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**ISSUES RELEVANT TO CBS ARISING FROM
CONGRESS, EXECUTIVE COUNCIL,
AND
THE 2003 MEETING OF THE PRESIDENTS OF
TECHNICAL COMMISSIONS**

Future integration of AMDAR into the WWW Programme
(Submitted by the President of CAeM)

Summary and purpose of document

This document provides information on progress being made in implementing the AMDAR programme, highlights the CBS recommendations regarding the full integration of AMDAR activities in the WWW Programme and suggests mechanisms to achieve this full integration

ACTION REQUIRED

The Management Group is requested to:

- (1) Note the information provided by the President of CAeM; and,
 - (2) Provide further guidance on how best to fully integrate AMDAR activities into the WWW Basic Systems Programme
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Future integration of AMDAR into the WWWW Programme

1 Introduction

1.1 This document has been prepared with the assistance of the Aeronautical Meteorology Unit of the WMO Secretariat and in consultation with the Chairman of the Aircraft Meteorological Data Relay (AMDAR) Panel. The Document is intended as input into discussions by the CBS Management Group (CBS-MG) meeting regarding Congress and Executive Council directives on the AMDAR Programme.

2 Background Information

2.1 It will be recalled that the "Executive Council forty-third session held in May 1991 approved Recommendation 4 /CBS-Ext. (90) which, in sub-items (d) and (e), invited the Operating Consortium of ASDAR Participants (OCAP) and the CAeM to cooperate with the CBS Working Group on the Global Observing System (GOS) in the preparation of a plan for the development on the Aircraft Meteorological Data Relay programme. The Council also requested the president of CAeM, in coordination with the president of CBS, to arrange for the full consultation and cooperation with the airlines and aviation organisations in the development and implementation of the AMDAR Programme and its integration into the World Weather Watch (WWW)"¹.

2.2 The Preparatory Meeting for the establishment of the AMDAR Programme held in 1997 decided to form the AMDAR Panel, open to all Members and sister organisations. The Inaugural Meeting of the AMDAR Panel held in 1998 agreed that its goal should be to enhance the upper air component of the WWW GOS through cooperation with Members in the acquisition, exchange and quality control of meteorological observation from aircraft using automated systems. The work programme of the Panel included four high priority items, namely: coordination of national and regional AMDAR programmes, improvement of AMDAR data exchange and quality control, and implementation of two high priority pilot projects (the Southern Africa and Middle East AMDAR projects), which were expected to become fully-fledged Regional AMDAR programmes.

2.3 The AMDAR Panel has held five annual meetings since its Inaugural Meeting in March 1998. To help facilitate the work of the Panel, a dedicated Technical Coordinator is required, as it has proven difficult to find staff to manage the Panel work on a voluntary basis. Therefore a Technical Coordinator was appointed in April 1999, and an AMDAR Trust Fund was established to assist with the work of the Panel. This Trust Fund is reliant on voluntary contributions from Panel members.

2.4 As a result of excellent progress in implementing the AMDAR Programme and individual efforts of WMO Members, the number of automated AMDAR observations globally exchanged on the GTS has dramatically grown from 45,000 per day in 1998 to nearly 150,000 AMDAR observations per day in 2003. This impressive result has been achieved thanks to the voluntary financial contributions of WMO Members to the AMDAR Trust Fund, their active involvement in AMDAR activities, and the efforts of the Technical Coordinator.

2.5 Fourteenth Congress (Cg-XIV) in May 2003 stressed that AMDAR had proven to be a very cost-effective data source that responded to the needs of WMO Programmes and

¹ Quoted from the Report of the Preparatory Meeting for the Establishment of the AMDAR Panel

brought benefits to end-users. Congress recognized the low cost of AMDAR observations compared to radiosonde soundings, the potential of such systems to improve data coverage in data-sparse areas of the world and the improvements to NWP output attributed to the assimilation of AMDAR observations.

3 Future Evolution of the AMDAR Programme

3.1 For the future, plans are to involve more countries and regions in AMDAR activities through the development and implementation of national and/or regional AMDAR projects/programmes, in particular, in Regions I and II through the expansion of the high priority Southern Africa and Middle East AMDAR programmes following the evaluation of the current AMDAR projects. Other AMDAR activities include assisting ASECNA AMDAR initiatives in RA I, the development of regional AMDAR programmes in Region III, the extension of AMDAR activities into the South-West Pacific Island countries of Region V and to the eastern part of Region VI with the aim of obtaining automated aircraft observations from most of these data void areas of the world.

3.2 The CBS-Ext. (02) session held in 2002 noted, among others, the importance of AMDAR in an integrated GOS as a supplement to the conventional upper-air network and considered the need for improved coverage by AMDAR in data sparse areas and for the management of AMDAR data flow. In this regard, the CBS session passed Recommendation 2 (CBS-Ext. (02)) that highlighted the following:

"That CBS and CAeM should develop an appropriate mechanism to integrate more fully AMDAR activities into the WWW Programme". (It will be noted that this is in line with the Executive Council forty-third session Recommendation 4 /CBS-Ext. (90) held in May 1990.), and,

"That specific activities are initiated under the WWW and Aeronautical Meteorology Programme, including training to facilitate the availability and use of AMDAR data in areas where they are currently not available, in particular in developing countries."

3.3 In relation to ongoing support to AMDAR activities and their sustainability, the Cg-XIV session welcomed Recommendation 2 (CBS-Ext. (02)) (see paragraph 3.4.3.19 of the Congress report). Congress agreed that AMDAR should be more fully integrated into the WWW Basic Systems Programme, and requested the Executive Council to consider appropriate measures in this regard including the desirability of funding AMDAR activities (see paragraph 3.1.1.6). In examining the report of the twelfth session of CAeM in May 2003, the fifty-fifth Executive Council session agreed to invite CBS and CAeM to implement the endorsed Recommendation 2 (CBS-Ext (02)) as indicated above.

3.4 In line with the directives of the Council, the president of CAeM, Dr Neil Gordon (New Zealand), and the Chairman of the AMDAR Panel, Mr Frank Grooters (The Netherlands) have noted with interest the invitation from the Council and agreed to work together and with CBS to develop a mechanism to more fully integrate the AMDAR Programme in the WWW Basic Systems Programme. Exchanges of views are being currently conducted both within CAeM and the AMDAR Panel on how best this integration can be achieved without impeding the current momentum of AMDAR Panel activities and achievements. Ways and means on how best this integration could be achieved will also be sought from the next meetings of the AMDAR Panel and the CAeM Management Group to be held respectively in South Africa in October 2003 and tentatively in Geneva, in early 2004.

4 Possible Mechanisms to Integrate More Fully AMDAR Activities into the WWW Programme

4.1 From the outset, it may be useful and relevant to consider the current formal mechanisms for dealing with AMDAR. In this regard, it should be noted that the AMDAR Panel is formally responsible to the Executive Council. In practice it receives WMO Secretarial support from the Aeronautical Meteorology Unit within the WWW Applications Department.

4.2 CAeM included AMDAR activities within the Aeronautical Meteorological Programme (AeMP) component of the 5LTP with its Item (g): "Promotion and coordination of cost-effective global collection and dissemination of automated meteorological observations from aircraft to contribute to the GOS". Similarly, Item (k) of the AeMP component of the 6LTP is intended to "further develop cost-effective global collection and dissemination of automated meteorological reports from aircraft to enhance the Global Observing System and improve forecasting of aviation weather hazards"

4.3 Expectations from the AeMP 6LTP are that "through coordination of Member's activities by the AMDAR Panel, with assistance by the Secretariat, the availability of good quality global upper air data (including humidity) will be enhanced, in particular from data sparse areas of the world, and progress will be made on resolving pending AMDAR data ownership issues in consultation with the aviation industry

4.4 In line with the 6LTP above, in the new structure for CAeM established by its twelfth session held in Montreal in 2002, AMDAR activities come under the PROMET OPAG, where a "Rapporteur on AMDAR" has been designated. This particular Rapporteur – Mike Edwards (South Africa) - is in fact performing triple duties, as he is also co-chair of the PROMET OPAG and current Vice-Chairman of the AMDAR Panel, which certainly assists in integrating AMDAR activities within CAeM.

4.5 It is naturally the responsibility of CBS and its Management Group to consider how and where AMDAR activities would most appropriately link in within CBS and hence the WWW Basic Systems Programme. Within CBS, the logical "home" for AMDAR activities is of course the Integrated Observing Systems OPAG. Within OPAG/IOS, the most relevant current teams appear to be the ICT/IOS and ET/Observational Data Requirements and Redesign of the GOS.

4.6 In view of the growing importance of AMDAR as a cost effective component of the GOS that provides timely and accurate upper air observations on the one hand, and the increasing difficulties of NMSs to fund the operations of expensive radiosonde networks on the other hand, by the end of the integration process it may be desirable to have a specific entity within CBS to address AMDAR issues. In this regard, for the purpose of discussions, the following points are brought to the attention of the CBS-MG:

- It would be advantageous to have a specific focal point or entity within the OPAG/IOS to deal with AMDAR activities, and in particular for this to have strong links with the AMDAR Panel;
- Such a focal point or entity could perhaps evolve with time into an Expert Team on AMDAR;
- Any such evolution should avoid duplication of efforts amongst CBS, CAeM and the AMDAR Panel, and in particular should not retard the progress already being made by the Panel in important areas such as extension into data void areas, and activities being carried out regarding sensing of icing and humidity; and,

- Consideration should be given to the eventual appropriate location with the WMO Secretariat structure of support to AMDAR activities, but in the meantime there could be merit in some WWW Basic Systems Secretariat involvement with AMDAR Panel activities

4.7 Over time, attention to the points highlighted above may result in a “migration” of prime responsibility for AMDAR activities from the AeMP to the WWW Basic Systems Programme.

4.8 The CBS-MG may wish to note however that no specific funds for AMDAR activities have been allocated from the regular WMO Budget during the 2004-2007 financial period, making the development and coordination of AMDAR activities solely dependent on the voluntary contributions of AMDAR Panel members at least until the end of 2007.

5 Specific Activities, Including Training

5.1 The second directive of the Executive Council was “to initiate specific activities under the WWW and Aeronautical Meteorology Programmes, including training to facilitate the availability and use of AMDAR data in areas where they are currently not available”. In this regard, it is again relevant to mention existing training related activities.

5.2 In terms of facilitation of the availability and use of AMDAR data, such activities have already started with the development of regional AMDAR bulletin headers that enable NMSs to access and use the AMDAR observations particularly relevant to their areas of interest.

5.3 Furthermore, an AMDAR Reference Manual published in early 2003 (WMO-No.958) comprises a comprehensive technical description of AMDAR ranging from sensor systems to the final output data. This is currently available from the WMO Secretariat in English, and very soon in French.

5.4 Training events on NWP organised under CAeM and CBS auspices provide opportune occasions to see how AMDAR observations impact forecast accuracy. In addition, the impact of the increased availability of AMDAR profiles at aerodromes could be evaluated and AMDAR observations used for nowcasting and short-range forecasts could increasingly complement the twice-daily radiosonde observations carried out in most countries.

5.5 Training activities on the use of automated aircraft data (including AMDAR) are expected to continue in the future in particular in relation to the implementation of the ICAO Communication Navigation Surveillance / Air Traffic Management (CNS/ATM) system that requires access to global meteorological information to support air traffic management requirements, and in particular to assist ATM in taking tactical decisions to optimise, among others, aerodrome capacity.

6 Conclusion

The CBS-MG may wish to note the information provided in this document and provide further guidance on the best ways to integrate more fully AMDAR activities into the WWW Basic Systems Programme in line with the directives of Congress and the Executive Council.
