W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

SECOND MEETING OF THE AMDAR PANEL

GENEVA, SWITZERLAND

19-22 October 1999

FINAL REPORT

GENERAL SUMMARY OF THE MEETING

1 OPENING OF THE MEETING

1.1 The Second Meeting of the Aircraft Meteorological Data Relay (AMDAR) Panel was opened at 10.00 hours on 19 October 1999 in the WMO Secretariat, Geneva, by Mr C. Sprinkle (USA), Chairman of the Panel. Mr Sprinkle asked the Director of the World Weather Watch Department of WMO, Mr R.C. Landis, to address the meeting. In welcoming the participants, Mr Landis said how pleased and encouraged he was to see so many Members present which he felt was a reflection of the continued interest and support to the WMO AMDAR Programme. He welcomed the representatives of the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) and the Chairman of the Operating Consortium of ASDAR Participants (OCAP).

1.2 Mr Landis said that the Inaugural Meeting of the Panel, held in 1998, provided the foundation for the implementation of the AMDAR Programme and set out the goal to co-ordinate and promote global AMDAR development in order to enhance the upper air component of the WWW Global Observing System. Several high priority items for the AMDAR programme were adopted including the co-ordination of national and regional AMDAR programmes, the improvement of data exchange and quality control, and the implementation of pilot projects in Southern Africa and the Middle East. A Trust Fund was established to support AMDAR activities, and to secure the services of an AMDAR Technical Co-ordinator, hereafter referred to as TC**.**

1.3 Mr Landis said that WMO was grateful to Members that had kindly contributed to the AMDAR Trust Fund, which had made it possible to hire Mr Jeff Stickland (Australia) as the TC. Mr Landis expressed the appreciation of the WMO to the UK Met Office, for kindly hosting the TC and providing him with adequate facilities. He noted with pleasure that the UK Met Office had proven to be a particularly appropriate location as the TC is co-located with experts and facilities directly involved in AMDAR activities.

1.4 Mr Landis said that information available suggested that since the establishment of the AMDAR Panel 17 months ago there had been about a 22% increase in the availability of AMDAR data globally with about 55,000 daily reports. Mr Landis noted with pleasure that although the TC started his assignment only seven months ago, advances had been made in implementing the Southern African Pilot project, and remarkable efforts had been made by AMDAR projects groups. Mr Landis reminded the meeting that the AMDAR Panel was established following the directive of the forty-ninth session of the Executive Council in view of the expected development of the WWW composite upper air observing system. The Council recognised the important role of WMO Technical Commissions in the functioning of the Panel, in particular, the role of CAeM and CBS. Mr Landis welcomed the President of CAeM, Dr N.D. Gordon (New Zealand), and the President of CBS, Mr S. Mildner (Germany). He pointed out that a number of issues to be discussed under various Agenda items for this second AMDAR Panel meeting would require collaboration and co-ordination between CAeM and CBS. These issues included, among others, the requirements for AMDAR data, the determination of data sparse areas, data management and the development of appropriate code forms for messages. Closer co-ordination with the airline industry and ICAO was vital to ensure the optimisation of automated upper air data from aircraft. Mr Landis noted with interest the proposal to discuss the opportunity for finding financial resources to pay for the AMDAR communication costs for air reports needed over data sparse areas of the globe and indicated that he looked forward to suggestions on this issue from the meeting.

1.5 Mr Landis informed the meeting that the Thirteenth Congress noted that AMDAR data were as yet not available at some National Meteorological Centres. He urged the Panel to

address this important issue in order to promote greater interest and involvement of Members for the AMDAR Programme. Mr Landis recalled that the last Extraordinary Meeting of the OCAP Programme Board agreed in principle to fully transfer its activities to the AMDAR Panel not later than 90 days following this Panel meeting. Mr Landis encouraged the meeting to finalise this transfer as soon as possible with the hope that pulling available expertise and financial resources together would more effectively help achieve the goal of enhancing the upper air component of the WWW Global Observing System.

1.6 Mr Landis concluded his remarks by wishing the meeting every success in its deliberations, a rewarding and enjoyable stay in Geneva and a safe and pleasant journey home. The list of participants is given in Annex I.

1.7 Mr Sprinkle, the AMDAR Chairman, thanked Mr Landis for the Secretary-General's support for this meeting. Mr Sprinkle also thanked the participants for taking time out of their busy schedules to attend this meeting.

2 ORGANIZATION OF THE MEETING

2.1 Adoption of the agenda

The provisional agenda was adopted by the meeting. The agenda is shown in Annex II.

2.2 Working arrangements and other organizational matters

The meeting approved working arrangements and various organisational aspects necessary for the efficient conduct of the session.

3. REPORT OF THE CHAIRMAN OF THE AMDAR PANEL

3.1 The Chairman of the Panel thanked the Secretariat for the work accomplished since the last meeting in particular regarding the selection and appointment of Mr J. Stickland as the AMDAR Technical Co-ordinator. He welcomed again Mr Stickland and said that since his appointment, the Technical Co-ordinator had done an excellent job. He noted the excellent relationship that existed between the Technical Co-ordinator and various AMDAR project managers, the ASDAR Centre including the UK engineering manager, the Chairman of OCAP, the ASDAR Technical Project Officer and the Data Monitoring Group. The Chairman informed the meeting about a letter he sent to the WMO Secretariat in August 1999 requesting the Secretary-General to consider waiving charges for Secretariat administrative support to the AMDAR Panel activities to be paid from the AMDAR Trust Fund. The Chairman also informed the meeting about his correspondence with Mr A.T.F. Grooters, the Chairman of OCAP, regarding the closure of the OCAP. He reminded the meeting that Doc. 5(2) relating to this issue would be presented later under Agenda Item 5 – Action items from the Inaugural Meeting of the AMDAR Panel, including the Transfer of Responsibility from OCAP to the AMDAR Panel.

4. REPORT OF THE AMDAR TECHNICAL CO-ORDINATOR

4.1 The meeting was aware that, at its Inaugural Meeting in March 1998, the Panel agreed to appoint an AMDAR Technical Co-ordinator (TC), subject to the availability of adequate funds from the established AMDAR Trust Fund. This task was given to the Panel Chairman, the vice-chairman, the Panel member from New Zealand and a Representative of the Secretary-General. An invitation letter from the Secretary-General was sent to the Permanent Representatives of the 14 Panel Member countries to nominate a suitable

candidate and/or to offer to host the appointee. Mr Jeff Stickland (Australia) was appointed TC in December 1998 and took up the post on 1 April 1999. He moved later that month to the UK Met Office that had offered to host the TC. The meeting expressed its gratitude to the UK Met Office for kindly hosting the TC and for providing him with office and support facilities at Beaufort Park. The meeting noted with satisfaction that the Met Office had proven to be a very beneficial location as the TC was co-located with the UK and EUMETNET AMDAR (E-AMDAR) project managers, the ASDAR Centre including the UK engineering manager, the ASDAR Technical Project Officer and the Data Monitoring Group. Mr Stickland expressed his gratitude to the Panel and the Secretary-General for selecting and appointing him as the TC.

4.2 The Panel was informed that the TC visited the WMO in Geneva and assumed control for several weeks of the Met Office Technical support for ASDAR. Other TC activities included contacts with project leaders, such as E-AMDAR, the Southern Africa Pilot Project, the Middle East Pilot Project and the Co-ordination of National and Regional Programmes group. A meeting attended by the TC convened at Beaufort Park on 14 June 1999 resulted in the establishment of an action programme. Conclusions of the Panel regarding this meeting were recorded under Item 6.1, Co-ordination of National and Regional Programmes. The TC was involved in a number of data exchange and data quality matters that resulted from the switching of AMDAR messages to Saudi Arabia. These matters were discussed further in Agenda 6.2 - Improvement of Data Exchange and Quality Control.

4.3 The TC informed the meeting that there had been close liaison with the OCAP Chairman, the ASDAR Technical Project Officer and the UK ASDAR engineer on matters relating to the winding up of OCAP. One of the major tasks of the TC had been to become familiar with the operational details of the ASDAR programme noting that the AMDAR Panel was to assume responsibility for the international co-ordination of the ASDAR programme. There had also been regular interaction with the ASDAR data monitoring centre and the ASDAR maintenance centre at Matra Marconi Space as technical problems arose.

4.4 The TC pointed out the difficulties of preparing a meaningful biannual budget given the very large uncertainty in the level of funding likely to be available over the next two years. He indicated that while he could address certain aspects of all these projects, some of the effort would need to be undertaken by specialists from various participating countries. In this regard, the difficulties with framing the budget had been in estimating how much assistance would be given freely and how much might require additional contracted services that could be funded by the Panel. The TC attended briefings and prepared documents for a number of meetings that included the Co-ordination Group for the Composite Observing System for the North Atlantic (CGC) that he attended in August 1999 on behalf of the Panel, and the Co-ordination Group on Meteorological Satellites being held in October 1999 in China**.**

5. ACTION TAKEN SINCE THE INAUGURAL MEETING OF THE AMDAR PANEL, INCLUDING THE TRASFER OF RESPONSIBILITY FROM OCAP TO THE AMDAR PANEL

5.1 The meeting was informed that action items identified at the Inaugural Meeting of the AMDAR Panel had been addressed as well as other items that might have required further work. The meeting noted with satisfaction that the following action items had been completed or were in progress:

(a) Panel Membership and AMDAR Trust Fund Contributions: Action completed. Information on the status of the AMDAR Trust Fund was recorded under Item 8 – Status of the AMDAR Trust Fund.

(b) Transfer of Responsibilities from OCAP to the AMDAR Panel: The OCAP Programme Board, at its Extraordinary Meeting held in 1998, agreed to arrange for the early closure of OCAP. It was agreed that the Chairman of OCAP would prepare and submit a proposal for the transfer of co-ordination responsibilities of the operational ASDAR programme to the Chairman of the AMDAR Panel for consideration by this meeting. It was further agreed that, subject to the agreement of the AMDAR Panel to the OCAP proposal, funds remaining in the ASDAR Trust Fund should be transferred to a specific budget item in the AMDAR Trust Fund. The Chairman of the AMDAR Panel had studied the OCAP proposal and provided a reply to the Chairman of OCAP. The decision of the meeting regarding the closure of OCAP was recorded under paragraph 5.2 of this report.

(c) Administrative Arrangements with the Secretariat: A letter from the Chairman of the AMDAR Panel dated 4 August 1999 requested that the costs for WMO Secretariat administrative support to the Panel activities be waived. The decision of the Secretariat regarding this request was recorded under Agenda Item 8 – Status of the AMDAR Trust Fund.

(d) Establishment of Four Sub-Groups: Action partially completed. The deliberations of the meeting on this particular item were recorded under Agenda item 9, - Future Work Programmes.

(e) Appointment of a Technical Co-ordinator: Action completed

(f) Liaison with CBS and co-ordination with other WMO bodies: On-going action. The Chairman of the AMDAR Panel had maintained informal contacts with the President of CBS regarding the overall Aeronautical Meteorology Programme including AMDAR issues before March 1999 when he was President of CAeM. Furthermore, at his request, the TC provided input for CBS meetings as reported under Agenda Item 4 - Report of the AMDAR Technical Co-ordinator. During the discussion on liaison with CBS and co-ordination with other WMO Bodies, the meeting recalled that the Chairman of the AMDAR Panel was expected to formally communicate with the President of RA III with regard to representation on the Panel. The meeting was informed that the responsibility of President of RA III was being temporarily assumed by the President of WMO and that, as a result, no contacts were initiated in the Region itself. Mr Mildner, the President of CBS, offered to contact Permanent Representatives with WMO who would attend a CBS meeting during his mission in Region III in November if any proposal for possible collaboration with the Region came out from the meeting. When discussing liaison with CBS and co-ordination with other bodies it was suggested that consideration should be given to the representation of the AMDAR Panel through WMO on the ICAO METLINK Study Group.

5.2 Proposal for an ASDAR Subgroup

5.2.1 Mr A.T.F. Grooters (the Netherlands), the Chairman of OCAP, presented the OCAP proposal to establish an ASDAR Sub-group within the AMDAR Panel to manage the operational ASDAR Programme following the closure of OCAP. Mr Grooters reminded the meeting that the Extraordinary Meeting of the Programme Board in 1998 agreed that the main objective was to transfer its activities to the AMDAR Panel whilst ensuring the continuance of the highly effective ASDAR Programme. There was general recognition by the meeting that the ASDAR Programme has been very successful in providing timely high quality and high resolution air reports to the users for nearly a decade. It was further recognised that the ASDAR programme continued to provide valuable data over data sparse areas of the world. While some members, in particular owners of ASDAR units, supported the OCAP proposal, other members expressed concern that the proposal as presented may create difficulties for the work of the Panel and could also lead to a competition for funding AMDAR activities. Following prolonged discussions on the OCAP proposal, the meeting

concurred with the principle to establish an AMDAR sub-group within the AMDAR Panel. The meeting reviewed and amended the OCAP proposal and adopted the Terms of Reference for an ASDAR Sub-group that is found in Annex III to this report. The Panel agreed that Mr A.T.F. Grooters (The Netherlands) should serve as an interim chairman of the ASDAR Sub-group until the first meeting of the ASG in conjunction with the third Panel meeting. The meeting noted with appreciation that the UK Met Office confirmed that it would probably continue to support the ASDAR monitoring centre.

5.2.2 The Panel noted the information provided by the ASDAR Technical Project Officer that the average cost per ASDAR observation from the 17 units currently installed, providing around 1400 observations per day, was in the vicinity of US$ 0.75. Although it was not a clear-cut matter of making direct comparisons with the cost to NMSs of obtaining AMDAR observations, most AMDAR observations cost significantly less than an ASDAR report, with costs for communication and handling ranging from as low as a few US cents per observation. The Panel therefore noted that, in pursuit of its overall goal, it would be essential for it to devote its resources to achieve the best overall benefit to cost ratio. In this regard it was recognised that the ASDAR system is likely to become uneconomical to maintain in the near future and that, in this event, support from the Panel for ASDAR activities would cease.

5.2.3. The agreed Terms of Reference for the ASG are included in Annex III.

5.2.4 It was agreed that remaining ASDAR Trust Fund money would be transferred to the AMDAR Trust Fund as an identifiable ASDAR line item within the AMDAR Trust Fund and budget by 31 December 1999. The Panel requested the responsible parties to make the necessary arrangements as soon as possible. The chairman of OCAP indicated that he did not foresee members making further contributions to the ASDAR budget.

6. REVIEW OF THE AMDAR PANEL WORK PROGRAMME

6.1 Co-ordination of national and regional programmes: Report and discussions of a meeting held on 14 June 1999

6.1.1 The Panel noted with satisfaction that the TC with the assistance of Mr John Cunning (USA), the leader for the AMDAR project on Co-ordination of National and Regional AMDAR Programmes, convened an informal meeting at Beaufort Park (UK), in June 1999, at no cost to the AMDAR Trust Fund. The purpose of the informal meeting was, among other things, to identify and understand the aims of the project, identify potential areas of overlap with the Data Improvement Project and explore practical ways to move the co-ordination project forward. Mrs C. Boyack and Mr B. Truscott, respectively the UK and E-AMDAR programme managers, Mr A.T.F. Grooters, the Chairman of OCAP, Mr D. Painting, the ASDAR TPO, Dr. R. Pettifer (UK), and Dr. Rex Fleming (USA) attended this meeting.

6.1.2 The informal meeting, addressing the issue of AMDAR software, noted that there were several “standard” versions of software available to any country/airline wishing to commence an AMDAR programme. It was noted with interest that there was considerable potential for just a few airlines with large long haul fleet of AMDAR equipped aircraft that covered many airports around the world, to provide a large proportion of the required AMDAR data. It was suggested that ways needed to be explored where co-ordinated funding could be found to support these airlines. With regard to meteorological data requirements, the informal meeting was aware that a basic set of requirements for the Global Observing System had been published by CBS. Furthermore, more stringent requirements for meteorological data needed to obtain optimum results for NWP models had also been developed by CBS and these requirements were referenced in the AMDAR Study (1996). It was pointed out that some AMDAR observations, i.e., turbulence, and icing, that could have potential global value were not adequately covered

in WMO technical regulations and the Manual on the Global Observing System. The informal meeting considered that closer co-operation on these particular issues between the Panel and CBS would be needed in future. The Panel highlighted action items that needed to be undertaken by the group on Co-ordination of National and Regional Programmes. Other decisions of the Panel regarding the results of this informal meeting were recorded under Agenda Item 9 – Future Work Programmes.

6.1.3 Report by the project leader

Mr Cunning described the various components of national and regional AMDAR programmes and outlined future activities of the group. The meeting was aware that there were three major regions in the world where AMDAR programmes were currently established, namely Europe, the Australia/New Zealand area, and North America. The meeting was also aware that AMDAR Pilot projects were being developed for Southern Africa and the Middle East. Various existing national and regional AMDAR programmes were discussed, including the E-AMDAR and AMDAR programmes from Australian, New Zealand, the US and the ASDAR programme. With regard to the New Zealand AMDAR and E-AMDAR and Australian programmes, detailed information was recorded under items 7.1 - National and Regional Programmes.

6.1.4 The Australian and New Zealand AMDAR Programme

The meeting recalled that the Australian AMDAR programme was the first operational AMDAR programme following the successful use of ASDAR equipped aircraft in the First GARP Global Experiment in the late 1970s. AMDAR data were supplied by Ansett primarily over Australia and to a small number of SW Pacific islands and Qantas provided data over all international routes. The meeting noted with satisfaction that all air reports were being placed on the GTS including a measure of turbulence in the form of Derived Equivalent Vertical Gust (DEVG). Additional details on the Australian and New Zealand AMDAR programmes were recorded under Agenda Item 7.1 – National and Regional Programmes.

6.1.5 The United States AMDAR Programme

The meeting was informed that the US AMDAR programme had been operating since about 1987 and that 6 airlines were providing approximately 60,000 reports a day with a lower daily figure of 45,000 reports over the weekend. The meeting noted with interest that the US AMDAR programme was unique, in the sense that airlines paid the full communications costs for getting meteorological messages from the aircraft to ARINC. Following decoding and reformatting of the downloaded information, BUFR messages were sent to the National Weather Service and the FAA and then disseminated through the GTS. The meeting was informed that there were no formal arrangements with the airlines to provide the data and that in order to make this AMDAR programme fully operational, a formal arrangement with the airlines would need to be implemented. Mr Cunning provided information on the US water vapour and turbulence programmes that were described in detail in Agenda Item 7.3 – Technical developments.

6.1.6 New Potential Programmes

With regard to the establishment of new AMDAR programmes, the informal meeting suggested that a general approach to be adopted should be to build at the national level but co-ordinate at the regional level. Locations where new regional AMDAR programmes were required were reviewed. With regard to the Middle East high priority pilot project, little progress was made apart from a review of the potential of using existing equipped aircraft from European airlines already involved in AMDAR programmes such as BA, KLM and Lufthansa. However, the Permanent Representative of Bahrain with WMO had expressed his interest in

becoming involved in a Middle East AMDAR project. The meeting identified potential AMDAR Programme areas included Asia, in particular the western Pacific rim and Pacific island countries. Airlines approached included those from Japan, Korea, Taiwan, Hong Kong and Singapore. China Air and EVA Air as well as Singapore Airlines and Cathay Pacific were reported to be especially interested in collecting data on turbulence. The view was expressed that the likelihood of obtaining some early achievements in this region was quite good. It was noted that there was also a potential for an AMDAR programme in South America given the Argentinean involvement in the ASDAR programme and the interest shown by others in the region. Furthermore, the Panel was aware that equipped AMDAR and ASDAR aircraft (AR, BA, KLM, Qantas) were already providing data in this region.

6.1.7 ICAO Automatic Dependent Surveillance (ADS)

With regard to the ICAO ADS, the meeting, while emphasising the potential value of data obtainable from the ADS system, expressed concern about whether practical steps were being taken to implement the meteorological data requirement given that the responsibility for ADS was outside the control of meteorological services. It was pointed out that many Meteorological Services had no direct involvement in ADS and that they needed to work through air traffic services to arrange access and distribution of down linked meteorological data. In order to address this concern it was suggested that WMO and ICAO encourage the downlinking of meteorological reports and that the Panel maintain close co-operation with the ICAO METLINK Study Group. There were some discussions about the transmissions of AMDAR data using future systems, such as ADS-B, and it was recognised that there may be some potential cost effectiveness of data transmitted though these means to meteorological services. The informal meeting identified the need for close liaison between the code groups within users, WMO and ICAO to try to make maximum use of the down linked data. The meeting was informed that contacts had been identified to ascertain that weather information was being collected through ADS including Tahiti for the Pacific region, and the Gander and Shanwick FIRs for the operational ADS trial over the North Atlantic.

6.1.8 The need to address the lack of equivalent WMO code in the WMO FM 42 AMDAR messages for humidity data originating in the ARINC 620 format and for turbulence data originating from both ARINC 620 and the proposed ADS formats was highlighted. It was also recognised that the problem of reporting water vapour should require some attention by the Panel. However, the President of CBS reminded the meeting that the issue of meteorological codes should be addressed by relevant CBS expert teams. The Chairman of the AMDAR Panel indicated that any CBS business arising from the meeting discussions would be conveyed to the President of CBS for appropriate action through customary channels.

6.2 Improvement of Data Exchange and Quality Control

6.2.1 The meeting expressed its gratitude to the UK Met Office and to Dr R. Pettifer who carried out the Data Exchange and Quality Control study on behalf of the AMDAR Panel, aimed at assessing the activities to be undertaken and the magnitude of the resources needed to complete the task.

6.2.2 The study described the AMDAR system organisation including AMDAR, MDCRS, FANS (ADS), the European Air/Ground Exchange of Meteorological Information and the roles of the various players that included airlines, airline telecommunication companies and national Meteorological Services. The main part of the study presented an overview of the issue of Data exchange and discussed the regional and global data exchange requirements, current status of data volume including volume control, communications bandwidth, code forms and data flow. It was pointed out that the current volume of AMDAR data was estimated to be

about 55,000 observations per day and that this volume was expected to be about 150,000 observations per day over the next five to ten years.

6.2.3 The study discussed the requirement for data quality control and looked at the activity being carried out in this field by the USA, Europe, Australia, and New Zealand. The need for an agreed set of systematic data quality evaluation rules and procedures was foreseen. The study discussed the need for the availability of "visualisation software", and considered, inter alia, the use of the World Wide Web as a means of data exchange. The study noted that such a technique could present a segment of the user community with an acceptable data delivery system that could circumvent difficulties with the GTS in some WMO Regions.

6.2.4 Dr. Pettifer estimated that there was about one man-year's work in running the project, with an expectation that this resource would be spread over 2-4 years to allow for international consultation and agreement. The President of CBS cautioned the meeting about being overly optimistic, as some of the issues discussed might just be hypothetical. He pointed out that a dynamic response was needed in face of rapid development in the availability of data. He said that a number of the actions listed in the reports were already CBS actions and what was needed was interaction between the Panel and relevant CBS Expert Teams. A member pointed out with regard to data availability that an aircraft landing in a given country might not be able to provide the AMDAR data directly to that country. In view of this situation, there was a need to address the redistribution of data to all users.

6.2.5 The meeting agreed that this task formed one of the high priority areas identified by the AMDAR Panel and to invite the AMDAR Group on Improvement of Data Exchange and Quality Control, when formed, to take the necessary steps to review and implement as appropriate the actions listed in Annex V under the guidance of the TC.

6.3 Pilot Projects on Southern Africa and the Middle East

6.3.1 The Panel was aware, from results of the Regional Basic Synoptic Network upper air stations monitoring in 1992 and 1998, that an increased number of "silent " stations and a persistence in data sparse areas were found over parts of Africa, Asia, South America and the oceans. This prompted the Inaugural Meeting of the AMDAR Panel to establish a high priority pilot project on Southern Africa (AmPaSAP) with South Africa taking the lead for its implementation. The Panel member from South Africa informed the meeting about steps envisaged for the full implementation of the project. Directors of National Meteorological Services of Southern African countries were informed about AmPaSAP in May 1998 followed up by two letters inviting them to become involved in the Project. A letter was also addressed to most airlines operating in the region highlighting expected benefits to aviation from the implementation of the project.

6.3.2 During the implementation phase, 15 South African Airways aircraft and 14 foreign airlines operating more than 180 flights per week were expected to produce AMDAR reports. While 3 airlines had been providing ASDAR data, only one airline had indicated readiness to provide AMDAR data for the project. Other airlines were said to be upgrading their international fleet to enable them to participate in the project in the first half of 2000. It was expected however that AMDAR data could be collected from at least 90 flights per week. The implementation of the project initially planned from September 1999 to March 2000 was postponed to the period April-September 2000 because most of the aircraft expected to be involved would only be ready to do so in early 2000. One of the major problems in implementing the Southern African Pilot project that was brought to the attention of the meeting was the need for funding of AMDAR data. The meeting was requested to address this issue. The project was developing a programme to assess its impact of the project on aeronautical meteorological services.

6.3.3 The Panel member from Saudi Arabia informed the meeting about plans for the Middle East project that his country had accepted to lead. The objective of the national AMDAR Programme of Saudi Arabia under the Middle East project was to provide data and forecast guidance and to encourage adjacent countries to participate in the implementing the Saudi Arabia AMDAR Programme. The Meteorological and Environmental Protection Administration (MEPA) and the Saudi Arabian Airlines (Saudia) were the national lead agencies for implementing the programme. The new fleet of 61 aircraft equipped with ACARS/ADS systems would be expected to take part in implementing the project in the long term. The meeting was informed however that costs would be a major factor in expanding the project and that, for the moment, MEPA and Saudi were collaborating in sharing the costs of the project. During discussions on this item, questions were posed about the possibility for taking advantage of other airlines flying in the region to provide AMDAR data and about the end-use of the AMDAR data. It was suggested that in order to evaluate the cost/benefit in implementing such a pilot project, MEPA could initiate very quickly a pilot impact study based on the available AMDAR data.

6.4 Other Activities

6.4.1 The meeting was informed that the final ASDAR installation became operational on a Boeing 747 of Aerolineas Argentinas on 27 March 1999. The meeting was aware that it was the 22nd of 23 ASDARs to be installed in a programme that commenced full operations on a British Airways Boeing 747 in June 1991. However, the meeting was informed that three systems on BA DC10s had been removed since October 1998 as these aircraft were taken out of service. Two further units on BA 747 100 aircraft would be withdrawn by the end of 1999. As of 30 July 1999, 17 ASDAR units were operational and providing air reports. The number of ASDAR units reporting at any given time had remained fairly steady since 1996 at an average of 18 units providing around 1800 reports per day. Data quality had remained high although a loss of data occurred through maintenance down time, aircraft avionics and ASDAR hardware faults. The meeting was aware that the number of ASDAR units reporting was expected to decline as faults occurred in the ASDAR hardware now becoming increasingly obsolescent and noted that, as of 15 October 1999, there were 14 operational ASDAR units reporting.

6.4.2 As envisaged after the closure of OCAP, the maintenance of ASDAR units in individual country ownership would be the sole responsibility of the current owner or operator. However, OCAP had arranged for a minimal level of technical support to be maintained by the equipment supplier to ensure that repair facilities were available for individual ASDAR owners for at least one year after the closure of OCAP. Two units would remain in common ownership and OCAP had set aside funds to decommission these units should the current operators decide to withdraw them from service.

7. EXISTING AND PLANNED AMDAR PROGRAMMES

7.1 National and Regional Programmes

7.1.1 New Zealand AMDAR

The Panel member from New Zealand informed the meeting that the Meteorological Service of New Zealand Limited (MetService) was primarily concerned with obtaining ascent and descent profiles in the New Zealand region. The meeting noted with satisfaction that under a formal agreement with Air New Zealand (AirNZ), AMDAR reports from selected AirNZ B737-300 aircraft were delivered to the MetService and relayed to the GTS following quality control procedures. A trigger logic software had been specified to initiate reports within a geographical box 155 E to 180E and 25 S to 50 S. A compressed version of the FM 42-XI AMDAR Code was used to reduce communication costs and six observations were

combined into one message that was transmitted by VHF radio to the nearest SITA remote ground stations (RGS). Approximately 450 observations per day were being produced. During discussions on the New Zealand AMDAR programme, a view was expressed that, for short flights, a cost-effective option might be to store the data for transmission after landing. The Panel noted with interest the cost-sharing scheme agreed on with the Australian Bureau of Meteorology for Qantas AMDAR data generated in the box Equator to 50S and Longitude 160E through 180 to 160W. There were around 300 observations per day provided under this arrangement. The Panel noted with appreciation that this bilateral arrangement enabled the data to be made available to the meteorological community via the GTS.

7.1.2 Report of the EUMETNET-AMDAR Programme

The meeting noted with interest that the EUMETNET Council decided early in 1998 to establish an EUMETNET-AMDAR (E-AMDAR) Project for three years. E-AMDAR had been set up to optimise the cost/benefit ratio of AMDAR systems by reducing duplication and seeking to meet requirements in a most cost-effective manner. The E-AMDAR Project was described as a self-contained activity, with identified objectives, deliverables and timetables. E-AMDAR was a component of the EUCOS Programme[1], aimed at improving the Composite Observing System over Europe, and a regional component of the WMO AMDAR Programme. Fourteen of the eighteen EUMETNET members had chosen to participate in the programme. The initial requirement for E-AMDAR data identified the area of interest as 10N - 90N , 70W - 40E, which included the European continent and adjoining sea areas, the Northern Atlantic, the Arctic between Greenland and Scandinavia, the Mediterranean Sea and the Northern part of Africa.

The Panel noted with interest the technical objectives and the scope of the E-AMDAR project, in particular ascent/descent measurements, as a complement and potential substitute for radiosondes over the territory of EUMETNET Members. Areas of AMDAR data collection included data sparse areas having an impact on short-range forecasts in Europe, and data sparse areas worldwide. The implementation of the E-AMDAR started on 1 January 1999 and was set in three stages. The final system was expected to be operational by December 2001. An important component of the E-AMDAR project of particular interest to the Panel was that 20% of the operational AMDAR data budget was being reserved to support the Panel through the provision of data from selected components of the European fleet of long haul aircraft including regions both inside and outside of areas of primary interest. It was pointed out however, that the 20% of the operational AMDAR data budget was not a contribution to the AMDAR Panel itself but destined to AMDAR data delivery. The meeting was informed that planning that part of the E-AMDAR project would start soon in co-operation with the TC and relevant AMDAR Panel project leaders. In line with present priorities, the initial aim would be likely to improve data coverage over Africa, South America and Middle East.

Plans for making greater use of the available fleet had been agreed on the condition that funding would be secured. The potential coverage offered by each European AMDAR fleet was considered on an airport by airport basis. It was expected that whilst falling some way short of the target, this would significantly increase AMDAR data generated over the territory of EUMETNET members and other world wide data sparse areas. If funding could be secured, E-AMDAR would lead to more than 25,000 well distributed AMDAR observations being made daily including over 700 profiles from over 100 European airports. In line with CBS recommendations to move to BUFR code by 2002, E-AMDAR was planing to include this functionality in the ground base system as well as the ability to code data into FM42 AMDAR. The report indicated that regional programmes such as E-AMDAR would require guidance from WMO on coding form to follow due to the competing requirements from different users.

[1] European Union Composite Observing System Programme

E-AMDAR programme was also responsible for monitoring the development of new systems such as the ICAO ADS. ADS data received by the UK Met Office during 1998/1999 showed that these data were of similar quality to other forms of AMDAR data. Efforts were being made to ensure that ADS data from the planned North Atlantic trial would also be made available.

The meeting was informed about a feasibility study to be conducted to build up an E-AMDAR data optimising system. The study was expected to clarify whether information from EUROCONTROL could be used to monitor in real time where and when AMDAR fitted aircraft would be flying, and whether all airlines would accept access of a Data Optimising Centre to these data. In Germany, a contract between the meteorological service and Lufthansa (LH) Aeronautical Services providing for the development of a data optimising system for LH aircraft during 2000-2001 had been placed.

7.1.3 Australian AMDAR

On behalf of Australia, the TC summarised the status of the Australian AMDAR programme operated since 1986 by the Bureau of Meteorology (Bureau) in cooperation with Qantas and Ansett Australia (Ansett) airlines. The AMDAR-operational fleet consisted of Ansett B767 and B737 and Qantas B747-400 aircraft. A table showing a monthly count provided indicated that from January to June 1999, a total of 116,958 observations per month were made by 25 Ansett aircraft and a total of 43,878 observations per month by 21 Qantas aircraft. As a temporary measure, the meeting was further informed that the Bureau had established an archive of AMDAR data in Microsoft Access Database format that could be used for longer-term data quality control and quality monitoring dating back to 1994. It was reported that quality monitoring was limited to comparing AMDAR data with upper air radiosonde data for temperature and wind vector components. The meeting noted with interest that In July 1998, the New Zealand Meteorological Service (MetService) and the Bureau entered into an arrangement that resulted in MetService meeting transmission costs for observations generated by Australian AMDAR fitted aircraft over an agreed region in the vicinity of New Zealand.

7.1.4 Canada Report to the AMDAR Panel

The meeting was informed about a Canadian plan to establish an AMDAR Programme. Since there was no Canadian system/programme to facilitate the use of automated aircraft reports for meteorological applications. However, Air Canada had its own ACARS processing system used exclusively to serve the airline's operations. The meeting noted with interest that a contract would be let by the end of October 1999 for the development of a Business Case that would examine the requirements, benefits and costs to major airlines in Canada and Environment Canada for communicating and reporting meteorological data from aircraft in Canada. The Business Case would include an inventory of current and planned facilities, a Benefit-Cost Analysis, and would address all airlines' concerns and issues. The Business Case would be delivered by the end of March 2000. It was expected that the best cost-effective operational scenarios for the establishment of a Canadian AMDAR programme and cost-sharing avenues or possible service arrangements between the Canadian airlines and Environment Canada would be recommended. The meeting noted with interest that the Canadian Meteorological Centre (CMC) was nevertheless receiving about 50,000 ACARS (MDCRS), 12,000 ASDAR/other AMDAR, 4,500 AIREPs, and 200 ADS reports daily in a test mode. These reports would be assimilated in the operational analyses in the northern spring of 2000. Experiments were being conducted on assimilating winds from ACARS/ASDAR/AMDAR reports in the 3D analysis with promising results. Experiments on the assimilation of winds and temperatures from all types of aircraft reports were producing analyses directly on the numerical model levels, and if results were satisfactory, the scheme would be implemented in the northern spring of 2000.

With regard to quality control of aircraft reports, CMC had been developing a routine to check for repeated aircraft observations, and to reduce the density of these reports in some regions. The meeting was informed that, to circumvent difficulties with NOAA ACARS data plotted on skew-T diagrams with forecasters trained to use Tephigrams, a project to report the US data into the operational Tephigram program was expected to be completed by the end of March 2000. The evaluation of the value of ACARS reports by Canadian forecasters would resume following the completion of the project. The support of the Panel was requested to help establish an AMDAR programme in Canada and to determine whether there were merits for creating links with the development of wave vortex prediction capability. During the discussions on this item, it was suggested that, if Canada had access to European AMDAR data along with the US data, this data could be used to developing Business case. A Panel member offered to facilitate the provision of AMDAR data from a European airline flying to Canada, subject to funding the data.

7.2 Requirements of WMO Programmes

7.2.1 Characteristics of air-reports made in accordance with ICAO Annex 3/WMO Technical Regulations (C.3.1)

The ICAO observer informed the meeting about the main features of air-reports made in accordance with ICAO Annex 3/WMO Technical Regulations (C.3.1) and described the characteristics of variables included in automated air-reports, and in particular, their association with Air Traffic Services (ATS) requirements, the sensors required, the frequency of reporting, as well as the routing of air-reports to WAFCs. It was pointed out that automated routine air-reports were *de facto* automatic dependent surveillance (ADS) reports, required for air traffic control (ATC) purposes and that, when implemented, ADS would meet the ICAO requirements for both ATS and aeronautical meteorological offices. As regard sensors required to generate meteorological data, current provisions were developed on the premise that meteorological parameters could only be derived from existing on-board sensors/avionics. It was further pointed out that air-reports were mainly destined to WAFCs, and that, beyond these centres, these air-reports were considered as basic data subject to WMO provisions. The ICAO observer indicated that routine automated air-reports were ADS reports that used ADS reporting format. Any routine air-report would include information on the four-dimensional position of the aircraft, wind and temperature. The meeting noted with interest that an amendment proposal for reporting turbulence using “Eddy Dissipation Rate” had been developed by ICAO with the assistance of the METLINK Study Group. The ICAO Observer pointed out that air-reports referred to in Annex 3/Technical Regulations (C.3.1) were aeronautical requirement that should be adhered to by ICAO Contracting States and WMO Members unless differences were filed. It was further pointed out that air reporting beyond that specified in ICAO/WMO regulatory material could not be considered to be an aeronautical requirement and, therefore was not eligible for cost recovery from aviation. The Panel was aware that this situation had already been reflected in paragraphs 5.31 and 5.32 of the report of the Inaugural Meeting of the AMDAR Panel held in 1998.

Some members were of the opinion that, in view of the safety implications of icing on aircraft operations, some consideration should be given to propose to ICAO to include aircraft icing in the ADS meteorological data block. In this context, it was also pointed out that a number of aircraft were already fitted with an icing sensor and in these cases no additional equipment would be required. It was, however, indicated by the ICAO observer that the inclusion of icing had been thoroughly considered by the METLINKSG and that the group had concluded that the humidity would be better suited for the use in the numerical weather prediction models run by the WAFCs than aircraft icing. Therefore, humidity, instead of icing, had been included in the ICAO provisions. Furthermore, it was pointed out that special air reports on severe icing would continue to be issued. Under these circumstances, the meeting

concluded that the usefulness of automated icing reports should be first demonstrated using AMDAR systems. If the results were conclusive, they could be referred to ICAO for further consideration and action, as appropriate.

The issue of the availability of ADS meteorological information to other meteorological centres than WAFCs was raised. In this regard, the meeting recalled that, in accordance with ICAO Annex 3/WMO Technical Regulations, the meteorological information would be disseminated to the WAFCs only which the Panel felt should then make it available to other meteorological centres through WMO channels. However, the issue could also be addressed at the national level and the meteorological data could be made available directly from the ATS units subject to agreement between the meteorological and civil aviation authorities concerned.

7.2.2 Information provided by the President of CBS

The President of CBS, Mr S. Mildner (Germany) informed the meeting that following the CBS Technical Conference on Integrated Upper-Air Observing held in Karlsruhe (Germany), in 1998, the requirement for integrating AMDAR as operational source of upper-air data was confirmed. The Panel noted with satisfaction that AMDAR was therefore considered as an important part of the future WWW composite observing system organised and operated in conformity with relevant WWW standards and procedures.

The Technical Conference took note of past and current AMDAR developments and identified AMDAR as one of three important components generating upper-air data on an operational scale, namely the rawinsonde network, meteorological satellites and automated aircraft reporting. The meeting noted with interest that the Technical Conference statement contained a qualitative description of the requirements for upper-air observations stated by the WWW and various other WMO Programmes as well as a summary of recommended actions specifically relevant to AMDAR Panel. The meeting noted with interest that CBS and its subsidiary groups had taken the initiative to collect and list the data requirements of all WMO programmes under the OPAGs on Integrated Observing Systems (IOS) and that relevant programme requirements were continuously reviewed and updated. CBS had taken the initiative in scientific impact studies, systems simulations and evaluations aimed at an assessment of the relative value of observing system components and optimum IOS design.

The President of CBS pointed out that the goals of the AMDAR Panel were largely compliant with CBS requirements and would therefore be actively supported by the relevant teams of the newly structured CBS. He highlighted issues that he would like to see the AMDAR Panel to take on board namely the introduction of humidity in AMDAR reports; improvement of AMDAR data coverage, active control of the AMDAR data flow, development of a concept of AMDAR data quality and management and a concept for targeted observations by aircraft. As regard CBS involvement in the work of the Panel, he noted that close co-ordinations and active support by CBS OPAG/IOS would involve the statement of data requirements, IOS design and data coverage, data monitoring and quality assurance. Close co-ordination and active support by CBS OPAG/ISS would involve data formats and other data management aspects, management of the AMDAR data flow and dissemination of AMDAR data. CBS OPAG/DPFS support would involve observing system studies and simulations and development of IOS design criteria. Moreover, the Commission for Instruments and Methods of Observations (CIMO) would be involved in meteorological sensor development and related aspects as necessary.

7.3 Technical development

7.3.1 Water Vapour Measurements from Commercial Aircraft: Progress and Plans

The meeting noted with interest a report from Dr Rex Fleming (USA) on progress and plans for water vapour measurements from commercial aircraft. The report indicated that accurate water vapour measurements were a requirement for a spectrum of socio-economic applications in atmospheric science and in the shorter time scale particularly crucial to aviation operations. The report further indicated that a composite observing system for global and regional water vapour information was required and that the key element of that composite system was commercial aircraft. Progress on two generations of water vapour sensors flown on commercial aircraft was described.

The meeting noted the potential importance of high-level humidity reports in any future efforts to reduce the formation of unnecessary contrails that may have an adverse impact on the environment.

The meeting was informed that the first-generation of water vapour sensing system (WVSS) using a thin-film capacitor was fitted on six aircraft producing over 1,200 observations per day in real-time. The meeting noted with interest that in a number of comparisons between WVSS and radiosonde data, the WVSS data were shown to be consistent with itself and with the radiosonde. Preliminary conclusions from comparisons between WVSS and radiosonde showed that the WVSS had comparable accuracy with the radiosonde in the region below 20,000 feet. It was pointed out however that the unique disadvantage in measuring relative humidity on a commercial aircraft came from the definition of relative humidity that included the saturation vapour pressure that was a strongly non-linear function of temperature. The meeting noted with interest that the FAA/NOAA evaluation would be completed in 2000.

A new WVS technology under development uses a single-mode diode laser to obtain a potential accuracy down to one part per million for water vapour mixing ratio. The second generation of WVSS fitted into the existing temperature probe aperture on all aircraft thus making the retrofit of this sensor easy. Future plans included the increase of the number of first generation WVSS units expected as part of a formal FAA evaluation to 62 units with at least 30 units to be fitted to UPS aircraft. Four second-generation WVSS prototypes would be evaluated on National Centre for Atmospheric Research (NCAR) aircraft and on selected commercial aircraft.

7.3.2 Improvement of the Quality of AMDAR Temperature Observations Using Multiple TAT Sensors

The Meeting noted with satisfaction that the results of monitoring AMDAR temperature observations over many years had shown their quality to be of comparable standard to those obtained from radiosondes. However, it was pointed out that from time-to-time, data from individual aircraft had shown unexpectedly large deviations during certain stages of some flights. The cause for these deviations had never been clearly identified although they were thought to be related to a specific set of flying conditions that, until recently, had not been closely investigated.

7.3.3 The Choice of a Turbulence Algorithm and Related Issues

The meeting was aware that three different types of turbulence parameters had been in common use in automated meteorological air reporting system, namely a departure from the normal vertical acceleration of gravity (1.0g), Maximum Derived Equivalent Vertical Gust (DEVG) and Eddy Dissipation Rate (EDR). The first two parameters were commonly use in

various WMO AMDAR systems with appropriate coding formats in FM42 and BUFR codes, However EDR had no equivalent WMO code. The meeting noted with interest that ICAO had adopted EDR as the preferred algorithm for reporting turbulence in the meteorological data block of ADS system. The attention of the meeting was drawn to the desirability for applying uniform operational standards across the WMO AMDAR and the ICAO ADS for automated meteorological air reporting to serve the needs of both the aviation industry and WMO Programmes. As a result, the meeting agreed to recommend to relevant WMO bodies that EDR for reporting turbulence be adopted. However, the meeting recognized that a number of issues would still remain to be addressed, including the method for reporting the information. The meeting noted with interest that in response to user requirements, ICAO had adopted an 8-level index that included a 7-level turbulence index plus an additional level to indicate a nil report. It was indicated that if the ICAO 8-level index for reporting EDR were adopted by the Panel, methods for reporting this information in acceptable WMO character and binary codes would need to be addressed by the Panel and CBS. As regard the current WMO FM 42-XI code, substantial modification to the format would be necessary to change from the current reported values to EDR parameters. In this connection, the assistance of CBS would be needed to ensure that switching centres and data users were properly informed and that guidance material was developed for all potential users including NWP users. The issue of the development or tuning of existing software to report EDR was largely discussed as well as the reporting intervals of AMDAR data so as to also meet WMO meteorological requirements. The ICAO observer pointed out that the provisions for reporting automated air reports every 15 minutes during the en-route phase and every 30 seconds during the climb-out phase for the first 10 minutes of flight were already a recommended practice in the ICAO/WMO regulatory material.

7.3.4 Aerosonde Robotic Aircraft: Progress and Plans

The meeting noted with interest that, in Australia, an aerosonde robotic aircraft was conceived to provide economical meteorological and environmental observations with considerable flexibility of operation. The first version of the aircraft was superseded by another version of the aircraft that incorporated a number of design upgrades based on extensive operational experience. Full information about the current Aerosonde capacity may be found at the web page at **www.aerosonde.com**.

7.3.5 A Potential Alternative for Obtaining High-resolution Moisture Profiles to Complement AMDAR Ascent/Decent Reports

Dr R. Petersen (the United States) presented information on a “Potential Alternative for Obtaining High-resolution Moisture Profiles to Complement AMDAR Ascent/Decent Reports”. The meeting noted with interest that NOAA had been conducting tests of a new boundary layer moisture and temperature observing systems that could serve as an important complement to automated aircraft temperature and wind ascent/descent reports provided by AMDAR. The system, called the Atmospheric Emitted Radiance Interferometer (AERI), is a remote-sensing infrared Interferometer modelled after instruments developed for satellite application. Data from AERI systems compared within a few percent with other more complex systems costing nearly 100 times as much, and provided vertical profiles of moisture and temperature in the lowest approximately 3 km. It was pointed out that when combined with cloud base temperature information data provided by AERI information from the system differentiating water and ice particles could help forecasters and modellers determine if the base of the cloud is supercooled and therefore a threat for aircraft icing.

7.3.6 Results of Tests of the Impact of Automated Aircraft Reports on Numerical Weather Prediction Models

Tests conducted under NAOS by the National Centers for Environmental Prediction (NCEP) have assessed the utility of automated aircraft data in operational NWP model accuracy. The aim was to determine the degree of the impact that the loss of rawinsonde and aircraft ascent/descent data would have on operational forecast systems. Two types of tests were run for a period of six weeks during midwinter of 1997-1998. One test excluded rawinsonde data at locations where aircraft data could be available but no aircraft data were included below 20,000 feet. For the other test, rawinsonde data were excluded at locations where aircraft data were available, but all aircraft data were used at all levels and all times. The results of the tests showed substantial differences between operational forecasts and tests conducted when neither rawinsonde nor ascent/descent data, were used at the 14 sites. In contrast, the results of the tests using all of the aircraft data at the 14 sites were nearly identical to the operational forecasts, both from the global and domestic models. It was concluded that the results of these tests validated the importance of automated aircraft observations to existing NWP systems. Moreover, the results highlighted the potential impact that aircraft ascent/descent data could have on improving the accuracy of NWP guidance when used to supplement existing, but widely spaced, rawinsonde networks. These results will be published in the near future.

8. STATUS OF THE AMDAR TRUST FUND

8.1 The meeting noted with satisfaction that, as of 30 September 1999, thanks to the contributions from Australia, Canada, Germany, the Netherlands, New Zealand, the United Kingdom and the United States, the AMDAR Trust Fund income amounted to SFr 445,517.08 including interest. Total expenditure amounted to SFr 186,070.56 leaving an unallotted balance of SFr 259,446.52.

8.2 A point was made that some Members including South Africa and Saudi Arabia had supported the costs for running their respective Pilot Project at no costs to the AMDAR Trust Fund. The meeting recognised this and thanked the Panel members from South Africa and Saudi Arabia for their contributions to the development of the high priority pilot projects in their region.

8.3 With regard to costs for administrative Secretariat support to the AMDAR Panel activities, the meeting was informed by the Secretariat, that the policy had been not to charge the AMDAR Panel for supporting its activities and that there was no change of policy for the moment. The AMDAR Panel would welcome the continuation of this policy.

9. FUTURE WORK PROGRAMME

9.1 In introducing the Future Work Programme, the TC made the point that most of the issues and work programme items presented at the Inaugural Panel meeting in March 1998 still remained valid although it was recognised that significant progress had been made on several of the high priority projects. One of the contributing factors for this situation had been the difficulty in securing leadership on some projects. Another factor that had hampered progress was the long delay in appointing the TC.

9.2 A summary of activities identified with a broadly based programme was presented to the meeting in order for those considered to be more important and achievable within the limited time frame to be identified as the basis for the work programme for 2000. Details were considered under the various major project headings and their related components. In the ensuing discussion, members were mindful of the limited resources available to accomplish the work. Action items developed at the informal meeting held in June 1999 of the sub-group of

the Co-ordination of National and Regional Programmes project were used as the basis to prioritise a substantial programme. Similarly, action items were identified in the report on the project to improve data exchange and quality control. Focus was also given to each of the pilot projects for Southern Africa and the Middle East to ensure that an appropriate level of support was provided. The meeting was reminded of the requirement to continue supporting the AMDAR programme and the decision of the meeting to assume the operational responsibilities for the ASDAR programme.

9.3 There was general agreement among Panel members that the TC presentation had provided a sound basis for defining the work programme of the Panel. With a view to focussing the work programme on items that were of a high priority and could be reasonably undertaken over the following 12 months, the Panel requested the Chairman together with the TC to ensure the following items were addressed:

(a) Co-ordinate activities of the operational ASDAR programme;

(b) Provide continued support of the Southern Africa pilot project to assist it reach operational status and possibly to be extended to other countries in the region;

(c) Provide support for the Middle East Pilot Project to reach operational status;

(d) Assist by the use of limited Panel funding, the Southern Africa pilot project through the provision of aircraft reports from long haul flights of existing AMDAR programmes;

(e) Provide support, as resources permit, to other countries actively developing national AMDAR programmes;

(f) Request assistance from CBS on a range of matters of mutual interest, including items identified throughout the meeting;

(g) Locate an expert from a member country or, if necessary, appoint a contractor to assist with the project on improvement of data exchange and quality control as requested by the UK representative at the meeting;

(h) Review and follow up as necessary on ICAO ADS data distribution beyond WAFCs;

(i) Identify and follow up, as opportunities arise, potential participants and develop new contacts with countries interested in developing new AMDAR programmes and encourage their attendance at the next Panel meeting;

(j) Prepare an information document on the activities of the AMDAR Programme and distribute to members, observers and other interested groups;

(k) Assist leaders of pilot projects with the preparation of project plans (objectives, terms of reference, impact tests, timelines and budget) and to provide these to the Panel within 6 months;

(l) Request project leaders to provide quarterly reports within 10 days of the end of each quarter;

(m) Provide a quarterly newsletter to members and interested groups and with the assistance of WMO and others, develop an AMDAR Panel Internet World Wide Web site.

10. AMDAR BUDGET (2000-2001)

The TC provided a draft budget of anticipated income and expenditure for the next biennium 2000-2001 based on the current level of income and expenditure supported by the AMDAR Trust Fund. The meeting noted with appreciation that EUMETNET was planning to spend 20% of its budget for operational AMDAR data in support of WMO AMDAR operations through the provision of observations in areas outside of Europe's immediate area of interest. The meeting, following discussions on the proposed budget, reviewed and amended the TC proposal and subsequently approved a budget estimate that is found in Annex IV to this report.

The AMDAR Panel appreciated the kind offer by the UK Met. Office to contribute £ 25,000 for the purpose of funding a consultant or NMS representative to progress the data exchange and quality control project. This offer was conditional on payment being made by 31st March 2000.

Suggestions were made that the Secretariat send letters to WMO Members, including non-Members of the Panel soliciting contributions to support the AMDAR Programme and explaining the benefits that they would derive from the provision of the AMDAR data. The representative of the Secretary-General agreed that this approach used for collecting contributions to the AMDAR trust Fund following the inaugural Meeting of the Panel in 1998, would be repeated for the next AMDAR budget as indicated in ANNEX IV.

11. REVIEW OF ESTABLISHED RULES AND PROCEDURES

The meeting was aware that the Inaugural Meeting of the AMDAR Panel adopted a number of basic documents that highlighted the procedures and the rules that the Panel agreed to follow in implementing the WMO AMDAR Programme. In line with the provisions contained in the document - Membership and Operating procedures for the Panel on Aircraft Meteorological Data relay (AMDAR Panel), the meeting examined the proposal submitted by the Chairman of the AMDAR Panel and concurred that the current Terms of Reference and Membership and Operating Procedures for the Panel on Aircraft Meteorological Data Relay (AMDAR Panel) should be maintained until the next meeting of the AMDAR Panel.

12. ELECTION OF OFFICERS

A proposal that the current Chairman and Vice-Chairman, respectively Mr C. Sprinkle (USA) and Mr M. Edwards (South Africa), continue to lead the AMDAR Panel until the next meeting of the Panel was adopted by acclamation. Both Messrs Sprinkle and Edwards accepted with pleasure to continue to serve the Panel during the period indicated.

13. ANY OTHER BUSINESS

The Chairman of the AMDAR Panel thanked Mr A.T.F. Grooters, the Chairman of OCAP, and Mr D. Painting, the ASDAR Technical Officer, for the commendable work they had accomplished in implementing the ASDAR programme.

14. DATE AND PLACE OF NEXT MEETING OF THE AMDAR PANEL

It was agreed that the next meeting of the AMDAR Panel would be held in September 2000. The exact date would be decided following consultation with the WMO Secretariat. It was further proposed that the ASDAR Sub-group would meet for half a day prior to the next meeting of the Panel and this could also be an opportune time for similar meetings of various project teams. A proposal was also made to change the current structure of the AMDAR Panel meeting to comprise 3 components, namely a workshop to look at AMDAR scientific

aspects, an AMDAR implementation programme including the reporting on AMDAR Panel activities and a third component that would deal with administrative activities with particular focus on budget and future programme matters. A general consensus was reached to consider implementing such a structure for the next Panel meeting.

15. CLOSURE OF THE SESSION

After the customary exchange of courtesies, the meeting rose at 13.15 hours on Friday, 22 October 1999.