CNS/COMM/5-WP/07
International Civil Aviation Organization 03/11/06
CAR/SAM REGIONAL PLANNING IMPLEMENTATION GROUP (GREPECAS)
Fifth Meeting of the CNS Committee of the GREPECAS ATM/CNS Subgroup (CNS/COMM/5)
Lima, Peru, 13 to 17 November 2006

Agenda Item 1: Communication systems development
1.4 Study of a communication system to support the migration towards the meteorological messages interchange (METAR/SPECI and TAF) in BUFR format code

CONSIDERATIONS ON THE SUPPORT OF COMMUNICATIONS TO THE MIGRATION TO THE BUFR-CODED OPMET FORMAT

(Presented by the Secretariat)

SUMMARY

This working paper contains considerations on the communication aspects related to the migration towards the exchange of MET messages in BUFR code, its current status, and the results of the COM/MET Task Force presented at the AERMET/SG/8 Meeting held in Santiago, Chile, on 9-13 October 2006.

References:

- Report of the GREPECAS/13 Meeting (Havana, Cuba, 7-11 June 2004).
- Report of the AERMET/SG/8 Meeting (Santiago, Chile, 9-13 October 2006).
- Report of the ATNICG/1, 22-26 May 2006, Seoul, Republic of Korea.

1. Introduction

1.1 The plan for the migration from the traditional alphanumeric format to a coded format based on bit-oriented tables (BUFR *Binary Universal Form for the Representation of meteorological data*) for the transmission of OPMET meteorological information was approved at the 14th Congress of the World Meteorological Organization (WMO) held in Geneva, Switzerland, on 5-23 May 2003.

1.2 According to ICAO Document 7475 (*Working arrangements between the International Civil Aviation Organization and the World Meteorological Organization),* aspects concerning aeronautical codes are a prerogative of WMO, and ICAO has to follow WMO plans for the transition from alphanumeric to bit-oriented codes in order to improve the efficiency of the aeronautical meteorology service.

1.3 The transition contemplates the parallel use of alphanumeric codes and codes based on bit-oriented tables in OPMET messages starting in 2007, and the exclusive use of codes based on bit-oriented tables by 2015.

1.4 The AFTN system, which is oriented to the transmission of alphanumeric data, will not be able to support the transmission of BUFR-coded OPMET messages, since the latter is bit-oriented. This requires the support of a digital communication system, such as the AMHS (Aeronautical Message Handling System).

1.5 The GREPECAS/13 Meeting (Santiago, Chile, November 2005) approved Decision 13/29 - *Plan for the migration of aeronautical meteorological messages to the BUFR code in the CAR/SAM Regions*, requesting the AERMET Subgroup to develop, in coordination with the CNS Committee of the GREPECAS ATM/CNS/SG, a detailed plan for the migration of aeronautical meteorological codes to the BUFR code. In this respect, the GREPECAS/13 Meeting, through Conclusion 13/83 (*Nomination of communication experts to join the COM/MET Task Force)* agreed that the CNS Committee should support the work of the COM/MET Task Force, by nominating members of the communication area to form part of the aforementioned task force.

2. Analysis

2.1 For the transition to the BUFR code, ICAO has established the following timetable of amendments to Annex 3 (*Meteorological service for international air navigation)*:

Late 2007 – Amendment 74: Establishes the use of the BUFR code, together with the alphanumeric codes, between States, based on bilateral agreements.

2010 – Amendment 75: Establishes the exchange/distribution of BUFR between OPMET data banks based on the recommended practices (RP).

2013 – Amendment 76: The recommended practices become standards and provisions for all States to put OPMET messages in BUFR code in the OPMET databases, as a recommended practice.

2016 – Amendment 77: The aforementioned recommended practice becomes a standard, and the full implementation of BUFR-coded OPMET messages begins.

2.2 Taking into account the timetable for the implementation of the BUFR code, as mentioned in the previous paragraph, we may say that the transition from AFTN to AMHS foreseen for the CAR/SAM Regions is consistent with BUFR implementation dates.

2.3 Appendix F to working paper 4 of this Meeting contains the AMHS implementation plans in the CAR/SAM Regions. These plans show that COCESNA and Argentina have already implemented an AMHS system, and that almost all of the CAR/SAM States, Territories and Organizations will have an AMHS system installed by the year 2010.

2.4 When implementing the AMHS, it should be noted that a basic ATS MHS would not be in a position of supporting the exchange of BUFR-coded OPMET messages. These basic systems require some modifications. In order for the exchange of BUFR-coded OPMET messages to work, BUFR-type OPMET messages would have to be annexed to an AMHS message.

2.5 Consequently, an AMHS capable of supporting BUFR-type OPMET messages would have to be an extended AMHS that contemplates file transfer (use of the FTBP - File Transfer Body Part). This specification will be included in the fourth preliminary edition of ICAO Document 9705, which is being revised by the N Task Force of the Aeronautical Communications Panel (ACP).

2.6 In a survey conducted in the Asia/PAC Region and reported to the ATNI CG/1 Meeting (22-26 May 2006, Seoul, Republic of Korea) on BUFR support in AMHS systems installed in that Region, it was noted that the AMHS of Japan, Thailand and United States had a basic AMHS that did not support the BUFR code.

2.7 In the SAM Region, the AMHS installed in Argentina supports the BUFR format, in keeping with information provided by the system manufacturer during the seminar on CNS implementation held in Lima on 26-28 September 2006. Likewise, the AMHS of Spain also supports the BUFR format (as reported at the Seminar “The future of air navigation communications”, Santa Cruz de la Sierra, Bolivia, 16-20 October 2006).

2.8 Another consideration for the implementation of the exchange of BUFR-coded OPMET messages is that communications used for data broadcast should be based on a bit-oriented protocol, such as TCP/IP and X.25 among others. These protocols, through the use of cyclic redundant for verification purposes, significantly reduce the possibility of undetected corruption of data during transmission.

2.9 Furthermore, other aspects should be considered for the migration to BUFR, such as the drafting of an interface document (ICD) that defines interface characteristics for the integration of AMHS and MET systems, the establishment of standards on display systems, template conversion specifications, acceptance standards, conversion programmes, and security aspects.

2.10 The COM/MET Task Force of the AERMET Subgroup, when studying the implementation of the BUFR code, analysed the impact that the introduction of the BUFR code would have on CAR/SAM States/Territories. The analysis described certain complexities that would arise in the BUFR code implementation process, and the most relevant aspects to be borne in mind for the transition, with emphasis on WMO and ICAO responsibility.

2.11 The coordination meeting of the AERMET/8 Subgroup (Santiago, Chile, 9-13 October 2006), based on the analysis of the impact of BUFR implementation, formulated Conclusion *8/7- Revision of BUFR transition* urging ICAO to consider revising the decision to proceed with the transition from traditional alphanumeric codes to BUFR-coded OPMET messages, to study the possibilities of reducing the negative impact on the aeronautical community, to submit the issue of BUFR coding to the consideration of the corresponding WMO committees, especially safety-related aspects; and, lastly, to make sure, through close coordination with the WMO Secretariat, that future decisions of said organisation continue to take into consideration all aspects pertaining to aviation.

3. Conclusions

3.1 From the communication systems point of view, to support the transition to BUFR-coded OPMET messages, we might say that there would be no problem in the CAR/SAM Regions, since digital communication networks are available at regional and national level, and there are plans to implement extended AMHS systems before 2015.

3.2 Other issues to be analysed more in depth by the COM/MET Task Force are the drafting of an interface document (ICD) that defines interface characteristics for the integration of aspects between the AMHS and MET systems, the establishment of standards on display systems, template conversion specifications, acceptance standards, conversion programmes and security aspects.

3.3 From the BUFR operational point of view, even though ICAO Annex 3 contemplates the implementation of BUFR starting in 2007 up until the year in which it will be the only system in operation, there is no consensus amongst the Regions as to whether aviation should do the transition to the BUFR.

4. Suggested action

4.1 The Meeting is invited to:

a) take note of the information provided;

b) analyse the communication aspects to be considered for the transition to BUFR-coded OPMET transmission, as presented from paragraph 2.2 to paragraph 2.9 and from 3.1 to 3.3 of this working paper, so that they can be studied more in depth by the task force; and

c) study the possibility of recommending other actions related to this matter.

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