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**WMO AMDAR PANEL  
(Fifteenth Session)**

(25.X.2012)

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(BOULDER, USA, 6-9 NOVEMBER 2012)

ITEM: 3.1

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**AMDAR PROGRAMME STATUS**

***Report on the status of the AMDAR Programme***

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

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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 Panel is invited to note the information contained in the document.

**References:**

1. [WMO AMDAR Panel Terms of Reference \(November 2011\)](#)
  2. [Aircraft Observing System Programme Plan \(Version 1.0, March 2012\)](#)
  3. [Final Report, AMDAR Panel Management Group Session 3 \(February 2012\)](#)
  4. [Workshop on Aircraft Observing System Data Management, Geneva, Switzerland, 5 – 8 June 2012.](#)
  5. [Final Report, AMDAR Panel Management Group Session 4 \(August 2012\)](#)
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## **SUMMARY OF AMDAR PROGRAMME STATUS**

### **Status of the WMO AMDAR Panel and the Governance of the AMDAR Programme**

1. The WMO AMDAR Panel (the 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 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 AMDAR observing system and its full integration into the WMO Integrated Global Observing System (WIGOS) under the WMO World Weather Watch Programme.
3. Over the past 12 months, the AMDAR Panel has worked toward implementing the 2012 Work Programme and Medium-term Plan (see Appendix 1) as approved by the AMDAR Panel (Session 14) and the AMDAR Panel Management Group (Session 3).

### ***Transition of the AMDAR Programme to WMO***

4. The highest priority of activity for the Panel and its Management Group (APMG) has been the finalization of the transition of the governance of the AMDAR Programme and the AMDAR Observing System to WMO under its Technical Commissions, CBS and CIMO, which has progressed to the point where it is expected that this process will be finalized and completed at the end of this meeting of the Panel. This matter will be dealt with in detail under agenda items 3.2.
5. With the completion of the transition process and the finalization of the Terms of Reference under which the AMDAR Trust Fund management is moved from the Panel to WMO and the Technical Commission, CBS and CIMO, it is expected that the Panel will officially cease operation and all activities at the conclusion of this meeting (Session 15). These matters will be dealt with under agenda items 5.2 and 7.1.

### **Status of the Global AMDAR Programme**

6. 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
7. The following 39 airlines, comprised of over 2800 aircraft, provide AMDAR observations to the AMDAR Programme via the national or regional AMDAR programmes:
  - Qantas Airways, JetConnect (Qantas), Jetstar Airways, Jetstar Asia, SkyTraders and Vanuatu (Australia -7)

- Air Canada Jazz, NAV Canada (Canada - 2)
- China Southern Airlines and Shandong Airlines (China - 2)
- Air France, KLM, Lufthansa Passage, Lufthansa CityLine, Lufthansa Cargo, British Airways, Finnair, Scandinavian Airlines, Blue1, EasyJet Airline, Novair, Thomas Cook Scandinavia (E-AMDAR - 12)
- Cathay Pacific (Hong Kong China - 1)
- Air Nippon Airways and Japan Airlines (Japan - 2)
- Air New Zealand (New Zealand - 1)
- Korean Air and Asiana Airlines (Korea - 2)
- South African Airways (South Africa - 1)
- Alaska Airlines, American Airlines, Continental, Delta Air Lines, Northwest Airlines, Federal Express, United Airlines, United Parcel Service (UPS), Southwest Airlines (USA - 9)

8. Although the AMDAR Programme output, as measured in terms of the number of observations transmitted on the GTS has fluctuated markedly in recent years, most particularly due to economic cycles, the developments over 2011 and the first quarter of 2012, combined with an improved economic situation for airlines, have meant that the Programme now provides an average of around 300,000 upper air observations per day in support of the WMO World Weather Watch Programme. Figure 1 below shows the 5-year trend in GTS daily 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.

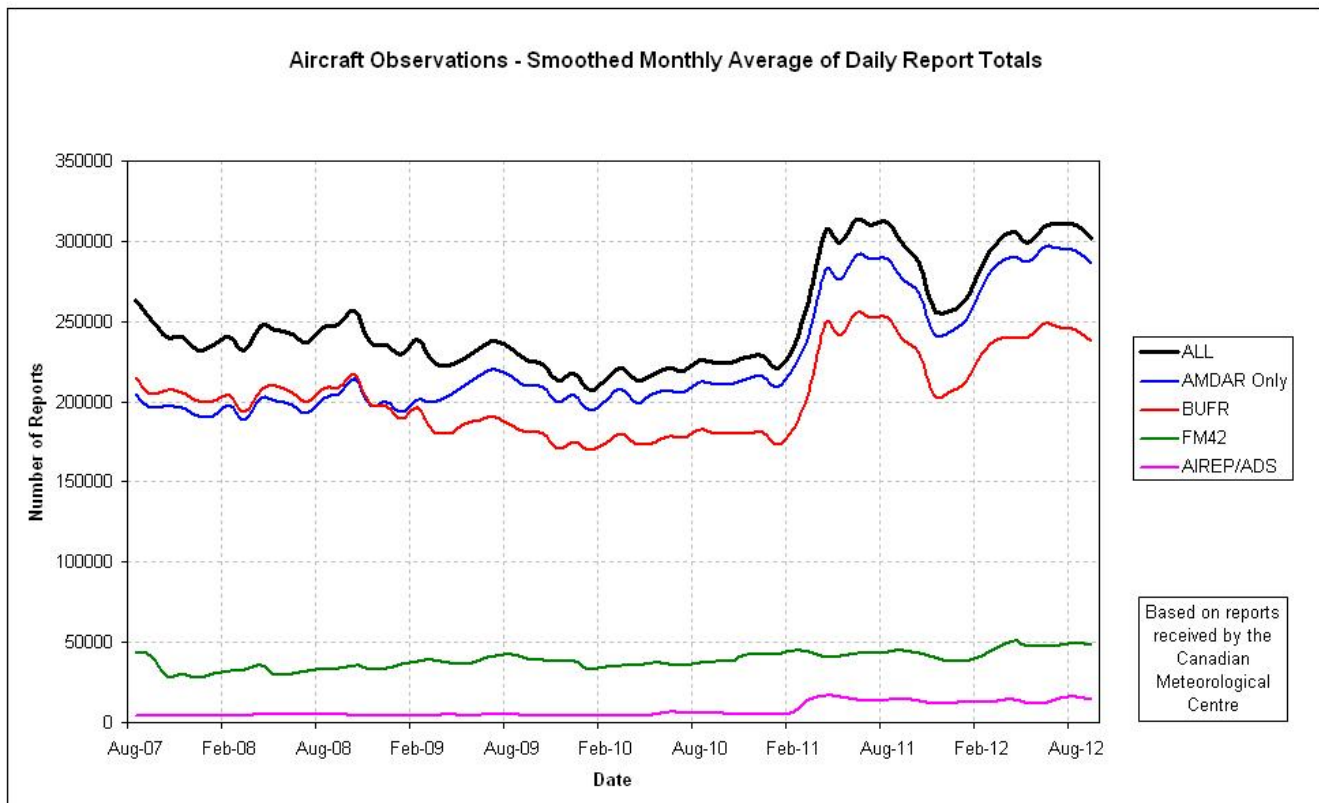


Figure 1 – Smoothed monthly mean daily aircraft-based observations output on the WMO Global Telecommunications System, August 2007 through September 2012.

9. Since Panel-14 (November 2012), the significant change to the global AMDAR fleet has been the addition of 2 airlines and over 20 aircraft to the Australian programme, namely, Jetstar Australia and Jetstar Asia operating out of Singapore. The addition of Jetstar Asia has enabled the

collection of observations from many Southeast Asian locations and areas within a relatively data sparse region.

10. Figure 10, courtesy of the AMDAR Data Display from NOAA, ESRL/GSD, provides an indication of the global coverage of aircraft observations on the GTS.

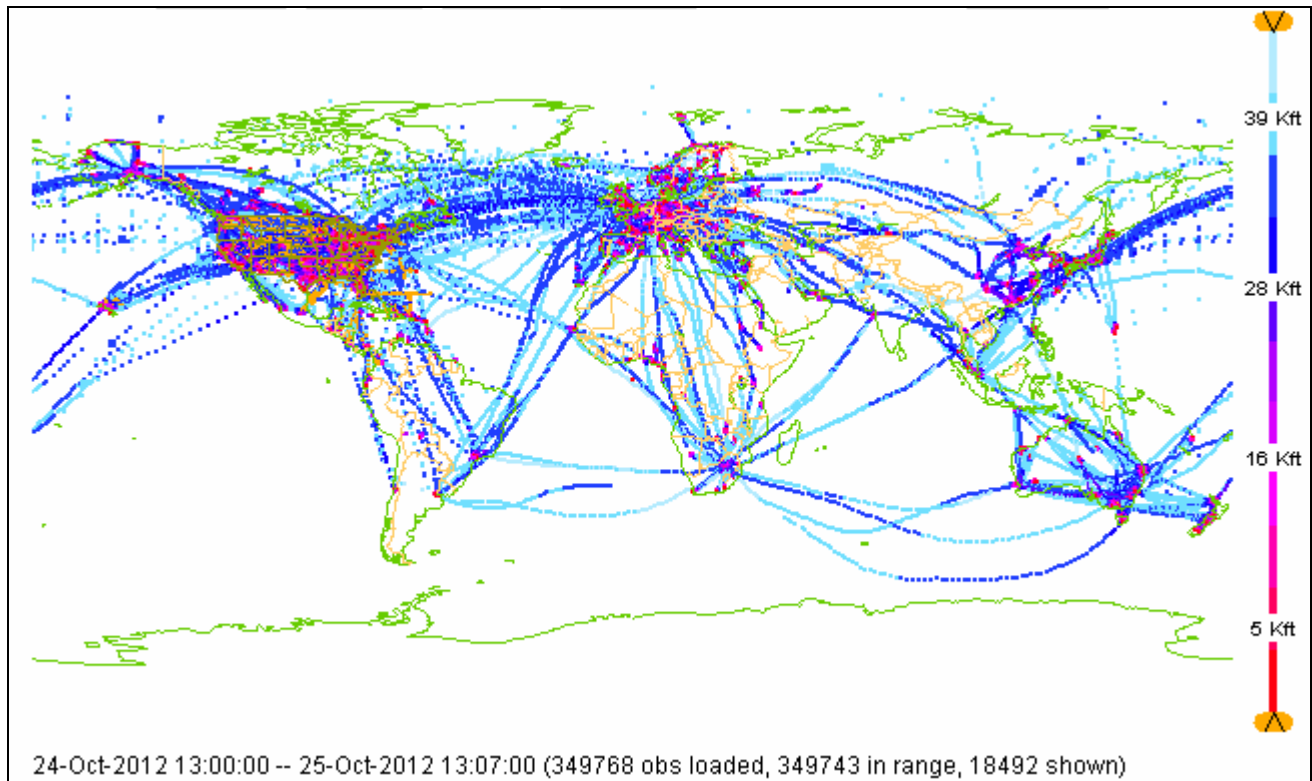


Figure 2 – Aircraft-based observations on the GTS as received by the NOAA Global Systems Division.

## ACTIVITY HIGHLIGHTS

### WIGOS Pilot Project for AMDAR

11. In July 2008, the AMDAR Panel was given the task of managing the WIGOS Pilot Project: for AMDAR for the Integration of AMDAR into WIGOS (WIGOS-PP-AMDAR), which has been incorporated into the AMDAR Panel and ET-AIR work programmes. With the activation of the WIGOS Implementation Plan (EC-64, 2012), the outstanding tasks associated with the WIGOS-PP-AMDAR should now be integrated separately into the Aircraft-based Observations Work Programme, which will be drafted within this meeting under agenda items 4.6.

12. In relation to the aims and tasks under WIGOS-PP-AMDAR the following progress has been made:

(1) Development of a standardised BUFR Template for AMDAR:

This activity has been completed with the new BUFR AMDAR Template (Code Table 3 11 10, Version 7) has been approved under the Fast-track Procedure of the WMO Technical Regulations relating to Procedure for Amending the Manual on Codes. The amendments were approved by the president of CBS, on behalf of Executive Council (EC) and were to be implemented on 2 May 2012.

(2) Application of WMO Metadata relevant to AMDAR:

This task has been advanced under the activity of the Workshop on Aircraft Observations Data Management (June, 2012), which will be further discussed under agenda item 4.4.

(3) Development of a standardised Quality Management Framework for AMDAR data:

This activity has also been advanced under the activity of the Workshop on Aircraft Observations Data Management (June, 2012), which will be further discussed under agenda item 4.4.

(4) Validation and preparation for inter-comparison of available Water Vapour sensor performance:

This activity has been advanced under the 2012 work programme with the development of a draft Implementation Plan of Water Vapour Sensing Capability for AMDAR, which will be discussed in detail under agenda item 4.2.

(5) Update of the AMDAR Reference Manual WMO-No.958:

No progress has been made on this task and should be incorporated into the future work programme.

(6) Development of the framework for generic software specification for AMDAR.

This activity has progressed markedly in 2012 with the appointment of a contractor under a WMO Special Services Agreement (SSA) to develop the AMDAR Onboard Software Functional Requirements Specification, which is expected to be complete later in 2012. This document will constitute the WMO standard for AMDAR software requirements. Addressed further under agenda item 4.4.

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

### ***Enhancement of AMDAR Observing System Coverage***

13. A WMO Special Services Agreement (SSA) was put in place (Feb 2012) with a consultant, Mr Graham Bruce, Canada, to carry out the *Study on AMDAR Coverage and Targeting for Future Airline Recruitment*.
14. The APMG and the Secretariat have undertaken developmental collaboration with several aviation industry partners including:
  - SITA – potential development of a turnkey solution for AMDAR incorporating data optimization;
  - ARINC – solution for AMDAR data ground-processing, delivery and optimization;
  - Teledyne Controls – AMDAR software development for Teledyne avionics products; and,
  - AirDat – collaboration on General Aviation delivery of aircraft-based observations data;
15. The Coordinator of the Science and Technical Sub-Group and the Secretariat commenced work on the development of an Implementation Plan for Water Vapour Sensing Capability for AMDAR. Addressed further under agenda item 4.2.

### ***Extension of the AMDAR System***

16. The Panel has collaborated with the USA Federal Aviation Authority and NCAR towards the definition of a standardized approach to turbulence and the application of Eddy Dissipation Rate within the AMDAR system. Algorithms and software for potential test programmes outside of the USA have been obtained. Addressed further under agenda item 4.2.

## **National Programmes Development**

17. Although taking longer than expected, work has progressed on the development of the Mexican AMDAR Programme in cooperation with Aeromexico and ARINC. It is expected the required agreements will be in place in the last quarter of 2012 with data quality to be tested before the programme becomes operational shortly after.
18. Some strong leads on potential AMDAR Programme development have been identified and followed up for Argentina (Aerolineas and LAN Argentina), Brazil, Qatar (Qatar Airways) and others.

#### ***Development and Maintenance of the Aircraft Observing System QMS***

19. The Panel and the Secretariat have overseen the specification of Version 5 of the Meteorological Report within Supplement 7 to the AEEC ARINC 620 Standard.
20. The Secretariat has established several email group aliases in support of Aircraft-based Observations Programme collaboration and data monitoring.

#### ***Aircraft Observing System Training and Outreach***

21. The Panel, the Coordinator for the Training and Outreach Sub-Group and the Secretariat have established a News & Events website in support of AMDAR outreach activities and overseen the production and publication of the first four editions of the WMO AMDAR Panel Newsletter.
22. The APMG and the Secretariat have collaborated with COMET regarding the possible development of a training and outreach module for the AMDAR programme.
23. Dr Ralph Petersen from the University of Wisconsin was contracted for the commissioning of a paper on AMDAR data impact assessment and, associated with this task, contributed to the Fifth WMO Workshop on the Impact of Various Observing Systems on NWP, Sedona, May 2012, under Session 2, Regional Forecast Impact Studies on Impact of AMDAR Aircraft Observations.
24. The Panel was represented at the AEEC DataLink Users Forum held in September 2012, Dublin, by Mr Stewart Taylor.

#### ***Workshop on Aircraft Observing System Data Management***

25. The Chairman, Dr Jitze Van der Meulen and the Secretariat organized and held the Workshop on Aircraft Observing System Data Management in Geneva over 5-8 June 2012. The Workshop was considered a great success and has significantly advanced the development of the Data Management Framework for the Aircraft-based Observing System.

#### **MEETINGS HELD OR ATTENDED**

26. The following meetings were held or attended in association with the activities of the AMDAR Panel:
  - AMDAR Panel Management Group Session 3, Silver Spring, United States, 27 February - 2 March 2012 (AMDAR Panel Management Group, the Secretariat);
  - Joint AEEC DLK Systems Subcommittee/RTCA SC-214 VDL SG – EUROCAE WG92, EUROCONTROL Institute Luxembourg, 14-16 February, 2012 (the Secretariat);
  - Meeting with COMET representatives, February 2012, Silver Spring, USA (AMDAR Panel Management Group, the Secretariat);
  - Informal meeting with Ms Jeannine Hendricks, ARINC, March 2012, Silver Spring, USA (AMDAR Panel Management Group, the Secretariat);
  - E-AMDAR Programme, Technical Advisory Group 19<sup>th</sup> Meeting, 13-15 March 2012, De Bilt, the Netherlands (Panel Chairman, the Secretariat);

- CBS Expert Team on Evolution of Global Observing System, Seventh Session (ET-EGOS-7), Geneva, Switzerland, 7-11 May 2012 (Panel Chairman and the Secretariat);
- Workshop on Aircraft Observing System Data Management, Geneva, Switzerland, 5 – 8 June 2012 (Panel Chairman, Dr Jitze Van der Meulen, the Secretariat);
- CBS OPAG-IOS, Implementation/Coordination Team on the Integrated Observing System, Seventh Session, Geneva, Switzerland, 18 – 22 June 2012 (Panel Chairman, the Secretariat);
- Informal meeting with Mr Tim Spangler, COMET, 26 June 2012, Geneva Switzerland (the Secretariat)
- AMDAR Panel Management Group Session 4, Geneva, Switzerland, 29-31 August 2012 (AMDAR Panel Management Group, the Secretariat);
- Meeting with Teledyne Controls representative, 29 August 2012, Geneva, Switzerland (AMDAR Panel Management Group, the Secretariat);
- Meeting on Argentina AMDAR Programme Development with Mr Juan Horler, Servicio Meteorológico Nacional, Argentina, 27 August 2012, Geneva, Switzerland (AMDAR Panel Management Group, the Secretariat);
- Informal meeting with AirDat LLC, 18 September 2012, Geneva, Switzerland (AMDAR Panel Management Group, the Secretariat); and
- AEEC DataLink Users Forum, Dublin, Ireland, 18-20 September 2012 (Mr Stewart Taylor);

#### **ASSISTANCE TO THE AMDAR PROGRAMME**

27. The Panel Chairman and the Secretariat gratefully acknowledge the following people and organizations for assistance to the AMDAR Panel and its work programme:

- Those WMO AMDAR Panel Member NMHSs providing financial and in-kind contributions to the AMDAR Panel Trust Fund;
- Mr Carl Weiss, USA, for the roles as Vice-chair of the Panel and Coordinator of the Training and Outreach Sub-group;
- Dr Axel Hoff, Germany, for roles as Coordinator of the Science and Technical Sub-group and representation as CIMO Theme Leader on Aircraft-based Measurements;
- Dr Jitze Van der Meulen for representation as CIMO Theme Leader on Aircraft-based Measurements and for the role as Leader on AMDAR Quality Management Framework;
- Mr Stewart Taylor for the role as Coordinator for the Improvement in Data Exchange & Quality Control;
- Ms Eva Červená, Czech Republic, for assistance in finalisation of the AMDAR BUFR Template;
- USA NOAA/National Weather Service and Mr Carl Weiss, USA, for hosting the AMDAR Panel Management Group Meeting 3<sup>rd</sup> Session;
- USA NOAA/National Weather Service and the National Center for Atmospheric Research, Mr Carl Weiss, USA, and Ms Marcia Politovich, USA, for hosting and coordination of the AMDAR Panel 15<sup>th</sup> Session and the Technical Workshop on Turbulence and EDR;
- USA NOAA/Earth System Research Laboratory (ESRL), Global Systems Division (GSD) for maintenance and provision of the online AMDAR Data Display;

- USA Federal Aviation Administration and Ms Tammy Farrar for representation to the Panel, organisation and coordination of the Technical Workshop on Turbulence and EDR;
  - The Environment Canada, Canadian Meteorological Centre, the USA NOAA National Center for Environmental Prediction (NCEP) for provision of monitoring and statistical services and information on the AMDAR Programme; and,
  - All those that have contributed to articles and the compilation of the WMO AMDAR Panel Newsletters.
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APPENDIX I

WMO AIRCRAFT OBSERVING SYSTEM WORK PROGRAMME 2012 AND MEDIUM-TERM PLAN

Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate	
1.1 (Enhancement of AMDAR Observing System Coverage - Extend global AMDAR coverage)	1.1.1	Study on data coverage and airline capabilities	1	1. Award SSA	1. APMG	Q1 2012	Q4 2012	Commenced	SSA in place	40K		
				2. Manage SSA	2. SO/ARO	Q4 2011	Q4 2012	TBC	Nil			
				3. Review deliverables.	3. SO/ARO, A-FPs, (APMG)	Q1 2012	Q4 2012	TBC	1. Study on Coverage; 2. Study on airlines; 3. Report.			
	1.1.2	Development of AMDAR Programmes for: <ul style="list-style-type: none"> <li>• Northern Africa;</li> <li>• South and Central America;</li> <li>• Southwest Pacific</li> <li>• Eastern Europe;</li> <li>• Middle East</li> <li>• Central Africa.</li> </ul>		1	1. Organise finance for AeroMexico programme.	1. APMG, SO/ARO	Q4 2011	Q2 2012	Commenced	1. Contract with AeroMexico	50K	
				2	2. Determine potential for data targeting over Africa	2. APMG	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
				2	3. Determine what capacity there is to use targeted data in Africa	3. APMG	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
				2	4. 1 or 2 members of the Panel to undertake fact-finding mission to Africa re programme potential	4. APMG	Q1 2012	2013	TBC	1. Report to Panel-15		10K

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
			3	5. Investigate approach for Emirates AMDAR Programme commencement – assess possibilities for Bahrain, Oman: Write generic letter to appropriate PRs and contacts through the Secretariat.	F.Grooters	Q1 2012	Q4 2012	TBC	1. Report to APMG-4		
				6. Write to WMO Regional Association I	F.Grooters				2. Letter to 3. Report to APMG-4		
	1.1.3	Improve and extend Targeted Data Activities	2	All programmes to identify potential for data targeting within their programs. Request info from A-FPs Submit information Analyse data Report to APMG-4	1. SO/ARO 2. A-FPs (Operational) 3. SO/ARO 4. SO/ARO	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
	1.1.4	Develop guidelines for programme development	2	1. Write DoW 2. Review and approval 3. Compilation of Guidelines	1. SO/ARO 2. APMG 3. SSA or A-FPs?	Q1 2012	Q3 2012	TBC	1. DoW		
	1.1.5	Contribute to the WMO/CBS RRR Process	1	Develop a methodology for defining the required capabilities for inclusion in the RRR database. Provide data for input to the RRR Obs Systems Capabilities database	SO/ARO	Q3 2011	Q2 2012 2013	TBC	Input in the RRR Database SoR document. Input in the RRR OSC Database		

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
1.2 (Enhancement of AMDAR Observing System Coverage - Address the requirement for national, regional and global optimization)	1.2.1	Develop optimization systems for: <ul style="list-style-type: none"> <li>• United States AMDAR Programme;</li> <li>• Asia;</li> <li>• Africa;</li> <li>• South America.</li> </ul>	2	<ol style="list-style-type: none"> <li>1. Study on optimization for Sth Africa AMDAR Programme</li> <li>2. Study on optimization for US AMDAR Programme (MDCRS)</li> <li>3. Report on Australian Data Optimisation System</li> <li>4. SITA Optimisation Development</li> </ol>	SO/ARO, G.Khambule SO/ARO, D. Helms SO/ARO, A-FP-Australia SO/ARO seek Pilot Project proposal from SITA.	Q2 2012	Q3 2012	TBC	<ol style="list-style-type: none"> <li>1. Report to APMG-4</li> <li>2. Report to Panel-15</li> <li>3. Report to APMG-4</li> <li>4. Report to APMG-4</li> </ol>		
2.1 (Extension of the AMDAR System - Implement water vapour sensing measurement)	2.1.1	Implement water vapour sensing measurement	1	1. Investigate Panel ownership of general STC for Airbus 320 family.	1. A.Hoff	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
			1	2. Investigate Panel ownership of general FAA STCs for Boeing 737 types and conversion to European EU/EASA certification.	2. A.Hoff/Y. Lemaitre	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
			1	3. Write a letter to PRs seeking interest in international project for WV implementation	3. SO/ARO	Q1 2012	Q2 2012	TBC	1. Letters to PRs		
			2	4. Request SSI to provide a "dynamic" document on STC status, issues and processes	4. SO/ARO	Q2 2012 (APMG-3)	Q4 2012	TBC	Document on STCs		
			1	5. Draft a strategic plan for WV implementation	5. SO/ARO, A.Hoff, D.Helms	Q2 2012 (APMG-3)	Q3 2012	TBC	Draft Strategic Plan.		

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
			2	6. Obtain statements of impact of WVSS-II on airline operations from USA airlines.	6. F. Grooters	Q2 2012 (APMG-3)	Q3 2012	Commenced	WVSS-II airline impact statements		
2.2 (Extension of the AMDAR System - Implement turbulence measurement)	2.2.1	Implement turbulence measurement	1	1. Obtain specification for EDR from FAA	1. SO/ARO	Q1 2012	Q3 2012	TBC	1. EDR Specification	10K	
			1	2. Obtain EDR software package from FAA for use in E-AMDAR	2. SO/ARO	Q1 2012	Q3 2012	TBC	2. EDR Software		
4.1 (Development and Maintenance of the Aircraft Observing System Quality Management System - Implement a Quality Management Framework for AMDAR)	4.1.1	WIGOS Pilot Project for AMDAR	1	1. WIGOS-PP-AMDAR-1 Development of BUFR Template: <ul style="list-style-type: none"> <li>• Coordinate validation;</li> <li>• Report to Code Group</li> <li>• Report to APMG-3;</li> <li>• Report to JM-4</li> </ul>	1. SO/ARO ECMWF/Met Office	Q4 2011	Q1 2012	Commenced	1. Validated template		
			1	2. WIGOS-PP-AMDAR-2 Metadata Development: <ul style="list-style-type: none"> <li>• AP-FPs and Review Group to review Metadata sets;</li> <li>• D..Helms to review and define metadata categories;</li> <li>• AP-FPs and Review Group to Review in preparation for AMDAR DM Workshop</li> </ul>	2. PL-IDEQC, SO/ARO, AP-FPs  Review Group: SO/ARO, N.Halsey, D.Helms, J.v.d.Meulen,	Q4 2011	Q3 2012	Commenced	1. Refined metadata set; 2. Categorized metadata set. 3. PL-IDEQC report to APMG-4		

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
			1	3. WIGOS-PP-AMDAR-3 Develop AMDAR Data Management Procedures: <ul style="list-style-type: none"> <li>• Hold a workshop of AMDAR data management experts in Q2 2012 (Geneva);</li> <li>• Develop a strategy for global AMDAR data management;</li> <li>• Address data display issues;</li> </ul>	3. J.v.d.Meulen, APMG	Q1 2012	Q4 2012	TBC	1. AMDAR Data Management Workshop; 2. Global AMDAR Data Management Strategy.	15K	

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
			1	4. WIGOS-PP-AMDAR-4 Validation and Inter-comparison of WVSS-II: <ul style="list-style-type: none"> <li>• Paper on summary of results and conclusions:                             <ul style="list-style-type: none"> <li>• DoW</li> <li>• Award SSA</li> <li>• Manage SSA</li> </ul> </li> <li>• Seek endorsement by CIMO and CBS as a candidate system for operational deployment by Members;</li> <li>• Technique employed by the WVSS-II sensor should be appropriately integrated into the CIMO Guide and CBS guides.</li> <li>• Development of AMDAR Panel Statement of Support for WV implementation leading to WMO endorsement.</li> </ul>	4. APMG	Q1 2012	Q4 2012	TBC	1. DoW 2. SSA 3. Paper 4. Statement of Support	30K	

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
			1	5. WIGOS-PP-AMDAR-5: Update of AMDAR Reference Manual: 1. SSA to be compiled for: i) Review of WMO and AMDAR regulatory material ii). Integrate AMDAR RM into WMO regulatory material. I iii). Conduct a regulatory material review process as necessary to finalise item ii. 2. Review and update the CIMO Guide for water vapor sensing developments.	5. 1. APMG, SO/ARO 2. APMG 3. A.Hoff	Q1 2012	2005	TBC	1. DoW for SSA. 2. AMDAR System reviewed in WMO reg. material. 3. Draft AMDAR Implementation Manual 4. Update to CIMO Guide for water vapor sensing developments		40K
			1	6. WIGOS-PP-AMDAR-6 Generic Software Spec: 1. Manage SSA; 2. Review deliverables.	6. 1. SO/ARO; 2. Review group: SO/ARO, D.Helms, HR.Sonnabend, A.Hoff.	Q4 2011	Q3 2012	Commenced	1. Generic software specification.	40K	
4.1 (Development and Maintenance of the Aircraft Observing System Quality Management System - Implement a Quality Management Framework for AMDAR)	4.1.2	Establishment of National and International Metadata	2	1. Collection of metadata on AMDAR software to be completed	1. PL-IDEQC, SO/ARO, AP-FPs	Q1 2012	Q4 2012	TBC	1. Software metadata set		

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
4.2 (Development and Maintenance of the Aircraft Observing System QMS - Develop a National and Global Aircraft Observations Data Management Framework)	4.2.1	Develop a National and Global Aircraft Observations Data Management Framework	2	<ol style="list-style-type: none"> <li>1. Re NOAA/ESRL/GSD AMDAR data display determine: <ul style="list-style-type: none"> <li>• Future maintenance of and for this system</li> <li>• Possible change to use of national aircraft IDs</li> </ul> </li> </ol>	1. D.Helms	Q1 2012	Q3 2012	TBC	1. Report to APMG-4		
4.3 (Development and Maintenance of the Aircraft Observing System QMS - Standardise AMDAR software function across avionics systems and optional sensors across aircraft)	4.3.1	Update of ARINC 620 Meteorological Report to Version 5	1	1. Finalise ARINC 620 Met. Report Version 5	1. SO/ARO, A.Hoff, HR.Sonnabend, D.Helms	Q4 2011	Q3 2012	Commenced	1. ARINC 620 V5		
	4.3.2	Standardisation of AMDAR within Aviation	3	<ol style="list-style-type: none"> <li>1. Commence planning for an Aviation Industry event for 2013 re software implementation in new aircraft.</li> <li>2. Attend the Airlines Association of South Africa AGM, South Africa</li> </ol>	<ol style="list-style-type: none"> <li>1. APMG</li> <li>2. APMG G.Khambule,</li> <li>3. APMG</li> </ol>	Q1 2012	Q4 2012	TBC	Report to Panel-15 Report to Panel-15 Report to Panel-15		
	4.3.3	AMDAR Software Development	2	B777 Software Development: Proposal of B777 software development to be made to Meteo-France and E-AMDAR at E-TAG (March 2012) Ownership issues to be addressed at E-TAG (March 2012) Chairman to report to Panel-15 (Q4)	F.Grooters APMG	Q1 2012	Q4 2012	TBC	Letter to M-France and E-AMDAR	20K	



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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
4.4 (Development and Maintenance of the Aircraft Observing System QMS - Manage the data processing and quality assurance for other sources of aircraft data)	4.4.1	Develop strategies for the management of ADS and Mode S data	2	Ensure item is addressed under 4.1.1(3): AMDAR Data Management Workshop	SO/ARO, J.v.d.Meulen	Q1 2012	Q3 2012	TBC	Report to APMG-4		
5.1 (Aircraft Observing System Training and Outreach - Develop methods and material for promoting Aircraft Observations)	5.1.1	Aircraft Observations System Website Maintenance	2	1. Review website.	2. C.Weiss, SO/ARO, Y.Lemaitre, J.v.d.Meulen	Q1 2012	Q3 2012	Commenced	1. Review report to APMG-3		
			3	2. Technical contractor to update website.	3. SO/ARO	Q2 2012	2013	TBC	1. SSA Website update plan 2. Website update 3. Website update commenced		40K
	5.1.2	Impacts and Benefits Document for Aviation	2	Identify contractors and obtain Eols and quotations Award and manage SSA Review deliverables Write to USA and Australian airline contacts seeking evidence of AMDAR impacts and benefits.	1. APMG 2. SO/ARO, B.Ford 3. APMG 4. F.Grooters, SO/ARO	Q1 2012	2013	Commenced	1. SSA 2. Aviation 3. Impacts and Benefits document 4. Nil 5. Examples of impacts and benefits.		40K
	5.1.3	AMDAR COMET Training Module	3	Contact COMET re development of a AMDAR course.	APMG(C. Weiss), SO/ARO	Q1 2012	Q1 2012	Commenced	Report to APMG-3		
	5.1.4	Impact Studies Assessment	3	Commission a paper summarizing results of AMDAR Impact studies including NWP and other Data Users	APMG, (ESRL, ECMWF, ABoM, MF, CMA,SAWS)	(Q2 2012)	(Q4 2012)	TBC	Commenced	30K	
	5.1.5	Attend Aviation Meetings	2	Panel to attend AEEC DLUF Meetings in Europe and USA	APMG	Q1 2012	Q42012	TBC	Report to Panel-15	4K	

**APPENDIX I**

Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
5.2 (Aircraft Observing System Training and Outreach - Conduct training and outreach activities)	5.2.1	Aircraft Observations Newsletter production	2	Newsletters Q1, Q2, Q3, Q4	C-TOSG, SO/ARO,APMG, AP-FPs.	Q1 2012	Q4 2012	Commenced  Volume 1 published.	Newsletters Q1, Q2, Q3, Q4		
6	N/A	AMDAR Panel Admin	1	Update of AMDAR Panel ToR	APMG	Q1 2012	Q4 2012	Commenced	Updated ToR		
6	N/A	AMDAR Panel Admin	1	Manage and finalise the transition of the AMDAR Observing System to WMO	APMG	Q1 2012	Q4 2012	Commenced	Manage and complete the transition process of the AMDAR System to WMO.		
6.1 (Management and administration of the Aircraft Observing System Programme - Conduct meetings of members)	6.1.1	Organization of Panel Meetings	1	1. Confirm meeting location and date	APMG	Q1 2012	Q1 2012	Commenced	Location, dates	5K	
				2. Venue and meeting logistics	Host	Q2 2012	Q2 2012	TBC	Venue		
				3. Info for participants	Host	Q3 2012	Q3 2012	TBC	Info for participants		
				4. Doc Plan draft	APMG	Q3 2012	Q3 2012	TBC	Doc Plan Draft		
				5. Doc Plan	APMG, SO/ARO, A-FPs	Q3 2012	Q3 2012	TBC	Doc Plan		
				6. 2012 Panel Meeting	SO/ARO, (APMG)	Q4 2012	Q4 2012	TBC	2012 Meeting Report		
	6.1.2	Organization of AMDAR Panel Management Group Meetings	1	Organise and hold APMG Session 3	APMG, SO/ARO	Q1 2012	Q1 2012	TBC	APMG-3 Report	10K	
				Organise and hold APMG Session 4	APMG, SO/ARO	Q2 2012	Q3 2012	TBC	APMG-4 Report	5K	
6.2 (Management and administration of the Aircraft)	6.2.1	Reporting and planning associated with ICT-IOS, CBS and ET-AIR	1	Finalisation of ET-Work Plan 2013 - 2016 ET-AIR Report to CBS	APMG ET-AIR Chair	Q1 2012	Q3 2012	TBC	ET-AIR Work Plan Report to CBS		

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Core and L-T Activity	M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Commence	Complete	Status	Outputs / Deliverables	2012 Budget Estimate	2013 Budget Estimate
Observing System Programme - Coordinate planning activities)			1	Review of EGOS IP	APMG	Q4 2011	Q4 2011	TBC	Revision provided to ET-EGOS Chair-		