to address the issues related to the regional plan for transition to BUFR-coded OPMET information.

**Report on the Proposed Transition for Meteorological Messages from Traditional
Alphanumeric Codes (TAC) to Binary Universal Format (BUFR)**

(BUFR Transition Assessment Task Force – EUR)

1 EXECUTIVE SUMMARY

1.1 BUFR is a Table Driven Code Form (TDCF) developed by the WMO that can be used to encode meteorological data using a self describing code which is presented in a binary form. The WMO is currently transitioning its existing Traditional Alphanumeric Codes (TACs) to BUFR as a major programme covering all of the domains in which meteorological data is exchanged including aviation.

1.2 This document, on the planning for the migration to BUFR (Binary Universal Form for the Representation of meteorological data) encoded OPMET Messages, has been produced by the BUFR Transition Assessment Task Force in response to Decision 45/13 of the EANPG.

1.3 The Task Force considered a number of issues in relation to the migration from TAC to BUFR in the aviation domain. These issues included an assessment of the benefits to the aviation community of a full transition to BUFR, an assessment of the different approaches to transition and whether or not the proposed transition time frames are realistic. The task force also considered whether the transition was justifiable in the aviation domain and what guidelines would be required in order to provide an ordered, safe and efficient transition if it proceeds.

1.4 The benefits of BUFR were examined and it was agreed that BUFR would produce some significant benefits most particularly by forcing the automation of systems originating BUFR encoded observations or forecasts and the use of communications protocols that included sophisticated error detection. Other benefits related to BUFR self describing nature including the ability to examine and interpret legacy data and the ability to add new parameters without code changes to the BUFR processing.

1.5 The flexibility of BUFR was however compromised by its unsuitability for human interpretation which requires that a presentation format be used. Conversion to the presentation format, assumed to be the same as the existing TAC codes, removes the benefits of flexibility and adds to the complexity of systems. It is vital however that a familiar presentation format is maintained as aviation users of meteorological data are a much broader group than for other meteorological data. Safety and liability issues, particularly in the light of forthcoming 'Single European Skies' legislation could also be a significant problem.

1.6 A fundamental element of any transition will be the development and implementation of TAC/BUFR and BUFR/TAC converters so that information in presentation format can be generated from BUFR data and legacy systems can be used during the transition period. Some conversion software is available at the moment but it needs to be developed further as it does not do the complete conversion. Any such software should be built to a standard developed by the WMO and ICAO to ensure correct and consistent operation.

1.7 National communications infrastructures for the promulgation of meteorological data are highly diverse so it is important that these infrastructures can support BUFR coded messages without problem. This situation can however be worked around by the use of TAC/BUFR and BUFR/TAC converters. States face a choice of supporting BUFR directly by updating data generating systems and end users systems or by insulating these systems from BUFR by use of converters.

Special attention, in the latter case, needs to be paid to the interface between the AMHS and the TAC/BUFR Converter.

1.8 Of critical importance in relation to BUFR migration with the EUR region is the implementation of the AMHS. It is noted from the AFSG Work Programme that the implementation planning of the AMHS based on the BUFR requirements has been suspended until it can be fully justified. It is matter of debate whether the benefits accruing from BUFR alone justify the implementation of AMHS. Although the GTS is used in some states for both national and international distribution it is not part of the AFS and its widespread use would lead to institutional difficulties including funding.

1.9 Assuming that BUFR transition does go ahead it is suggested the existing MOTNE distribution scheme be used and dual transmission of both TAC and BUFR be maintained. Once a number of qualifying criteria have been achieved states may transition to international promulgation in BUFR only. Changes will also be required to the OPMET Databanks in Brussels, Toulouse and Vienna. The transition process will need to planned, administered and monitored by a dedicated group.

1.10 On a regional basis the same problems apply but in particular the implementation of AMHS with a minimum profile equivalent to that defined in the EUR-ATSMHS Profile is a prerequisite for transition implementation activities. ATSMHS trials have been carried between Japan and the United States but the profile used does not support binary data.

1.11 In conclusion the paper states that BUFR does offer some useful benefits, in particular a guarantee of correctly formatted data. Other benefits however are less clear and there is a significant amount of work and cost involved in a transition both by ICAO and the states. A substantial amount of this work, production of specifications, compliance procedures and guideline material, must be carried out prior to operational transition in order to ensure that the transition process is on a firm basis. There are also issues regarding safety and liability that may further complicate the transition. The transition also has a significant dependency on the implementation of AMHS for which there is no agreed operational requirement and therefore no agreed timetable for implementation.
