

WORLD METEOROLOGICAL ORGANIZATION

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ET-AIR-3 and AMDAR Panel-14/Doc. 3.2

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**JOINT MEETING:  
CBS EXPERT TEAM ON AIRCRAFT BASED  
OBSERVATIONS  
(Third Session)  
AND  
AMDAR PANEL  
(Fourteenth Session)**

ITEM: 3.2

Original: ENGLISH ONLY

(QUEBEC CITY, CANADA, 2-4 NOVEMBER 2011)

**AMDAR PROGRAMME STATUS**

***Report on the Status of the AMDAR Programme***

*(Submitted by the WMO Secretariat and AMDAR Panel Chairman)*

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**SUMMARY AND PURPOSE OF DOCUMENT**

Provides a summary of the current status of the AMDAR Programme and a summary of the achievements and progress made since the previous Joint Meeting.

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**ACTION PROPOSED**

1. The Joint Meeting is invited to note the information contained in the document.
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## **1. SUMMARY OF AMDAR PROGRAMME STATUS**

### **Status of the AMDAR Programme and Technical Coordinator Role**

1. The AMDAR Panel continues to operate as a WMO affiliated body made up of Members of WMO operating under the Terms of Reference that have been put in place and maintained by the Panel Membership. AMDAR Panel Members contribute on an annual basis to the AMDAR Panel Trust Fund, which is managed and overseen by WMO and supports the coordination, activities and work programme of the Panel and the AMDAR Programme.
2. The AMDAR Panel in cooperation with the CBS Expert Team on Aircraft Observations (ET-AIR) and the CIMO Theme Leaders on Aircraft Measurements forms the WMO AMDAR Programme and together have continued to work towards further development of the AMDAR observations and their full integration into the WMO Integrated Global Observing System (WIGOS) under the WMO World Weather Watch Programme.
3. In November 2010, WMO advertised for the position of SO/ARO and conducted interviews in March 2011. Mr Dean Lockett was appointed to the position at the P4 level and commenced work in the Secretariat in June 2011.

### **Status of the AMDAR Observations Programme**

4. The following countries and organisations maintain operational AMDAR programmes as sub-programmes of the global WMO AMDAR Programme:
  - Australia
  - Canada
  - China
  - E-AMDAR
  - Hong Kong, China
  - Japan
  - New Zealand
  - Republic of Korea
  - South Africa
  - United States
5. The following 31 airlines, comprised of over 2800 aircraft, provide AMDAR observations to the AMDAR Programme via the national or regional AMDAR programmes:
  - Qantas Airways and SkyTraders (Australia)
  - Air Canada Jazz (Canada)
  - Air China, China Southern Airlines and Shandong Airlines (China)
  - Air France, KLM, Lufthansa Passage, Lufthansa CityLine, Lufthansa Cargo, British Airways, Finnair, Scandinavian Airlines, Blue1, EasyJet Airline, Novair, Thomas Cook Scandinavia (E-AMDAR)
  - Cathay Pacific (Hong Kong China)
  - Air Nippon Airways and Japan Airlines (Japan)
  - Air New Zealand (New Zealand)
  - Korean Air and Asiana Airlines (Korea)

- South African Airways (South Africa)
- Alaska Airlines, American Airlines, Delta Air Lines (including Northwest Airlines), Federal Express, United Airlines, United Parcel Service (UPS), Southwest Airlines (USA)

6. Although the AMDAR Programme output, as measured in terms of the number of observations transmitted on the GTS has fluctuated markedly in recent years, developments over 2011 have meant that the Programme now provides an average of between 250,00 and 300,000 upper air observations per day in support of the WMO World Weather Watch Programme. Figure 1 below shows the 4-year trend in GTS output of aircraft observations, with the contribution by the AMDAR Programme depicted by the blue line, with statistics compiled and provided by the Canadian Meteorological Centre, Environment Canada.

7. The recent sharp rise in observations is chiefly associated with the addition of 110 Alaska Airlines B737 aircraft as a new component of the USA AMDAR (MDCRS) Programme over March – June 2011. There is also evident a marked rise in observations available on the GTS as a result of increased output from the ICAO Automatic Dependent Surveillance (ADS) programme over February to April 2011, predominantly over the northern Atlantic area.

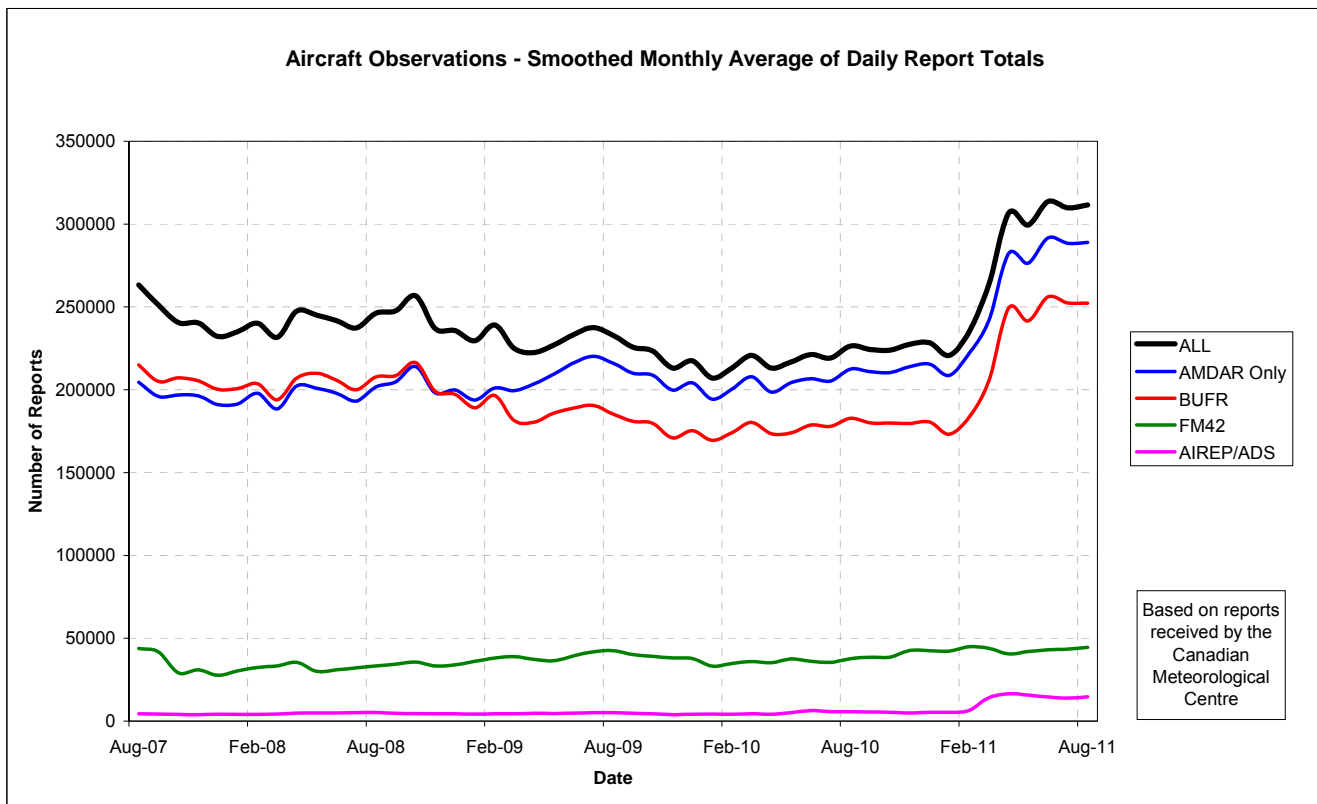


Figure 1, Aircraft observations on the GTS over August 2007 to August 2011.

## 2. ACTIVITY HIGHLIGHTS

8. This section highlights progress in AMDAR Programme projects and some notable achievements, issues and developments. More details of the various activities undertaken by the Panel and ET-AIR are presented within the relevant project and national/regional status reports provided to the Joint Meeting.

## **WIGOS Pilot Project for AMDAR**

9. The AMDAR Panel and ET-AIR memberships continue to work towards the full integration of the AMDAR Programme into the WMO World Weather Watch Programme through the processes and steps defined in consultation with the WMO World Weather Watch Programme and respective Technical Commissions and their Open Programme Area Groups (OPAGs). A component of this process involves the further development, definition and integration of the procedures, practices and regulatory materials of the AMDAR Programme into WWW Programme and WIGOS.
10. The development of the AMDAR BUFR Template has progressed with pre-operational testing of Version 7 of the template completed and presented to the 3rd session of the Inter-Programme Expert Team on Data Representation and Codes (20-23 September, Melbourne) by Ms Eva Červená. The AMDAR Panel has been offered the help of ECMWF and the UK Met Office in carrying out the validation process for the template, expected to take place late in 2011.
11. Work has progressed on the development of a metadata set for the AMDAR Programme.
12. The CIMO Theme Lead on Aircraft Observations has continued to work towards the development of standardised procedure for quality management of AMDAR data.
13. Significant progress on validation of the WVSS-II sensor as a water vapour measurement sensor for the AMDAR Programme has been made with a draft report on the tests and comparisons made with the 2 WVSS-II systems that were installed on the Facility for Airborne Measurements (FAAM) research aircraft received by E-AMDAR. The final version is expected to be available by November 2011.

## **Other AMDAR Programme Activity and Projects**

14. In cooperation with the Mexican meteorological service (CONAGUA), the USA National Weather Service and WMO, the AMDAR Panel has organized and will conduct the Mexican Regional AMDAR Workshop, to be held in Mexico City from 8-10 November 2011.
15. The AMDAR Panel Chairman provided an AMDAR Programme status report to the CBS Expert Team on Evolution of Global Observing Systems (ET-EGOS).
16. Descriptions of Work have been developed towards the progressing of projects including: 1) Compilation of a Generic Specification of Functional Requirements for AMDAR Software and, 2) Study on AMDAR Coverage and Targeting for Future Airline Recruitment. Aviation consultants have been approached to submit expressions of interest for completing the work.
17. Work has progressed on the update of the ARINC 620 Meteorological Report specification towards a Version 5, incorporating many necessary improvements.
18. The AMDAR Programme has worked towards the specification and implementation of AMDAR software for Honeywell avionics for Boeing 777 aircraft.
19. The AMDAR Programme has worked towards the establishment of a quarterly AMDAR Programme Newsletter to be published on a quarterly (every 4 months) basis.

20. With the assistance of the Canadian Meteorological Centre, statistics on programme output on the GTS have been revised and published on the WMO Aircraft Observations website.

### **National Programmes Developments**

21. The USA National Weather Service, in cooperation with Aeronautical Radio Incorporated (ARINC) and the USA Federal Aviation Administration (FAA) has implemented an AMDAR programme with Alaska Airlines, incorporating the equipping of 110 Boeing 737 aircraft and providing a significant improvement to global AMDAR data coverage over Northern America.

22. The South African Weather Service (SAWS) was assisted by the Australian Bureau of Meteorology and the USA NOAA National Center for Environmental Prediction (NCEP) in completing the update of the SAWS AMDAR AAA V3 (AMDAR3) data processing module and the South African Airways (SAA) airline completed the update of the SAA AMDAR fleet to AAA V3 software, which has resulted in the South African AMDAR data quality and GTS output improving significantly and to full potential.

23. The Australian AMDAR Programme has been assisted in the development of a specification for the development of AMDAR software for Honeywell Avionics for the Embraer 190 aircraft.

24. The Australian AMDAR Programme has commenced receiving AMDAR data from an Airbus A319 aircraft that is operated on behalf of the Australian Antarctic Division by SkyTraders airline and flying inter-continental services between Australia and Antarctica over the Southern hemisphere summer. The first AMDAR data for this aircraft was transmitted on the GTS in early 2011.

25. The Australian AMDAR Programme in a cooperative project with Meteo France, Air Vanuatu and Qantas has commenced flight testing of AMDAR AAA v3 software on a B737 Air Vanuatu aircraft which, if successful, will lead to the implementation of the first AMDAR Programme in the Southwest Pacific.

### **3. MEETINGS HELD OR ATTENDED**

26. The following meetings were held or attended in 2011:

- The WMO Integrated Global Observing System (WIGOS) Pilot Project for AMDAR (Fifth Session) and AMDAR Panel Management Group Meeting (Second Session) was held in De Bilt, The Netherlands, 28 February - 04 March 2011;
- The AMDAR Panel and ET-AIR Chairman attended the 17<sup>th</sup> E-AMDAR Technical Advisor Group Meeting in Plitvice, Croatia, 15-17 March 2011;
- The AMDAR Panel and ET-AIR Chairman submitted a Programme Status Report to the ET-EGOS CBS-OPAG/IOS Expert Team on Evolution of Global Observing Systems (Sixth Session), Geneva, 14-17 June 2011;
- SO/ARO and the E-AMDAR Programme Manager attended the AEEC DataLink Users Forum held in Brussels, Belgium, 7-8 September 2011;
- The AMDAR Panel and ET-AIR Chairman and SO/ARO met in Geneva, 22 September 2011 for an AMDAR Panel and Mexico Regional Workshop planning and preparatory meeting;
- The AMDAR Panel and ET-AIR Chairman and SO/ARO attended the 18<sup>th</sup> E-AMDAR Technical Advisor Group Meeting in Offenbach, Germany, 17-19 October 2011.

#### **4. ASSISTANCE TO THE AMDAR PROGRAMME**

27. The AMDAR Programme continues to rely on the support, work and assistance of Panel and ET Members, the WMO Secretariat and others to progress the AMDAR work programme. In particular the following support and assistance is acknowledged with appreciation:

- The dedicated work of the AMDAR Panel and ET-AIR Chairs and Vice-chairs;
  - Those AMDAR Panel Member NMHSs providing financial and in-kind contributions to the AMDAR Panel Trust Fund;
  - Aviation industry partners including the airlines operating AMDAR programmes;
  - The Panel Members for Germany and USA for leading the Science and Technical and Training and Outreach Sub-Groups respectively;
  - The E-AMDAR Technical Coordinator for leading the Improvement in Data Exchange and Quality Control project;
  - CIMO Theme Leader on Aircraft Measurements, Dr Jitze van der Meulen, for leading the WIGOS sub-project on the Development of Standardised Procedure for Quality Management of AMDAR data and in the development of a strategy for establishment of a Quality Management System for AMDAR;
  - The Royal Netherlands Meteorological Institute (KNMI) for administrative assistance and support to the AMDAR Panel and ET-AIR Chairman;
  - The E-AMDAR Programme for provision of targeted data over various parts of the globe, assistance and technical support associated with several ongoing projects, including the ARINC 620 Meteorological Report update, the BUFR template and coordination of continued testing and verification of the WVSS-II system;
  - The Environment Canada, Canadian Meteorological Centre, the USA NOAA National Center for Environmental Prediction (NCEP) for provision of monitoring and statistical information on the AMDAR Programme;
  - The Bureau of Meteorology for provision of AMDAR data over New Zealand and South Africa and assistance in resolving the South African AMDAR Programme data processing issue related to AAA software;
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