

**WORLD METEOROLOGICAL ORGANIZATION**

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**COMMISSION FOR BASIC SYSTEMS**  
OPEN PROGRAMME AREA GROUP ON  
INTEGRATED OBSERVING SYSTEMS

ITEM: 6.6

**IMPLEMENTATION-COORDINATION TEAM  
ON INTEGRATED OBSERVING SYSTEM  
(ICT-IOS)**  
*Eighth Session*

Original: ENGLISH

GENEVA, SWITZERLAND, 7 – 10 APRIL 2014

## **REPORTS OF THE OPAG-IOS EXPERT TEAMS AND RAPPORTEURS**

### **REPORT OF THE EXPERT TEAM ON AIRCRAFT-BASED OBSERVING SYSTEMS (ET-ABO)**

*(Submitted by Frank Grooters (the Netherlands), Chair, ET-ABO)*

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#### **SUMMARY AND PURPOSE OF DOCUMENT**

This document provides a report of the work of the Expert Team on Aircraft-Based Observing Systems (ET-ABO) since the seventh Session of the ICT-IOS, together with subsequent progress, and recommendations.

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#### **ACTION PROPOSED**

The Meeting is invited to note the information contained in this document when discussing how it organises its work and formulates its recommendations.

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**Appendix A** Terms of Reference of the Expert Team on Aircraft-Based Observing Systems (ET-ABO)

**Appendix B** Updated Work Plans for 2013-2014 and 2014-2015 with status of the Expert Team on Aircraft-Based Observing Systems (ET-ABO)

**Appendix C** Proposed changes to the Expert Team on Aircraft-Based Observing Systems (ET-ABO) Terms of Reference

**Appendix D** Template of draft Recommendation to CBS

## DISCUSSION

### 1. Introduction

1.1 At its 15<sup>th</sup> Session (November 2012) the WMO AMDAR Panel finalised and approved the transfer of the programmatic management and governance of the AMDAR observing system to WMO under the WWW and agreed that the Panel should forthwith cease operation. The new governance (which includes responsibility for management and operation of the AMDAR Trust Fund) was handed over to the CBS and CIMO Technical Commissions, to be used by the CBS OPAG-IOS Expert Team on Aircraft-based Observing Systems (ET-ABO) and the CIMO OPAG-SI Task Team on Aircraft-based Observations (TT-AO). Together these two teams and their work programmes are referred to as the Aircraft-Base Observations Programme (ABOP)<sup>1</sup>.

1.2 The ET-ABO held its first meeting in September 2013<sup>2</sup>. At that meeting, the Expert Team approved the ET-ABO Work Plan 2013-2014 and the supporting budget for use of the AMDAR Trust Fund. As required under the new Terms of Reference for the AMDAR Trust Fund<sup>3</sup>, the work plan and budget for 2014-2015 has been updated in accordance with the progress made regarding the individual tasks and sub-tasks of the ABOP.

### 2. Achievements

In relation to its Terms of Reference (Appendix A), the ET-ABO achieved the following:

1. ToR (a): - development and update of the ABO Work Plans 2012-2013 and 2014-2015 (see Appendix B);
  - development and update of the budget for use of the AMDAR Trust Fund;
  - coordination and contribution to the development of the Strategy and Implementation Plan to 2025, including Development and Expansion of AMDAR<sup>4</sup> ;
  - coordination and contribution to the ABOP Budget for the 2012-2013 Work Plan and Projection to 2016<sup>5</sup>;
2. ToR (b): - initial work on review and update of AMDAR regulatory material including specifications for Quality Control and Quality Management of ABO data and metadata;
  - development of a Requirements Specification and distribution of a Request for an Expression of Interest for the establishment of an ABO Global Data Center;
3. ToR (c): - development of a generic AMDAR Onboard Software Functional Requirements Specification (AOSFRS)<sup>6</sup>;

1 For details, see : [http://www.wmo.int/pages/prog/www/GOS/ABO/ABO\\_Work\\_Program.html](http://www.wmo.int/pages/prog/www/GOS/ABO/ABO_Work_Program.html)

2 [http://www.wmo.int/pages/prog/www/CBS-Reports/documents/ET-ABO-1\\_September\\_2013\\_Final\\_Report.pdf](http://www.wmo.int/pages/prog/www/CBS-Reports/documents/ET-ABO-1_September_2013_Final_Report.pdf)

3 [http://www.wmo.int/pages/prog/www/GOS/ABO/documents/AMDAR\\_TF\\_ToR\\_Jan2013\\_Approved.pdf](http://www.wmo.int/pages/prog/www/GOS/ABO/documents/AMDAR_TF_ToR_Jan2013_Approved.pdf)

4 [http://www.wmo.int/pages/prog/www/GOS/ABO/documents/ABOP\\_Strategy\\_Implementation\\_Plan\\_V2013.1A.pdf](http://www.wmo.int/pages/prog/www/GOS/ABO/documents/ABOP_Strategy_Implementation_Plan_V2013.1A.pdf)

5 [http://www.wmo.int/pages/prog/www/GOS/ABO/documents/ABOP\\_Budget\\_2013-2014\\_Version\\_2013.2A.pdf](http://www.wmo.int/pages/prog/www/GOS/ABO/documents/ABOP_Budget_2013-2014_Version_2013.2A.pdf)

6 [http://www.wmo.int/pages/prog/www/IMOP/publications/IOM-114\\_AOSFRS\\_v1/IOM-114\\_AMDAR\\_AOSFRS\\_V1.pdf](http://www.wmo.int/pages/prog/www/IMOP/publications/IOM-114_AOSFRS_v1/IOM-114_AMDAR_AOSFRS_V1.pdf)

- update of the ARINC620 Meteorological Report Specification with the Aeronautical Airlines Electronic Engineering Committee (AEEC)<sup>7</sup>;
  - extended implementation of the humidity sensor WVSS-II in SWA and UPS aircraft under the US AMDAR (MDCRS) programme;
  - initiatives started to increase the number of humidity sensors WVSS-II in DLH aircraft under the European E-AMDAR programme;
  - wider implementation of the turbulence reporting algorithm (EDR) in DAL and SWA aircraft under the US AMDAR (MDCRS) programme;
  - the EDR algorithm and software package was made available to the E-AMDAR programme for possible European trial and verification activities;
4. ToR (d):
- study and publication of report on AMDAR Coverage and Targeting for Future Airline Recruitment<sup>8</sup> ;
  - study and publication of WIGOS Technical Report TR 2014-1 on the Benefits of AMDAR Data to Meteorology and Aviation<sup>9</sup>;
  - publication of WIGIS Technical Report TR 2014-2 on Guidance and Requirements for the Implementation and Operation of an AMDAR Programme<sup>10</sup>;
  - development of (six) ABOP Regional Implementation Plans (A-RIPs) through the Regional WIGOS IPs;
  - preparation of a letter to the Permanent Representatives to WMO recommending the expansion of the Global AMDAR Programme;
  - encouraged the US AMDAR (MDCRS) programme in plans for the development of an Optimization System in the USA;
5. ToR (e):
- initiation of development of a generic Workshop Programme;
  - update and population (News and Events) of the WMO Aircraft-Based Observations and AMDAR web site<sup>11</sup> ;
  - publication of currently six volumes of the WMO AMDAR Observing System Newsletter (4 volumes in 2012, 2 volumes in 2013)<sup>12</sup>;
  - action started for organizing ABO workshops in Qatar and Senegal (ASECNA);
6. ToR (f):
- the ET-ABO has provided support to the Chairperson of the OPAG-IOS on the Implementation of the WIGOS Framework and its Operational Aspects, including representation to TT-WMD.

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7 [ftp://ftp.wmo.int/Documents/www/amdar/standards/620-7\\_Met\\_Report.pdf](ftp://ftp.wmo.int/Documents/www/amdar/standards/620-7_Met_Report.pdf)

8 [http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/resources/AMDAR\\_Coverage\\_Recruitment\\_Study.html](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/resources/AMDAR_Coverage_Recruitment_Study.html)

9 [http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/publications/Benefit\\_of\\_AMDAR\\_Data\\_to\\_Meteorology\\_and\\_Aviation.pdf](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/publications/Benefit_of_AMDAR_Data_to_Meteorology_and_Aviation.pdf)

10 [http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/publications/Requirements\\_Implementation\\_Operation\\_AMDAR\\_Programme.pdf](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/publications/Requirements_Implementation_Operation_AMDAR_Programme.pdf)

11 <https://sites.google.com/a/wmo.int/amdar-news-and-events/>

12 <https://sites.google.com/a/wmo.int/amdar-news-and-events/newsletters>

### 3. Issues

In addition to the issues covered by Recommendations in Section 4, the Expert Team on Aircraft-Based Observing Systems (ET-ABO) has identified the following issues for consideration by the ICT-IOS:

#### **3.1 WMO Integrated Global Observing System (WIGOS) and contribution to the WIGOS Framework Implementation Plan (WIP)**

3.1.1 At its first session in September 2013, the CBS Expert Team on Aircraft-Based Observing Systems (ET-ABO) approved the Aircraft-Based Observations Programme Strategy and Implementation Plan to 2025 (A-SIP). The A-SIP provides the strategy and plan for development of aircraft-based observations and the AMDAR observing system in response to the set of 6 high-level global actions for Aircraft Meteorological Stations, of the CBS Implementation Plan for Evolution of the Global Observing System (EGOS-IP)<sup>13</sup>.

3.1.2 The strategy and implementation plan for ABOP development will support and rely upon a regional approach to planning and implementation through collaboration with the WMO Regional Associations and will also continue to provide requested support directly to those individual NMHSs that have demonstrated capability and drive to establish AMDAR programs. Work has already commenced on the development of ABOP Regional Implementation Plans (A-RIPs) for each WMO region and ET-ABO will recommend to each RA that they consider adoption, maintenance and implementation of the plans by Members as a component of their Regional WIGOS Implementation Plans.

3.1.3 ET-ABO recommends that ICT-IOS and CBS endorse this approach to aircraft-based observations development. (See recommendation below.)

#### **3.2 Observational requirements for the Global Framework for Climate Services (GFCS)**

3.2.1 The quality of ABO data has been shown to be of similar quality to Radiosonde data. Together with the increasing availability of water vapour data, AMDAR information is expected in the future to become increasingly important to climate research, since that data originates from an altitude where the influence of constituents, such as the greenhouse gas Water Vapour, are not yet fully understood.

3.2.2 ET-ABO recommends that ICT-IOS request through the RRR process, an assessment of requirements for aircraft-based observations in support of climate applications, such as the GFCS.

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<sup>13</sup> [http://www.wmo.int/pages/prog/www/GOS/ABO/ABO\\_EGOS-IP.html](http://www.wmo.int/pages/prog/www/GOS/ABO/ABO_EGOS-IP.html)

### **3.3 Capacity Building**

3.3.1 With the adoption of the strategy for ABOP based on the A-SIP, the ET-ABO has started initiatives for the enhancement and implementation of aircraft-based observations tailored to the specific needs and requirements of each WMO regions. At the regional level, the individual A-RIPs are currently being developed with the guidance and assistance of designated regional leads within the ET-ABO.

3.3.2 In order to seek the support of WMO Members for this activity, the Secretariat has drafted a letter explaining the strategy and recommending that Members consider the further development and implementation of the AMDAR observing system, providing demonstrated national, regional and global benefits. The letter is expected to be sent to all PRs to WMO by April 2013.

3.3.4 The ET-ABO Work Plan includes a budget and capacity for the organisation of technical and operational workshops. To increase the efficiency of this activity and to enhance the benefits to participants, the ET-ABO has started an initiative for the development of a workshop agenda and training template that identifies and addresses the most important issues and topics to be covered during such workshops. The template format will be flexible so that adaptation to specific requirements of the participants can easily be achieved.

## **4. Recommendations**

4.1 The Expert Team on Aircraft-Based Observing Systems (ET-ABO) is proposing the following recommendation to the ICT-IOS and the CBS-Ext.(2014):

**Recommendation 1** –ENHANCEMENT AND EXPANSION OF AIRCRAFT-BASED OBSERVATIONS AND AMDAR IN LINE WITH THE GLOBAL ACTIONS OF THE CBS IMPLEMENTATION PLAN FOR EVOLUTION OF THE GOS–  
See Appendix D

## **5. Proposal for the Terms of reference of the Expert Team / the Rapporteur**

5.1 No changes are proposed by the Expert Team on Aircraft-Based Observing Systems (ET-ABO) to its Terms of Reference at this point.

## **6. Work plan**

6.1 The updated Work Plans with status for the Expert Team on Aircraft-Based Observing Systems (ET-ABO) for the periods 2013-2014 and 2014-2015 are at Appendix B.

**APPENDIX A**

**TERMS OF REFERENCE OF THE EXPERT TEAM ON AIRCRAFT-BASED  
OBSERVING SYSTEMS (ET-ABO)**

Last updated: 03/04/2013

(Approved by CBS-XV)

- (a) Manage the programme for the aircraft observing system and the budget for the corresponding expenditure of the AMDAR Trust Fund in line with its ToR;
- (b) Oversee the development and maintenance of the aircraft observations Quality Management System;
- (c) Oversee the scientific and technical development and maintenance of the aircraft observing system;
- (d) Oversee and assist in the enhancement and optimization of the aircraft observing system in line with the requirements of Members and the recommendations and actions of the EGOS-IP;
- (e) Assist and provide support for training and outreach activities to support promotion and further development of the aircraft observing system;
- (f) Provide advice and support to the Chairperson of OPAG-IOS on the implementation of the WIGOS framework and its operational aspects.

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**APPENDIX B**

**UPDATED WORK PLAN WITH STATUS FOR THE EXPERT TEAM ON AIRCRAFT-  
BASED OBSERVING SYSTEMS (ET-ABO) FOR THE PERIOD 2013-2014**

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
1	(a)	Compile ET-ABO work plan and budget.	2013 WP & Budget		Ch/ET-ABO	Q1 2013	Q1 2013	1	Work Plan, Ann. Budget 2013		
			2014 WP & Budget		Ch/ET-ABO	Q4 2013	Q4 2013	0	Work Plan, Ann. Budget 2014		
2	(a)	2013 Meeting of ET-ABO		Hold a meeting, possibly in end August 2013. Requirements: <ul style="list-style-type: none"> <li>Agenda (Ch-ET-ABO);</li> <li>Meeting Form (SO/ARO)</li> </ul>	Ch/ET-ABO	Q1 2013	Q3 2013	0	Agenda, Meeting Form, Meeting	15K + (10K from WMO RB)	
3	(b)	Establishment of AMDAR Metadata (national, international)	Finalise Imp. Plan		S.Taylor, SO/ARO	Q3 2013	Q3 2013	1	AMDAR Metadata IP		
			Incorporate metadata specification into draft Reg. Material		S.Taylor, SO/ARO	Q2 2013	Q1 2014	0	Metadata definition incorporated into WIGOS Reg. Mat.		
			Establish Metadata Pilot Project	Pilot project to test the exchange of metadata. Will need a recipient data centre (e.g. CMC or the AO Data Centre?)	S.Taylor, SO/ARO	Q4 2013	Q1 2014	0	Pilot project in place.		20K
4	(b)	Establish AO Data Centre	<ol style="list-style-type: none"> <li>Write to pros. Centres;</li> <li>Defined requirements of AO DC</li> </ol>	Prospective centres: <ul style="list-style-type: none"> <li>NCEP</li> <li>CMC</li> <li>NOAA NCDC</li> </ul>	Ch/ET-ABO, SO/ARO	Q1 2013	Q4 2014	0	AO Data Centre		50K
5	(b)	Document ABO QMS		Include: <ul style="list-style-type: none"> <li>Recomm. from Workshop on DM</li> </ul>	J.v.d.Meulen, ET-ABO	2012	Q4 2014	1	ABO QM Documented in WMO Reg. Mat.		

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
6	(b)	Revise and update AOP Data QC procedures		Include: <ul style="list-style-type: none"> <li>• Relevant recomm. From Workshop on DM</li> <li>• Use of flags</li> <li>• Policy on ICAO data QM</li> <li>• Spec. of QC by DPCs/NMSHSs</li> <li>• Reqs for NWP</li> <li>• Radiosonde comparison</li> </ul>	J.v.d.Meuelen + Aust. Rep.	Q4 2013	Q4 2014	0	QC Procedures updated in WIGOS Reg. Mat.		
7	(c)	Coordinate with CIMO TT-AO on Scientific & Technical Matters			Ch-ET-ABO, SO/ARO			1	Harmonised Work Plan & Budget for the ABO Program.		
8	(c)	B777 Software Dev.	Finalise negotiations with AFR and KLM in consult. with E-AMДАР & Meteo-France.	<ul style="list-style-type: none"> <li>• Combined action with TT-AO</li> </ul>	Ch/ET-ABO, SO/ARO, Ch-TT-AO	2012	Q2 2013	1	B777 AMDAR Software application		
9	(d)	Study on Data Cov. and Airline Capabilities	Complete study & publish		SO/ARO	Q1 2012	Q1 2013	4	Published study	17K	
10	(d)	Mexico Prog Implement.	Finalise ARINC Contract		SO/ARO	2012	Q2 2013	2	Contract	54K	
11	(d)	Employ AMDAR Dev. Officer (ADO)			SO/ARO, Ch/ET-ABO, GF	Q1 2013	Q2 2014	2	Job Description, ADO employed.	30K	60K
12	(d)	Develop Global & Regional AMDAR Imp. Plans	Draft GA-IP	This may incorporate the following: <ul style="list-style-type: none"> <li>• WVSS Implementation</li> <li>• Letter to airlines based on consideration of Data Coverage &amp; Airline Targeting study;</li> <li>• Letter to PRs of relevant countries based on consideration of Data Coverage &amp; Airline Targeting study;</li> <li>• Letter to RAs.</li> </ul>	SO/ARO, Ch/ET-ABO, Vc/ET-ABO	Q1 2013	Q3 2013	1	Draft GA-IP Draft RA IP Template		

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
			Draft RA I IP	<ul style="list-style-type: none"> <li>Possible that these plans can be developed in coordination with RA meetings.</li> </ul>	ADO, SO/ARO, J.Ngamini	Q2 2013	Q4 2013	0	RA I IP		
			RA I AMDAR Stakeholders Seminar	Schedule around the end of 2013 or first quarter of 2014, to engage key stakeholders of the region relevant to RA I AMDAR IP, to discuss the roadmap for the implementation of the plan.	ET-ABO, SO/ARO, J.Ngamini, RA I FPs	Q2 2013	Q4 2014		<ul style="list-style-type: none"> <li>Contribute to the CAeM session in June 2014, and</li> <li>Contribute to the RA I Session in Dec. 2014.</li> </ul>	30K	
			Draft RA II IP		ADO, SO/ARO, Li Wei	Q2 2013	Q4 2013	0	RA II IP		
			Draft RA III IP		ADO, SO/ARO, J.Horler	Q2 2013	Q4 2013	0	RA III IP		
			Draft RA IV IP		ADO, SO/ARO, G.Fournier	Q2 2013	Q4 2013	0	RA IV IP		
			Draft RA V IP		ADO, SO/ARO, M.Esler	Q2 2013	Q4 2013	0	RA V IP		
			Draft RA VI IP		ADO, SO/ARO, S.Stringer	Q2 2013	Q4 2013	0	RA VI IP		
13	(d)	Polar ABO	Report on the availability of observations over polar regions		ET-ABO	Q3 2013	Q4 2013	0	Report to EC-PORS		
			Investigate and report on possible airlines/aircraft to enhance polar ABO coverage		ET-ABO, N.Jacobs			0	Report to EC-PORS		
14	(d)	Establish ASECNA requirements for Supplementary AMDAR Data			SO/ARO, J.Ngamini	Q2 2013	Q2 2014	0	Data Agreement with EUMETNET/E-AMDAR		

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
15	(d)	Optimise Existing Program Coverage	Determine existing potential coverage, capacity to provide the additional potential data & cost of doing so.	AMDAR Program Managers to provide potential vertical profile coverage. SO/ARO to make request.	ET-ABO, Operational Program FPs	Q1 2013	Q2 2014	1	Report to ET-ABO		
			Investigate WMO ability to admin. MoUs between NMHSs		SO/ARO	Q2 2013	Q2 2014	0	Report to ET-ABO		
16	(d)	Develop guidelines for AMDAR Program Dev.		Publish in relevant guide.	ET-ABO	Q3 2013	Q4 2014	0	Guidelines for AMDAR Prog. Dev.		
17	(d)	Attend meetings of relevance to global AMDAR dev.		This may include: <ul style="list-style-type: none"> <li>2 E-AMDAR TAG meetings;</li> <li>Others.</li> </ul>	SO/ARO, ET/ABO	Q2 2013	Q4 2014	1	Meetings attended. Reports produced for ET-ABO and Secretariat	15K	20K
18	(e)	Papers on Impact of AMDAR Data		1. Draft papers received 2. Papers reviewed 3. Papers published	SO/ARO, ET-ABO Review Team	2012	Q4 2013	1	Published papers	22K	
19	(e)	AMDAR Impacts and Benefits document for Aviation	Revise & Finalise Statement of Work		Ch/ET-ABO, SO/ARO	Q1 2013	Q2 2013	1	SoW		
			Seek Eols from consultants and commence and complete SSA.		Ch/ET-ABO, SO/ARO	Q3 2013	Q1 2014	0	SSA with selected Consultant and delivery of benefits document	15K	15K
20	(e)	AMDAR Promotion & Education Module	Develop SoW for Training Module	<ul style="list-style-type: none"> <li>Present SoW to ET/ABO for assessment;</li> <li>ET-ABO recommended proceed with development with COMET as joint project with NOAA</li> </ul>	Lead AMDAR Training & Outreach (C.Weiss)	Q3 2013	Q4 2013	4	SoW		

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
			ET-ABO to Work with COMET to produce AMDAR education module	The project will proceed through NOAA/NWS coordination and a contribution of 30K and likely an additional 30K. The Trust Fund will provide the remaining funding of 60K.	SO/ARO	Q1 2014	Q3 2014	1	<ul style="list-style-type: none"> <li>Expert advisory team formed by ET-ABO</li> <li>COMET Module produced.</li> </ul>	60K	Possible 30K
21	(e)	Attend Relevant Aviation Meetings	Attend AEEC DataLink Users Forum, Q1 2013, 2014		USA Rep.	Q1 2013	Q4 2014	4	Carl Weiss attended. Report received.	1.5K	2.5K
			Attend AEEC Data Link Users Forum, Q4 2013, 2014		E-AMDAR Rep.	Q4 2013	Q4 2014	0	Meeting attended; Report produced.	1.5K	2.5K
22	(e)	WMO AMDAR Newsletter	Produce Newsletter Vol 5		ET-ABO, AMDAR FPs, SO/ARO	Q2 2013	Q2 2013	4	Newsletter Vol 5		
			Produce Newsletter Vol 6		ET-ABO, AMDAR FPs, SO/ARO	Q4 2013	Q4 2013	0	Newsletter Vol 6		
23	(e)	Global AMDAR Program Development Workshops and Seminars			ET-ABO	Q2 2013	Q4 2014			30K	30K
24	(f)	Provide input to ICG-WIGOS/TT-WMD	Attend TT-WMD-1		S.Taylor, SO/ARO	Q1 2013	Q2 2013	1	Determine req. for input to TT-WMD		
25	(f)	Provide input to ICG-WIGOS/TT-WRM			J.v.d.Meulen	Q1 2013	Q4 2014	1	Determine req. for input to TT-WRM		
26	(f)	Contribute to the WMO/CBS RRR Process		Continuous process??	SO/ARO, ET-ABO	2012	Q4 2014	2	Input in RRR Database SoR Document/ input in RRR OSC Database		

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	2013 Budget Estimate	2014 Budget Estimate
27	(f)	Revision of AMDAR Regulatory Material in WIGOS context	<ul style="list-style-type: none"> <li>Revise current status.</li> <li>Develop plan for update process.</li> </ul>		J.v.d.Meulen	Q3 2013	Q4 2014	1	Plan for integration of AMDAR RM into WIGOS RM.		

### **Notes**

#### A. Status

- 0 Idea
- 1 Initiated/Commenced
- 2 Ongoing or In-progress
- 3 Review Deliverable
- 4 Deliverable accepted/Activity Completed

B. ET-ABO ToR: [http://www.wmo.int/pages/prog/www/CBS/Lists\\_WorkGroups/CBS/opag%20ios/et-abo/tors](http://www.wmo.int/pages/prog/www/CBS/Lists_WorkGroups/CBS/opag%20ios/et-abo/tors)

C. For context and long-term plans, see: [http://www.wmo.int/pages/prog/www/GOS/ABO/ABO\\_Work\\_Program.html](http://www.wmo.int/pages/prog/www/GOS/ABO/ABO_Work_Program.html)

**UPDATED WORK PLAN WITH STATUS FOR THE EXPERT TEAM ON AIRCRAFT-  
BASED OBSERVING SYSTEMS (ET-ABO) FOR THE PERIOD 2014-2015**

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
1	(a)	Compile ET-ABO work plan and budget.	1. 2014 WP & Budget 2. 2015 WP & Budget		Ch/ET-ABO	Q4 2013	Ong.	2	Work Plan, Ann. Budget 2014				
2	(a)	2015 Meeting of ET-ABO		Hold a meeting, 2 <sup>nd</sup> half of 2015. Requirements: <ul style="list-style-type: none"> <li>Agenda (Ch-ET-ABO);</li> <li>Meeting Form (SO/ARO)</li> </ul>	Ch/ET-ABO	Q1 2015	Ong.	1	Agenda, Meeting Form, Meeting	ET-ABO-1 held in Sep 2013	12K		
3	(b)	Establishment of AMDAR Metadata (national, international)	Finalise Imp. Plan		S.Taylor, SO/ARO	Q3 2013	Q4 2013	2	AMDAR Metadata IP				
			Incorporate metadata specification into draft Reg. Material		S.Taylor, SO/ARO	Q2 2013	Q1 2014	0	Metadata definition incorporated into WIGOS Reg. Mat.				
			Establish Metadata Pilot Project	Pilot project to test the exchange of metadata. Will need a recipient data centre (e.g. CMC or the AO Data Centre?) Funding possibly required for software development	S.Taylor, SO/ARO	Q4 2013	Q1 2014	0	Pilot project in place.				20K
4	(b)	Establish AO Data Centre	3. Write to pros. Centres; 4. Defined requirements of AO DC	Prospective centres: <ul style="list-style-type: none"> <li>NCEP</li> <li>CMC</li> <li>NOAA NCDC</li> <li>EUMETNET</li> <li>Panasonic Aviation</li> </ul> May require both establishment and ongoing funding support.	Ch/ET-ABO, SO/ARO	Q1 2013	Q4 2015	2	AO Data Centre	<ul style="list-style-type: none"> <li>Initial approaches made to prospective centers (Q3 2013)</li> </ul>		20K	50K
5	(b)	Document ABO QMS		Include: <ul style="list-style-type: none"> <li>Recomm. from Workshop on DM</li> </ul>	J.v.d.Meulen, ET-ABO	2012	Q4 2014	1	ABO QM Documented in WMO Reg. Mat.				

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
6	(b)	Revise and update AOP Data QC and QM procedures		Include: <ul style="list-style-type: none"> <li>Relevant recomm. From Workshop on DM</li> <li>Use of flags</li> <li>Policy on ICAO data QM</li> <li>Spec. of QC by DPCs/NMSHSS</li> <li>Reqs for NWP</li> <li>Radiosonde comparison</li> </ul>	J.v.d.Meulen, D.Body	Q4 2013	Q4 2014	0	QC Procedures updated in WIGOS Reg. Mat.				
		Improve QC and management of ADS Data	1. Provide requirements to ICAO		1. SO/ARO	Q4 2013	Q4 2013	0	1. Requirements developed & provided to ICAO				
7	(c)	Coordinate with CIMO TT-AO on Scientific & Technical Matters			Ch-ET-ABO, SO/ARO			2	Harmonised Work Plan & Budget for the ABO Program.	<ul style="list-style-type: none"> <li>Ch-TT-AO attended ET-ABO-1</li> <li>Vc-ET-ABO to attend TT-AO-1 as member</li> </ul>			
8	(c)	B777 Software Dev.	Finalise negotiations with AFR and KLM in consult. with E-AMDAR & Meteo-France.	<ul style="list-style-type: none"> <li>Combined action with TT-AO</li> </ul>	Ch/ET-ABO, SO/ARO, Ch-TT-AO, S.Stringer (E-AMDAR PM)	2012	Q4 2013	2	B777 AMDAR Software application	<ul style="list-style-type: none"> <li>Activity delayed in 2013 due to neg. with AFR and KLM.</li> </ul>	In TT-AO Budget	In TT-AO Budget	
9	(d)	Study on Data Cov. and Airline Capabilities	Complete study & publish		SO/ARO	Q1 2012	Q1 2013	4	Published study	Study completed and published.	15.9K (17K)		
10	(d)	Mexico Prog Implement.	<ol style="list-style-type: none"> <li>Finalise ARINC Contract</li> <li>Monitor contract &amp; data</li> </ol>		SO/ARO	2012	Q4 2014	2	Contract	<ul style="list-style-type: none"> <li>Contract with ARINC delayed</li> <li>WMO approval for contract provided in Nov 2013</li> </ul>	0K (54K)	30K (+12K depend. on operational timeline)	12K

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
11	(d)	Employ AMDAR Dev. Officer (ADO)			SO/ARO, Ch/ET-ABO, GF	Q1 2013	Q2 2014	2	Job Description, ADO employed.		30K (est)	60K	30K
12	(d)	Develop Global & Regional ABOP Imp. Plans	ABOP Strategy & Implementation Plan (A-SIP)	This may incorporate the following: <ul style="list-style-type: none"> <li>• WVSS Implementation</li> <li>• Letter to airlines based on consideration of Data Coverage &amp; Airline Targeting study;</li> <li>• Letter to PRs of relevant countries based on consideration of Data Coverage &amp; Airline Targeting study;</li> <li>• Letter to RAs.</li> </ul>	SO/ARO, Ch/ET-ABO, Vc/ET-ABO	Q1 2013	Q3 2013	4	1. A-SIP Completed and published; 2. Draft A-RIP Template completed.	Draft letters to PRs and RAs to be reviewed			
			Draft RA I IP	<ul style="list-style-type: none"> <li>• Possible that these plans can be developed in coordination with RA meetings.</li> </ul>	ADO, SO/ARO, J.Ngamini	Q2 2013	Q4 2013	2	RA I IP				
			RA I AMDAR Stakeholders Seminar	Schedule in 2 <sup>nd</sup> half of 2014 to engage key stakeholders of the region relevant to RA I AMDAR IP, to discuss the roadmap for the implementation of the plan.	ET-ABO, SO/ARO, J.Ngamini, RA I FPs	Q2 2013	Q4 2014		<ul style="list-style-type: none"> <li>• Contribute to the CAeM session in June 2014, and</li> <li>• Contribute to the RA I Session in Dec. 2014.</li> </ul>		0K (30K)	30K	
			AFIRS Trial in RA I	Investigate and, if feasible, implement a trial of AFIRS data provision within RA I.	J.Ngamini, ET-ABO, SO/ARO	Q1 2014	Q4 2014		<ol style="list-style-type: none"> <li>1. Data from trial obtained and analysed.</li> <li>2. Report to ET-ABO and CBS.</li> </ol>				20K
			Draft RA II IP		ADO, SO/ARO, Li Wei	Q2 2013	Q4 2013	2	RA II IP				
			Draft RA III IP		ADO, SO/ARO, J.Horler	Q2 2013	Q4 2013	2	RA III IP				
			Draft RA IV IP		ADO, SO/ARO, G.Fournier	Q2 2013	Q4 2013	2	RA IV IP				

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
			Draft RA V IP		ADO, SO/ARO, M.Esler	Q2 2013	Q4 2013	2	RA V IP				
			Draft RA VI IP		ADO, SO/ARO, S.Stringer	Q2 2013	Q4 2013	2	RA VI IP				
			Request collaboration with RAs	Responsible to write to RA President and request collaboration on the ABO-RIPs.	-ET-ABO, SO/ARO	Q4 2013	Q1 2014	2	Letters to Pr RAs compiled and sent.	Draft letter to be reviewed			
			Request collaboration with NMHSs	1. List of target NMHSs (based on target airlines) to be compiled; 2. Ch-ET-ABO to write to PRs of NMHS to request collaboration on programme development	Ch-ET-ABO, SO/ARO	Q4 2013	Q1 2014	2	Letters to target NMHSs compiled and sent.	Draft letter to be reviewed			
13	(d)	Polar ABO	Report on the availability of observations over polar regions		Ch-ET-ABO	Q3 2013	Q4 2013	2	Ch-ET-ABO to report to EC-PORS (24-28 Feb. 2014)				
			Investigate and report on possible airlines/aircraft to enhance polar ABO coverage	1. G.Fournier to follow up with Panasonic re Arctic coverage.	ET-ABO, N.Jacobs	Q3 2013	Q4 2013	2	Provide input to Ch-ET-ABO for report to EC-PORS				
14	(d)	Establish ASECNA requirements for Supplementary AMDAR Data			SO/ARO, J.Ngamini	Q2 2013	Q2 2014	0	Data Agreement with EUMETNET/E-AMDAR				
15	(d)	Optimise Existing Program Coverage	Determine existing potential coverage, capacity to provide the additional potential data & cost of doing so.	AMDAR Program Managers to provide potential vertical profile coverage. SO/ARO to make request.	ET-ABO, Operational Program FPs	Q1 2013	Q2 2014	2	Report to ET-ABO				
			Investigate WMO ability to admin. MoUs between NMHSs		SO/ARO	Q2 2013	Q2 2014	2	Report to ET-ABO				

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
16	(d)	Develop guidelines for AMDAR Program Dev.	<ol style="list-style-type: none"> <li>provide revised draft to ET-ABO</li> <li>Guidelines to be published in Man. or Guide on WIGOS</li> </ol>	Publish in relevant guide.	<ol style="list-style-type: none"> <li>Ch-ET-ABO, S.Taylor</li> <li>Review group, Task 28</li> </ol>	Q3 2013	Q1 2014	2	Guidelines for AMDAR Prog. Dev. Published in Reg. Material.	Draft document to br reviewed			
17	(d)	Attend meetings of relevance to global AMDAR dev.		This may include: <ul style="list-style-type: none"> <li>2 E-AMDAR TAG meetings;</li> <li>Participation in AAFRA conference (RA I, May 2014)</li> <li>Participation in ICAO/ASECNA meeting RA I (Aug 2014)</li> <li>Others.</li> </ul>	SO/ARO, ET/ABO	Q2 2013	Q4 2015	2	Meetings attended. Reports produced for ET-ABO and Secretariat	<ul style="list-style-type: none"> <li>SO/ARO attended E-TAG meetings 21 and 22 (2014) and 23, 24 (2015)</li> </ul>	3.2K (15K)	15K	15K
18	(e)	Papers on Impact of AMDAR Data		<ol style="list-style-type: none"> <li>Draft papers received</li> <li>Papers reviewed</li> <li>Papers published</li> </ol>	SO/ARO, ET-ABO Review Team	2012	Q4 2014	2	Published papers		9K (22K)	13K	
19	(e)	AMDAR Impacts and Benefits Documentation	Benefits for Aviation Document	<ol style="list-style-type: none"> <li>Revise &amp; Finalise Statement of Work</li> <li>Seek Eols from consultants and commence and complete SSA</li> </ol>	Ch/ET-ABO, SO/ARO	Q1 2013	Q1 2013	2	<ol style="list-style-type: none"> <li>SoW</li> <li>SSA with selected Consultant and delivery of benefits document</li> </ol>	Kick-off meeting held 9 December 2013	(0K) 15K	30K	
			ABO Benefits to Meteorology & Aviation Document	Work collaboratively with ABO Focal Points to compile a general ABO benefits document.	Ch/ET-ABO, SO/ARO, FPs Op. Programmes	Q3 2013	Q1 2014	2	ABO Benefits Document completed & published online.				
20	(e)	AMDAR Training Module	Develop SoW for Training Module	<ul style="list-style-type: none"> <li>Present SoW to ET/ABO for assessment;</li> <li>As per AMDAR-15, funding to be sought as ring-fenced item in TF.</li> </ul>	Lead AMDAR Training & Outreach (C.Weiss)	Q3 2013	Q4 2013	4	SoW	Completed			

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No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
			Investigate possible joint NOAA/WMO project to fund COMET to develop module.	<ol style="list-style-type: none"> <li>1. C.Weiss to investigate possibility within NOAA</li> <li>2. SO/ARO to investigate possibility within WMO</li> <li>3. If all ok, proceed to having funding approved</li> <li>4. Develop project in collaboration between NOAA, ET-ABO &amp; COMET</li> </ol>	C.Weiss, SO/ARO, Ch-ET-ABO, Vc-ET-ABO, Ch-TT-AO	Q1 2014	Q3 2014	1	Contract secured with COMET.	Kick-off meeting held 29 November 2013	30K from NOAA	60K (+30K from NOAA)	
21	(e)	Attend Relevant Aviation Meetings	Attend AEEC DataLink Users Forum, Q1 2013, 2015		USA Rep. (2013)	Q1 2013	Q4 2015	2	Attend meetings; report to ET-ABO;	Carl Weiss attended in 2013. Report received.	1.4K (1.5K)		2K
			Attend AEEC Data Link Users Forum, Q4 2013, 2014, 2015		E-AMDAR Rep. (2013)	Q4 2013	Q4 2015	2	Attend meetings; report to ET-ABO;	Meeting attended in 2013; Report produced.	1.5K (1.5K)	2K	2K
			Promote AMDAR & ABO at WMO/ICAO Joint Meeting, July 2014, Montreal	This may also potentially be used as the venue to launch a WMO/ICAO joint project on ABO development.	SO/ARO, Ch-ET-ABO	Q4 2013	Q3 2014	0	Report to ET-ABO on promotion activities.			Funding from Item 17	
22	(e)	WMO AMDAR Newsletter	Produce Newsletter Vol 5		ET-ABO, AMDAR FPs, SO/ARO	Q2 2013	Q2 2013	4	Newsletter Vol 5	Completed			
			Produce Newsletter Vol 6		ET-ABO, AMDAR FPs, SO/ARO	Q4 2013	Q4 2013	4	Newsletter Vol 6	Completed			
			Produce Newsletters Vols 7 & 8 (2-14) and Vols 9 &10 (2015)		ET-ABO, AMDAR FPs, SO/ARO	Q1 2014	Q4 2015	0	Newsletter Vol 7 & Vol 8; Newsletter Vol 9 & Vol10				
23	(e)	Global AMDAR Program Development Workshops and Seminars	1. Workshop in Region II, Mid-east.		ET-ABO	Q2 2013	Q4 2014	2	1. Region II Workshop			30K	

No.	ToR	Task	Sub-tasks	Description	Responsible	Commence	Complete	Status	Deliverables/ Activities	Progress	2013 Budget Expend	2014 Budget Estimate	2015 Budget Estimate
24	(e)	Maintain & Develop WMO ABO and AMDAR Websites	Operational programmes to produce a technical description of their programmes for the website	<ol style="list-style-type: none"> <li>SO/ARO to develop a template</li> <li>Operational programme managers to provide the input.</li> </ol>	SO/ARO, Op. Programme Managers	Q4 2013	Q3 2014	1	AMDAR Programme Technical Descriptions published online.				
			Investigate Cross-promotion from Av. Org. Websites	<ol style="list-style-type: none"> <li>SO/ARO to contact N.Halsey to investigate possibilities for ICAO website X-promotion;</li> <li>SO/ARO to contact H-R Sonnabend to investigate possibilities for IATA website X-promotion</li> </ol>	SO/ARO	Q4 2013	Q2 2014	0	X-promotion on ICAO and IATA websites				
25	(f)	Provide input to ICG-WIGOS/TT-WMD	Attend TT-WMD Meetings		S.Taylor, SO/ARO	Q1 2013	Ong.	2	Determine req. for input to TT-WMD	Commenced			
26	(f)	Provide input to ICG-WIGOS/TT-WRM	Attend TT-WRM Meetings		J.v.d.Meulen	Q1 2013	Ong.	2	Determine req. for input to TT-WRM	Commenced			
27	(f)	Contribute to the WMO/CBS RRR Process		Continuous process	SO/ARO, ET-ABO	2012	Ong.	2	Input in RRR Database SoR Document/ input in RRR OSC Database				
28	(f)	Revision of AMDAR Regulatory Material in WIGOS context	<ul style="list-style-type: none"> <li>Revise current status.</li> <li>Develop plan for update process.</li> </ul>	<ol style="list-style-type: none"> <li>First meeting of review team in early October 2013.</li> </ol>	ADO; J.v.d.Meulen, Ch-ET-ABO, A.Hoff, D.Body SO/ARO to form review team on Reg. Mat..	Q3 2013	Q4 2014	2	<ol style="list-style-type: none"> <li>Plan for integration of AMDAR RM into WIGOS RM.</li> <li>Commence and complete update of Reg. Mat. in Man. on WIGOS and Man. on GOS</li> </ol>	Commenced; ADO take lead.			

## Notes

D. Status

5 Idea

- 6 Initiated/Commenced
- 7 Ongoing
- 8 Review Deliverable
- 9 Deliverable accepted/Activity Completed

- E. ET-ABO ToR: [http://www.wmo.int/pages/prog/www/CBS/Lists\\_WorkGroups/CBS/opag%20ios/et-abo/tors](http://www.wmo.int/pages/prog/www/CBS/Lists_WorkGroups/CBS/opag%20ios/et-abo/tors)
- F. For context and long-term plans, see: [http://www.wmo.int/pages/prog/www/GOS/ABO/ABO\\_Work\\_Program.html](http://www.wmo.int/pages/prog/www/GOS/ABO/ABO_Work_Program.html)

**APPENDIX C**

**PROPOSED CHANGES TO THE TERMS OF REFERENCE OF THE EXPERT TEAM  
ON AIRCRAFT-BASED OBSERVING SYSTEMS (ET-ABO)**

None

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**APPENDIX D**

**TEMPLATE OF DRAFT RECOMMENDATION TO CBS**

**DRAFT RECOMMENDATION NO. ??? (CBS-EXT.(2014))**

**ENHANCEMENT AND EXPANSION OF AIRCRAFT-BASED OBSERVATIONS AND AMDAR IN LINE WITH THE GLOBAL ACTIONS OF THE CBS IMPLEMENTATION PLAN FOR EVOLUTION OF THE GOS**

THE COMMISSION FOR BASIC SYSTEMS,

**Noting:**

- (1) The operational status of the AMDAR observing system, as a component of the Global Observing System and the World Weather Watch Programme;
- (2) The overall significant and positive impact of the increasing availability of aircraft-based observations on the GTS;
- (3) The great potential to address deficiencies in upper air data coverage over many WMO Regions through further development and expansion of AMDAR and aircraft-based observations; and
- (4) The justification for the expansion and enhancement of aircraft-based observations based on the relevant global actions within the CBS Implementation Plan for the Evolution of the Global Observing System.

**Considering that:**

- (1) ) The CBS Expert Team on Aircraft-Based Observing Systems (ET-ABO) has undertaken a study that identifies many airlines that can be targeted by Members for participation in the AMDAR programme to address gaps in upper air data coverage;
- (2) ET-ABO has consolidated and updated standards and guidance material that can assist Members in the development of new AMDAR programmes; and,
- (3) Efficiencies in use of Member resources and more optimal data coverage can be achieved through regional collaboration on the planning and development of national aircraft-based observations programmes.

**Recommends that:**

- (1) CBS encourages Regional Associations and WMO Members to consider further and new development of aircraft-based observations, primarily through wider implementation of the AMDAR programme; and,
- (2) CBS endorses a process whereby Regional Associations and Members collaborate with CBS to develop, maintain and implement regional plans for the enhancement and expansion of aircraft-based observations and AMDAR, which might be maintained under the respective Regional WIGOS Implementation Plans of each Regional Association.

**Requests** CBS to request that the Secretariat provides support for the coordination of the development and maintenance of these planning and implementation activities through appropriate promotion to Members and at each Regional Association Session.

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