WORLD METEOROLOGICAL ORGANIZATION

_____

COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMMME AREA GROUP ON
INTEGRATED OBSERVING SYSTEMS

EXPERT TEAM ON
OBSERVATIONAL DATA REQUIREMENTS AND
REDESIGN OF THE GLOBAL OBSERVING SYSTEM
Sixth Session

GENEVA, SWITZERLAND, 3-7 NOVEMBER 2003

Dist.: RESTRICTED

CBS/OPAG-IOS
(ODRRGOS-6)/ Doc. 3.4

31.X.2003

_____

ITEM 3

Original: ENGLISH

REVIEW OF Cg-XIV AND CBS-EXT.(02) ; RECOMMENDATIONS FOR EVOLUTION OF SURFACE AND SPACE-BASED COMPONENTS OF THE GOS

AMDAR-Related Training

(Submitted by J. J. Stickland,
AMDAR Panel Technical Coordinator)

Summary and Purpose of Document

The purpose of the document is to inform the Expert Team of the AMDAR-related training activities to be carried out in the light of decisions by Cg-XIV.

ACTION PROPOSED

The meeting is invited to review the background information and proposals related to the AMDAR training and to decide on how they could be implemented.

_____

DISCUSSION

1. Introduction

1.1 AMDAR-related training has taken on a higher priority in the past 2 years following identification of the need by various WMO groups including the AMDAR Panel. The Panel is aware of a directive of the EC session held in 2003 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 were currently not available. In addition to CAeM, it is recognised that the task requires more broadly based support from other technical commissions including CBS and CIMO that can provide additional relevant expertise and training forums. This was acknowledged at the recent meeting of the CBS Management Group. The ET-ODRRGOS is invited to review the following matters related to AMDAR training and to decide on how they could be implemented noting that funding of these activities, at least in part, will be required.

1.2 AMDAR training will need to consist of at least 3 components:

- Familiarisation and awareness for the global meteorological community of the availability and use of AMDAR data, its benefits and limitations as a form of basic upper air data in operational meteorology;
- Provision of technical information and assistance to national meteorological services (NMS) and airlines considering the development of a local AMDAR programme with participating local airlines or collaborating with an existing AMDAR data provider for the development of a targeted AMDAR programme;
- Educating data users in the wide range of operational applications that can benefit from the inclusion of AMDAR as a basic form of upper air data.

2. Recent Activities

2.1 The AMDAR Panel with the support of WMO and NMSs has undertaken or initiated a number of activities over the past year that will assist Members in receiving and using AMDAR data. These include:

- Development of regional AMDAR bulletin headers and improvements to AMDAR BUFR code forms that would enable NMSs to access and use AMDAR observations;
- Publication of the AMDAR Reference Manual in English in the first half of 2003, and completion of its translation in French in October 2003 and its likely publication before the end of this year;
- Development of an information/publicity flyer to be completed by the end of 2003;
- Completion of impact studies conducted in various countries that show clear positive impacts of AMDAR data on short to medium term forecast accuracy;
- Very successful AMDAR Workshops have been conducted in Canada (Mar. 2000) that led to the development of the new Canadian AMDAR programme, and Dakar (Senegal) in 2002 that led to the development of a collaborative program of targeted observations to be provided by the E-AMDAR group. Under this arrangement with ASECNA, AMDAR data profiles will be provided for 14 countries in Central and West Africa and Madagascar. Nigeria and Ghana will also be included. The AMDAR Panel also participated in a successful joint AMDAR conference with the South African Society for Atmospheric Sciences (Pretoria, Oct. 2003);
- Formal requests for AMDAR technical workshops have been received from Argentina (South America region), Hungary (on behalf of 11 countries in central and eastern Europe), South Africa (Southern Africa region) and Morocco. Interest

in holding a workshop has been expressed by Saudi Arabia and Oman (Middle East region), the Russian Federation, and China (East Asia region);

- Preparation by the end of 2003 of the draft of a new AMDAR Manual for airlines;
- Initial planning to develop a stand-alone MS Windows interactive AMDAR data display and forecasting tool;
- The AMDAR Panel has formed a training sub-group to assist with the coordination and development of training programmes and material.

3. Familiarization and Awareness

3.1 Comments provided to the AMDAR Panel from various WMO meetings reveal that a need exists for a broadly based familiarization and awareness programme that provides the global meteorological community with information on AMDAR as a very cost-effective and accurate source of upper air data. This might be called a publicity campaign but it needs to make potential users aware of the demonstrated benefits and limitations of the data. It also needs to inform users that AMDAR is basic upper air data that can be used for a wide variety of meteorological applications and not just for aviation services, as is commonly the perception.

3.2 Implementation of the awareness programme would be gradual and could be achieved through various WMO fora – e.g., Regional Association meetings, WWW working groups, OPAGs and Expert Teams of CAeM, CBS and CIMO, and documents - especially those related to upper air data and observing systems.

3.3 Relevant information will be available by the end of the 2003 in the form of the AMDAR Reference Manual in both English and French, the AMDAR Panel Flyer, various working documents and reports of Panel activities and meetings (some on CD), the AMDAR Panel web site which currently is under development, impact study reports from ECMWF, NCEP, FSL, UK MO, EUCOS, Canada CMC, Hong Kong (China), etc.

4. Technical Training

4.1 As NMSs become aware of AMDAR, some will want to consider development of their own programmes either in collaboration with their own national or regional airlines, or of a targeted program with other AMDAR providers. Assistance is available from the AMDAR Panel to any NMS (or preferably a regional group of NMSs) wishing to hold a technical workshop that typically lasts 2 days. Training material is available. The workshop aims to provide the NMS with a range of AMDAR development options varying in complexity and cost. In all cases, individual NMSs are encouraged to form regional groups with neighbouring NMSs with similar interests in a collaborative programme that has been shown elsewhere to avoid duplication of effort, reduce development costs and workload, and reduces operational costs and workload through the sharing of resources once the programme becomes operational. It can also lead to a much more efficient and cost effective program by building in observation redundancy controlled by a well-managed optimization programme. Participating airlines also reap the benefits of regional programmes. These workshops are organized on an “as required” basis.

4.2 The AMDAR Panel also runs a bi-annual science and technology workshop as part of the Panel’s annual meeting on alternate years. The aims of the workshop are designed to highlight any special relevant AMDAR features of the national or regional host country and to provide a forum for government and research agencies together with private companies to present the latest developments in science and technology that impact on AMDAR.

4.3 By the end of 2003, training information will include a document outlining the content and aims of a workshop, special presentations, the AMDAR Reference Manual in both English and French, elements of the new manual for airlines, the AMDAR Panel Flyer, various working documents and reports of Panel activities and meetings, the AMDAR Panel web site currently under development, impact study reports from ECMWF, NCEP, FSL, UK MO, EUCOS, Canada CMC, Hong Kong (China), etc.

4.4 While the AMDAR Panel may be able to contribute at least in part to the cost of conducting technical training courses, additional funding will be needed from other WMO sources.

5. Data Users

5.1 It has become clear that, as the volume and coverage of AMDAR data grows, there is also a need for training of data users. Noting that AMDAR data can be used for any application requiring upper air observations, it seems that there is considerable variation amongst NMSs with established AMDAR programmes on how extensively AMDAR data is used. This then is reflected in the training programmes. This is expected to change in time as NMSs learn to use the data in more innovative ways. Noting the importance of AMDAR data as a basic form of upper air data that is now being used in a wide variety of ways, training in the US (and to a lesser extent in Australia) for example has increased substantially over recent years and is now an important element of introductory and further training programs.

5.2 A range of data impact studies has shown conclusively the positive value of AMDAR data to NWP forecasting. This has become possible because of the converging of 2 scientific development streams:

- Provision of AMDAR data with sufficient spatial and temporal density;
- Improvements in assimilation of AMDAR data using 3DVAR and 4DVAR.

5.3 A number of case studies have been documented showing how AMDAR data can be used in improving short-term forecasts at operational forecasting centres. The data are of particular value under these circumstances in providing aviation and severe weather services.

5.4 The AMDAR Panel does not have the expertise or resources to conduct “User” training courses so looks to the broadly based expertise within the various technical commissions to plan and undertake such courses. The UK Met Office for example is responding to a request from China to conduct a user-training course. It is suggested that a training initiative of several AMDAR data user courses be established per year over the next 6 years that ensures each Regional Association has at least one course each alternate year. The AMDAR Panel stands ready to assist through the provision of information and other material.

5.5 The US has developed a very helpful remote learning programme with live tutorial assistance that provides the student with an introduction on AMDAR, the benefits to operational forecasting and examples of how data can be used. It is designed specifically for the US, but an informal offer has been made by the programme developer to prepare a specially tailored stand-alone version with digitally recorded tutorial voice to run from CD or appropriate web site for use by any NMS. It is strongly recommended that this proposal be followed up in a collaborative effort with the AMDAR Panel. Australia and some European countries have also developed special training aids.

5.6 Of relevance to data use and therefore training, is the need to display AMDAR data in a variety of ways for operational use by forecasters. The interactive display tools

developed by most current providers of AMDAR data (of which the FSL and DWD displays are excellent examples) are all specifically built and integrated into each NMS's dedicated computing and processing system. In all cases they are developed for the Unix operating system. A need has been identified for the development of a similar interactive display that runs under the Windows operating system. A specific request for such a system has come from ASECNA to support its use of the targeted data to be provided by E-AMDAR. A tentative offer has come from the US (FSL) to assist with porting its existing display to run independently under the Windows environment. But it is likely that some funding will be needed.

6. Summary

6.1 A table summarizing the proposed training activities and responsible groups is given at Annex 1. The meeting is invited to review the proposal to more clearly identify those groups that will need to carry forward training activities.

_____

PROPOSED AMDAR TRAINING

Item	Activity	Location/ Responsible Group	Frequency
Familiarization/ Awareness	Promote, publicise	WMO Fora – CBS, CAeM, CIMO - OPAGS & ETs; Regional Associations; WWW Working Groups	Ongoing
Technical	System development Science and Technology	AMDAR Panel workshops with financial assistance from WMO	Development workshops - as required; Science and Technology. – biannual workshops
Data Use	NWP, Operational forecasting Data impact Remote learning Data displays Integrate into training for basic upper air data use	WMO Fora – CBS, CAeM, CIMO - OPAGS & ETs; Regional Associations; WWW Working Groups Impact workshops	All regions at least biannually