

WORLD METEOROLOGICAL ORGANIZATION

**AMDAR Panel Management Group Meeting
(4th Session)**

Geneva, Switzerland, 29 – 31 August 2012

(Updated 26 October 2012)

FINAL REPORT



EXECUTIVE SUMMARY

This Final Report provides minutes for the meeting and 4th Session of the AMDAR Panel Management Group, which took place over 29-31 August, 2012 at WMO, Geneva, Switzerland.

The Agenda for the Meeting is provided below with a list of appendices to this document. A summary of actions from the Meeting is provided within Annex VI.

ADOPTED AGENDA

- 1 Organization of the Meeting**
- 2 AMDAR Programme and Governance Transition Process**
- 3 Planning for AMDAR Panel Meeting Session XV**
- 4 Progress on the Aircraft Observations Work Programme**
- 5 Other Business**
- 6 Close**

APPENDICES

- I [List of Participants](#)**
- II [Recommended Text for Inclusion in Letters to PRs Requesting Continued Contribution to the AMDAR Trust Fund](#)**
- III [Extracts of CBS-XV Document 4.2\(1\) Relevant to Aircraft-based Observations](#)**
- IV [Terms of Reference of ET-ABO](#)**
- V [Notes on Status and Progress on 2012 Work Programme from AMPG-4 Review](#)**
- VI [AMDAR Panel Management Group Meeting Session 4 Actions](#)**

GENERAL SUMMARY OF THE WORK OF THE SESSION

1 OPENING AND ORGANIZATION OF THE MEETING

- 1.1 The 4th Session of the AMDAR Panel Management Group (APMG) was opened by the Chair of the AMDAR Panel, Mr Frank Grooters at 9am on the 29 August, 2012 at Geneva, Switzerland. The participants at the Meeting are provided within [Appendix I](#).
- 1.2 The Director of the Observing and Information Systems Branch, Dr Wenjian Zhang, welcomed participants to the Meeting on behalf of WMO and thanked the APMG for their contribution to the work of the WMO AMDAR Panel as members of the APMG. Dr Zhang spoke of the satisfaction of WMO and its Members with the successful and continued development of the AMDAR observing system under the governance of the AMDAR Panel and the work done in overseeing the finalization of the transition of the AMDAR programme to the WMO World Weather Watch Programme under the future governance of the WMO CBS and CIMO Technical Commissions. Dr Zhang informed the APMG that at the recent Workshop on The Impact of Various Observing System on NWP (Sedona, May 2012), it had once again been demonstrated that the AMDAR system continued to rank highly among those systems that significantly and positively impacted on NWP skill and ability. Dr Zhang urged the APMG and the Panel Members to take note of the outcomes and recommendations from the Sedona Workshop that might impact on future AMDAR system development and the associated work programme and in particular mentioned the noted high impact on NWP of AMDAR wind observations over tropical areas. Dr Zhang emphasized the need for continued global expansion of the Global AMDAR Programme, and especially for programme development with Regional Association I, where the benefits would be significant in improving upper air data coverage.
- 1.3 The APMG agreed on the above Adopted Agenda and the detailed agenda that was developed prior to the meeting and provided to participants via the AMDAR Projects & Collaboration meeting site.

2 AMDAR PROGRAMME AND GOVERNANCE TRANSITION PROCESS

2.1 Outcomes for ICT-IOS

ICT-IOS-7 Final Report

- 2.1.1. Mr Frank Grooters (Chair) provided a presentation on and summary of his report as Chairman of the CBS Expert Team on Aircraft-based Observations (ET-AIR) to the Implementation and Coordination Team on Integrated Observing Systems (ICT-IOS) 7th Session held in June 2012. In addition to reporting on the status of the AMDAR Programme, the report also provided a proposal made by the APMG for a new governance structure for the AMDAR Programme under WMO, which would address the issues that were raised at the last AMDAR Panel Meeting (Session 14, Quebec City, November 2012) and further considered by the APMG at its 3rd Session (Silver Spring, USA, February 2012). In particular, the proposal would address these issues through the following mechanisms:

1. Proposal of an Expert Team under CIMO.

This proposed replacement of the Theme Leader on Aircraft Measurements would allow the role of the AMDAR Panel to be split between two Expert Teams, with the existing and ongoing CBS team taking on the aircraft-based observations programme development role (see below), whilst the CIMO team should have responsibility for the technical and standards-related aspects. Envisaging that the two teams would meet every 2nd year in alternative years, this will allow those Members with an interest in meeting annually to attend both meetings. It is expected that, within the limitations of reasonable logistics and resources, Members will be able to continue to have representation in addition to the core membership at ET Meetings, at the expense of their own organization as is consistent with current arrangement for attending AMDAR Panel meetings. The structure also addresses the imbalance in CIMO representation in relation to aircraft-based observations.

2. Management of the AMDAR Trust Fund.

The APMG has proposed updated Terms of Reference for the AMDAR Trust Fund that would ensure that the Trust Fund continued to be maintained in the future in support of the ongoing work of the Aircraft-based Observations programme under the management of the chairs of the ET(s) and the Secretariat (SG through the Aircraft Observations Unit). These ToR, which have been submitted to CBS for approval, are provided in the Attachment.

3. Work Programme under the CBS and CIMO Expert Teams.

The existing work programme of the AMDAR Panel would be fully integrated into the formal Work Plans of the ETs. With a division of the work programme in this way and more formal responsibilities falling to a second ET, this arrangement would also cut down on the coordinative and administrative load of the Secretariat. Until CIMO has agreed on the establishment of the proposed CIMO Expert Team, the related ToR and Work Programme is (for the time being) included in the proposed ToR for Et-ABO. This proposed ToR and related activities are provided in the Attachment.

2.1.2. The ICT-IOS supported the recommendations made in relation to the transition of AMDAR to CBS, including the process to be followed, a timeline for implementation, and a draft recommendation for adoption by CBS-XV, which included the continuation of the Expert Team on Aircraft-based Observations (ET-ABO) and for CBS to work with CIMO as appropriate in order to develop an appropriate structure for AMDAR related activities and a work programme for aircraft-based observations within CIMO.

2.1.3. The APMG recommended that the finalization of the transition process is accepted by the Panel members and that the Panel should therefore cease activities after the 15th Session of the AMDAR Panel and formally hand over full programmatic and governance management of the AMDAR Programme to WMO under the WWW Programme.

Contribution to EGOS-IP for publishing and translation

- 2.1.4. The Chairman informed the meeting that the Panel was requested by ICT-IOS to consider a contribution of 10,000 CHF to the costs of translation and publication of the CBS Implementation Plan for Evolution of the GOS. The APMG agreed that this contribution was justified and appropriate in light of the number of significant actions related to AMDAR Programme development and the advantage gained from being able to make use of the publication for planning purposes and coordination with WMO Members and Regions on AMDAR.

2.2 Communication with Focal Points

- 2.2.1. The Chairman informed the APMG that a letter had been sent to all AMDAR Focal Points that explained the progress that had been made in addressing the issues relating to the transition process and recommended that, based on acceptance of the proposal made to ICT-IOS and CBS, that the Panel Members agreed to the finalization of the transition process in 2012, with the cessation of Panel activities to be formalized and concluded at the 15th Session of the AMDAR Panel in November 2012. The Chairman advised that no comments or objections had been raised by Members and that the APMG should therefore conclude that all Members were in agreement with this recommendation.

2.3 Letter to PRs of AMDAR Members

- 2.3.1. The APMG considered what other requirements there might be to ensure all stakeholders are informed regarding the finalization of the transition process and agreed that subsequent to AMDAR Panel 15th Session, the Panel Chairman should write to AMDAR Panel Member PRs and inform them of the outcomes regarding the transition process and the AMDAR Panel cessation of activities. The APMG developed and agreed upon text that might be utilized by the Chairman in the letter to be sent to WMO Member PRs regarding the requirement to continue supporting the AMDAR Programme through continued contribution to the AMDAR Trust Fund. This text can also be utilized as appropriate by the Secretariat in the annual letter sent to Member PRs to WMO formally requesting their contribution to the AMDAR Trust Fund. The text is provided within Appendix II

Action: Panel Chairman, subsequent to Panel-15, to write to AMDAR Panel Member PRs to inform them of outcomes in relation to the transition process.

2.4 Recommendation made to CBS

- 2.4.1. The APMG reviewed the text within CBS-XV relevant to AMDAR: Agenda Item 4.2, (1), DECISIONS FOR THE OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS, INCLUDING THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM AND THE WMO SPACE PROGRAMME relevant to AMDAR and the background information document. A small modification in the text of the background document was proposed, accepted and made and all other text agreed and approved by the APMG. The extracted texts relevant to AMDAR from the 2 documents under CBS Agenda Item 4.2 are provided within [Appendix III](#).

Recommendation to CIMO

- 2.4.2. The APMG was advised by the Secretariat that the President of CIMO had been informed regarding the proposal made to CBS in relation to the governance structure and the intention to consult with CIMO on its proposed role. It was suggested by the Secretariat that the APMG should submit a document to the CIMO Management Group Meeting (October 2012), through the CIMO Theme Leader on Aircraft Measurements to notify CIMO management of the proposal and formalize the request for creation of the CIMO ET.

Action: Dr Axel Hoff and the Secretariat to prepare a document to present to CIMO MG (October 2012) regarding the creation of an Expert Team for aircraft-based observations within the CIMO structure.

ToR for AMDAR Trust Fund

- 2.4.3. The APMG reviewed and approved the Draft Terms of Reference for the AMDAR Trust Fund as proposed to CBS-XV (see [Appendix III](#)) but agreed that these ToR would also be subject to further review by the Secretariat to ensure compliance with WMO regulations and policy.

Action: The Secretariat to request review of the new AMDAR Trust Fund Terms of Reference by WMO Legal Counsel and Finance in preparation for review by the Panel and subsequent approval by WMO SG.

Action: Panel Chairman to present final Trust Fund ToR to Panel-15.

ToRs of ETs

- 2.4.4. The APMG reviewed and agreed with the Terms of Reference for the Expert Team on Aircraft-Based Observations (ET-ABO) as approved by ICT-IOS-7 and submitted to CBS-XV. These ToR are provided within [Appendix IV](#). The APMG also agreed that, subject and subsequent to the process and outcome of the establishment of an ET within CIMO, these ToR would require adjustment to reflect the role of the CIMO ET and a reduction in the responsibilities of ET-ABO accordingly.

Work Plans of ETs

- 2.4.5. The APMG agreed that the Panel should develop a draft Work Plan for ET-ABO, to be based on and consistent with the current AMDAR Panel and CBS/ET-AIR work programme and to propose to the CBS Management Group at its next meeting.

Action: The Panel (Session 15) to draft a proposed Work Plan for ET-ABO.

Action: Dr Axel Hoff to include a draft Work Plan in the document to CIMO MG (October 2012).

2.5 Membership of ETs

- 2.5.1. It was agreed that the Secretariat should recommend to CBS that, Mr Frank Grooters would take on the role of Chair of ET-ABO and Mr Gilles Fournier the role of Vice-chair

subject to the relevant approvals of CBS-XV and respective PRs. Based on the nominations to CBS from Members that had been made, the APMG also discussed a possible ET-ABO core and associate membership that might be considered by CBS MG.

Action: Chair of ET-ABO to send an email to AMDAR FPs after the Panel Meeting to explain the working of ET-ABO in relation to core and associate membership.

2.6 New governance process

2.6.1. The APMG discussed possibilities for the working of the governance, work program and budget under the new structure with the following considered desirable:

- Until the CIMO ET was established and subject to CBS-XV approval, ET-ABO should retain full responsibility for the work programme and budget supporting the Aircraft-based Observations programme.
- Upon formation of the CIMO ET, each ET should annually develop a separate work programme and budget under the direction and procedures of the relevant Technical Commission Management Group, which would (both) be approved by the Aircraft-based Observations Programme Management Group, ideally consisting of the Chairs of both ETs and the WMO SG's delegate from the Secretariat.
- The Chair of the CIMO ET should be a member of ET-ABO and the Chair of ET-ABO a member of the CIMO ET.
- ETs should be open to invitations from PRs to host the meeting at a location that is most economic and strategic from a budget and programme development standpoint respectively.

2.7 Next Meeting of ET-AIR/ET-ABO

2.7.1. The APMG agreed that, ideally the next meeting of the CBS Expert Team on Aircraft-based Observations should take place in the first half of 2013.

3 Planning for AMDAR Panel Meeting Session 15

3.1 Turbulence Workshop Agenda

3.1.1. The APMG discussed the participants, format and agenda for the upcoming Technical Workshop on Turbulence on 5 November 2012, preceding the AMDAR Panel Meeting and organized collaboratively with the USA FAA and NOAA. It was agreed that the proposed program reflected the topics and aspects of turbulence that were previously suggested and discussed at the AMDAR Panel Management Group Meeting Session 3 (APMG-3, February 2012).

3.1.2. **Action:** The Secretariat to ensure suggested list of invitees receive notification of the Workshop.

3.2 Meeting Agenda

- 3.2.1. The APMG discussed the draft Agenda, Document Plan and invitations for the upcoming WMO AMDAR Panel Meeting 15th Session, Boulder, 6-9 November 2012 and determined the following actions were required.
- 3.2.2. **Action:** The Secretariat to ensure that an agenda item for the Panel Meeting to follow up on outcomes from the Workshop was appropriately placed on the Panel Meeting Agenda and that Dr Tammy Farrar was invited to attend the Meeting and be present for the relevant agenda item.
- 3.2.3. **Action:** The Secretariat to issue an invitation to Dr Lars Peter Riishojgaard, CBS ICT-IOS Chair, to attend the Panel meeting.
- 3.2.4. **Action:** The Secretariat to issue an invitation to Dr Ralph Petersen to attend the Panel Meeting and make a presentation on the outcomes relevant to AMDAR, of the Workshop on Impact of Various Observing Systems on NWP (Sedona, May 2012).
- 3.2.5. **Action:** The Secretariat to invite Mr Neil Halsey, ICAO to address the issue of ADS data quality management, if he is attending the Meeting.
- 3.2.6. **Action:** Carl Weiss to ensure that the Information for Participants document for the Meeting is made available by 14 September.
- 3.2.7. **Action:** The Secretariat to ensure there is an appropriate agenda item for the Panel Meeting for Stewart to provide a report on his attendance at the AEEC Datalink Users Forum meeting (Sep 2012), which he would attend representing E-AMDAR and the Panel.
- 3.2.8. **Action:** The Secretariat to issue an invitation to COMET to make a presentation at the Panel Meeting and to ensure the agenda and schedule accommodates this.

3.3 Handling of Cessation

- 3.3.1. As a result of the discussions and decisions relating to item 2 above, the APMG determined no barriers or issues with the expected cessation of the AMDAR Panel at the upcoming Panel Meeting. The Panel Chairman would be responsible for the agenda item related to this issue and seek the agreement of Panel Members in the finalization and cessation of AMDAR Panel business.
- 3.3.2. The APMG agreed that the AMDAR “brand” was a very significant aspect of the AMDAR Programme that should be retained under the new administration of the WMO Technical Commissions. In particular, the APMG would request that the AMDAR Panel logo might be altered accordingly and continued to be used by WMO in the promotion and administrative documentation of the AMDAR Programme by WMO and its Members.
- 3.3.3. **Action:** Chairman of Panel to organize and present the Panel Meeting agenda item concerning Panel cessation.
- 3.3.4. **Action:** Mr Stewart Taylor to contact the designer of the AMDAR Panel logo to ascertain if they are willing and able to modify the logo on behalf of the Panel.

3.4 Side Visits

- 3.4.1. The APMG agreed that, at the invitation of NOAA, it would be a high priority to visit the offices of the Global Systems Division of the Earth System Research Laboratory during the AMDAR Panel Meeting.

4 Progress on the Aircraft Observations Work Programme

4.1 Workshop on DM outcomes, recommendations and reporting

- 4.1.1. Mr Dean Lockett provided a presentation on the outcomes and recommendations from the AMDAR Panel Workshop on Aircraft Observations Data Management, which was held over 5-8 June 2012 at WMO, Geneva. The report from the Workshop is available on the WMO Aircraft Observations website [here](#).
- 4.1.2. **Action:** The CIMO Theme Leader on Aircraft Measurements to address the issue of the AMDAR air temperature bias, initially through the development of a plan as a component of the work programme of the appropriate Expert Team.
- 4.1.3. **Action:** The Panel Chairman to request that Mr Jitze Van der Meulen continue with the task of documenting the Aircraft-based Observations Quality Management Framework and the Data Management Framework in consistency with the recommendations of the Workshop.
- 4.1.4. **Action:** The Panel Chairman to request that Dr Jitze Van der Meulen take the lead on the task of developing a strategy and implementation plan for resolving the ADS data management issue, including any requirements for modification of the BUFR template or GTS headers.
- 4.1.5. **Action:** The Secretariat and Panel Chairman to ensure that WMO (through the Aeronautical Meteorological Division) indicates support for the [IATA proposal](#) at the 7th meeting of the ICAO World Area Forecast System Operations Group (WAFSOPSG), 17-21 Sept, Lima and requests report of the outcome for AMDAR Panel-15.
- 4.1.6. **Action:** The Panel Chairman to respond to NCDC regarding a potential role as Aircraft-based Observations Data Centre.

4.2 WIGOS PP for AMDAR

- 4.2.1. The APMG discussed the status of the WIGOS Pilot Project for AMDAR and the Chairman advised that, based on discussion at CBS/ICT-IO5-7 (June 2012), there was no longer a requirement for the activities for this project to be reported to CBS and that any remaining activities or task should be integrated into the work programme for the Panel and ET-AIR.

Implementation Plan for Metadata

4.2.2. Mr Stewart Taylor submitted and presented a document, AO Metadata Implementation Plan, with a draft plan for implementation of the Aircraft-based Observations metadata management system based on the outcomes and recommendations from the Workshop on AO Data Management.

4.2.3. **Action:** Mr Stewart Taylor to update the AO Metadata Implementation Plan to include the following elements: 1) Infrastructure requirements; 2) Tasks; 3) Timeline.

4.3 WIGOS-IP

4.3.1. The Meeting was informed by the Secretariat that a draft WIGOS Implementation Plan had been drafted and would be presented to CBS for approval. The APMG was requested to consider appropriate representation from among the Aircraft-based Observations and AMDAR experts on the various CBS and inter-Programme Expert and Task Teams.

4.4 National Programme Development

Possible TF Support for Development Officer(s) for RA I, III

4.4.1. The APMG considered the past approach of the AMDAR Panel to development of AMDAR over data-sparse areas, particularly within Regions I and III and agreed that, while there had been many promising leads and commencements of AMDAR programme developments in various countries arising from the workshops that the Panel had conducted and local independent initiatives, there appeared to be a requirement for a more centrally coordinated and ongoing approach to such budding AMDAR developments in order to sustain them and provide the required technical support and advice to the relevant NMHS and airline contacts and stakeholders. It was proposed that the APMG and the AMDAR Panel consider the appointment of an AMDAR Development Officer (ADO) funded from the AMDAR Trust Fund through a WMO Special Services Agreement and reporting to the Aircraft Observation Unit in the Secretariat. While one approach to this appointment might be the employment of an appropriately qualified consultant, another that might be considered would be for the AMDAR Trust Fund to fund resources for the functions of the AMDAR Development Officer to be carried out within an existing National or Regional AMDAR Programme. It was agreed that Global AMDAR Programme development should be based on the outcomes of the Study on Data Coverage and Airline Capabilities currently underway and expected to be completed in the 2nd half of 2012.

4.4.2. While it was agreed that it was advisable and necessary to work through the relevant Regional Associations to encourage and nurture AMDAR programme development and growth and all RAs should develop and maintain AMDAR Development Plans, it was also acknowledged that the approach of working directly with national NMHS and airline representatives, once identified, offered the most likely chance of success.

4.4.3. **Action:** The Secretariat and the Panel Chairman to draft a Description of Work for an AMDAR Development Officer to potentially be employed part-time for 12 months commencing in 2013 and with the primary role of international coordination of AMDAR programme development.

- 4.4.4. **Action:** The Panel Chairman to draft letters to all Regional Associations regarding Regional AMDAR Development plans and the possibility of working with an ADO.

RA I

- 4.4.5. The APMG considered the invitation from Airlines Association Of Southern Africa (AASA) and the South African Weather Service for WMO and the AMDAR Panel to participate in the Annual General Meeting of the AASA (Mozambique, 18-21 October) as a member of a panel on aviation safety, which would afford a limited opportunity to promote the AMDAR Programme as a contributor to improvement to weather-related aviation safety. The APMG agreed that, while the opportunity was limited within the formal AASA AGM proceedings and that a significant sponsorship fee was required to participate, leading to an estimated AMDAR Trust Fund requirement for support of around 10,000 CHF, the priority for development of AMDAR over Region I and the opportunity to liaise with important airline industry operators in Southern Africa should be taken. However, the APMG requested that SAWS and WMO also seek alternative sources for funding the sponsorship fee, possibly through the WMO Programme for Least Developed Countries.
- 4.4.6. Mr Stewart Taylor reported that Ethiopian Airlines and Rawandair are considering fleet expansion in the future and that these airlines, in addition to Kenya Airways should be considered when targeting airlines for programme development.
- 4.4.7. **Action:** The Secretariat (SO/ARO) to seek approval of D/OBS and SG to represent WMO and the AMDAR Panel at the AASA AGM.
- 4.4.8. **Action:** The Secretariat and Focal Point for South Africa to investigate possible funding alternatives for the required sponsorship fee for participation in the AASA AGM.
- 4.4.9. **Action:** Mr Stewart Taylor to follow up with ARINC on possibilities for collaboration with RA I airlines.

RA II Programs

- 4.4.10. The Secretariat advised that there has been recent interest shown by Qatar Airways in participating in the AMDAR Programme. Contacts in both the Airline and the meteorological service have been established.
- 4.4.11. The APMG discussed countries such as Saudi Arabia and the United Arab Emirates that had shown strong interest and progress in developing AMDAR programmes but had not come to fruition, underlining the need for ongoing and continued collaboration with WMO and AMDAR experts.
- 4.4.12. The Chairman reported that the E-AMDAR Quality Evaluation Centre had advised of an apparent issue with encoding of negative pressure altitudes for Japanese FM42 messages on the GTS.
- 4.4.13. **Action:** The Secretariat to advise the AMDAR Focal Point for Japan regarding this issue and request rectification.

RA III

4.4.14. The APMG discussed the considerable interest within RA III, particularly by Brazil, Argentina and Peru in the development of AMDAR Programmes with national airlines.

4.4.15. The AMDAR Focal Point for Argentina, Mr Juan Horler advised the Meeting that Argentina was currently receiving test AMDAR data from Aerolineas from the Airline's Embraer fleet and sought and received advice from the APMG on the matter of requirements for reporting frequency and transmission on the GTS. Mr Horler provided the APMG with avionics surveys from both Aerolineas and LAN Argentina with the latter also having expressed an interest in participating in the AMDAR Programme.

4.4.16. The Chairman advised that Brazil was now receiving and utilizing ADS data and that Brazil was seeking to develop an AMDAR Programme with national airlines.

4.4.17. Actions:

- The Secretariat to provide advice to Argentina on the requirements for frequency of reporting for AMDAR;
- The Secretariat to provide Argentina with a contact in ARINC for discussions on data processing and encoding and transmission in BUFR;
- The Secretariat to provide advice to Argentina on possible development or provision of AMDAR software for the LAN Argentina A320 fleet;

RA IV

4.4.18. The Secretariat advised that development of the AMDAR Programme with the Mexican meteorological service (SMN) and Aeromexico in collaboration with ARINC was progressing with the terms for a programme and contract largely agreed between ARINC and WMO/Aircraft Observation Unit, however, the process of meeting the requirements of the WMO Procurements and Contracts Committee was still to be concluded.

4.4.19. The APMG was advised of the interest of Hawaiian Airlines in developing an AMDAR Programme in cooperation with NOAA and within the USA MDCRS Programme.

RA V

4.4.20. The Chairman reported that the E-AMDAR Quality Evaluation Centre had advised that the Australian AMDAR Programme was reporting null (NIL) FM 42 reports on synoptic hours, which, although required for some observation GTS reports, were not required for these data.

4.4.21. **Action:** The Secretariat to seek clarification from the Bureau of Meteorology or WMO Information Systems Branch regarding this issue and its resolution.

4.5 Data Coverage

- 4.5.1. The APMG discussed the issue of what has previously been referred to as “targeted” AMDAR data, meaning AMDAR data made available by an AMDAR Programme outside of its normal mandated observing programme and region through an arrangement with another NMHS. The APMG agree that this data should be referred to as “supplementary” AMDAR data to avoid confusion with the term and practice relating to targeted data or observations, which is the generation of additional data from an observing system in order to meet the requirements of meteorological applications to monitor or predict a particular weather event. The Meeting agreed that it would be advantageous and more efficient to take a more formal and, perhaps WMO led approach to the international administrative aspects related to generation of supplementary AMDAR data.
- 4.5.2. Mr Stewart Taylor provided a report on the current status of the various agreements and arrangements with other NMHS for the provision of Supplementary AMDAR Data from the E-AMDAR Programme, particularly over Africa.
- 4.5.3. The following actions arose from this report and the subsequent discussion:
- **Action:** E-AMDAR Management Team to discuss SAWS requirements for data provision in support of their Regional Programme. Any changes to requirements will be amended in the Data Licence Agreement.
 - **Action:** The Secretariat to liaise with the AMDAR FP for ASECNA and ascertain the requirement for provision of supplementary AMDAR data from E-AMDAR and identify the funding source for the required data.
 - **Action:** The Secretariat to survey operational AMDAR Programme Managers to determine the extent and availability of potential supplementary AMDAR data.
 - **Action:** The Secretariat to investigate the potential for WMO to administer an “International Supplementary AMDAR Data Programme”.

4.6 Training & Outreach

- 4.6.1. The APMG reviewed the proposal from COMET related to the possible development of an AMDAR training module for which the APMG had provided input and requirements through several meetings with COMET subsequent to AMDAR Panel Session 14.
- 4.6.2. **Action:** Mr Carl Weiss to request COMET to provide a costing for producing a “preview” or “prototype” module for presentation to the AMDAR Panel (Session 15).
- 4.6.3. The Meeting discussed the use of social media such as Facebook, Twitter and LinkedIn as a vehicle for AMDAR outreach activities and agreed that recent discussions on LinkedIn had generated considerable interest and participation from airline industry contacts and representatives and served to promote and raise awareness of AMDAR among some key aviation people. It was agreed that the Aircraft-based Observations Programme should investigate the potential for wider use of these media in the future.
- 4.6.4. **Action:** Mr Carl Weiss and the Secretariat to ensure that the ACARS forum on LinkedIn is notified of future Newsletter publications.

4.7 AMDAR Science

- 4.7.1. The Meeting discussed the issue of future risks and opportunities associated with current and potential future avionics and aviation communications developments that might present risks and or opportunities for the Aircraft-based Observations Programme. It was agreed that this issue should be more actively addressed within the programme.
- 4.7.2. **Action:** The Panel to consider the requirement and terms for a study on Future Avionics and Communications Technology Affecting AMDAR under a WMO SSA funded by the AMDAR Trust Fund.

Water Vapor Implementation Plan

- 4.7.3. Dr Axel Hoff presented to the Meeting, a draft document developed by Dr Hoff and Mr Dean Lockett, Implementation Plan for Water Vapor Sensing Capability for AMDAR, which outlines a draft strategy and plan for an international collaborative approach to water vapor measurement utilizing the WVSS-II sensor.
- 4.7.4. The following actions were identified:
- **Action:** Dr Axel Hoff and Mr Dean Lockett to add reference to the FAAM and Denchar aircraft trials to the IP.
 - **Action:** Mr Frank Grooters, Dr Axel Hoff and Mr Dean Lockett to look at an appropriate way to approach and refresh negotiations with Airbus to integrate WVSS into Airbus infrastructure.
 - **Action:** Dr Axel Hoff and Mr Dean Lockett to work on the Justification section of the IP.
 - **Action:** Dr Axel Hoff to present the updated version of the IP to the AMDAR Panel Meeting Session 15.

Temperature bias and correction

- 4.7.5. See agenda item 4.1.

Update to CIMO Guide

- 4.7.6. Dr Axel Hoff presented the draft update to chapter 3 of the CIMO Guide pertaining to Aircraft Observations. The following actions were requested:
- **Action:** Dr Hoff to coordinate a review of the updated chapter by Dr Jitze Van der Meulen and Mr Dean Lockett by AMDAR Panel-15.

4.8 Business Cases

- 4.8.1. The APMG discussed the ongoing requirement to ensure the development and availability of an aviation sanctioned business case for describing the benefits of the AMDAR Programme to aviation. This was also identified as a significant missing element of the AMDAR Programme by the contractor undertaking the SSA on Data Coverage and Airline Capabilities. The AMDAR Panel should again address this issue at AMDAR Panel-15

4.9 SSA Generic Specification

4.9.1. The Secretariat provided a brief progress report on the Special Services Agreement project for development of the generic AMDAR functional software specification. This project is documented online at the AMDAR Projects & Collaboration website, available to Panel Members on request. Although behind schedule, this project is otherwise proceeding well with monthly reports being made by the consultant.

4.10 SSA Data Coverage and Airline Capabilities

4.10.1. The Secretariat provided a brief progress report on the Special Services Agreement project for the Study on Data Coverage and Airline Capabilities. This project is also documented online at the AMDAR Projects & Collaboration website and, although also behind schedule, the project is otherwise proceeding well with monthly reports being made by the consultant.

4.11 SSA AMDAR Impact Paper

4.11.1. The Secretariat informed the Meeting on the status of the SSA pertaining to the commissioning of the paper on AMDAR impact by Dr Ralph Petersen, which is progressing on schedule and as expected. The project is also documented online.

4.11.2. The Meeting discussed that Dr Petersen had provided to the APMG some preliminary work on an estimation and comparison of several observing systems including AMDAR which had demonstrated a significant economic advantage for AMDAR; however Dr Petersen had advised that his work required further analysis and qualification.

4.11.3. **Action:** The Secretariat to request that Dr Petersen further this work, possibly either as a component of the AMDAR impact paper or else as a stand-alone document.

4.12 Review of Work Programme

4.12.1. The APMG reviewed the 2012 Work Programme. A summary of notes on status and progress of the 2012 work programme is provided within [Appendix V](#).

4.13 AEEC DLUF Users Forum Meeting (Ireland, Sep 2012)

4.13.1. The APMG agreed that Mr Stewart Taylor would represent the AMDAR Panel at the upcoming AEEC Datalink Users Forum Meeting to be held in Ireland in September 2012.

4.13.2. **Action:** Mr Dean Lockett and Mr Carl Weiss provide input to Mr Stewart Taylor's presentation to be made to the AEEC DLUF Meeting.

5 Other Business

5.1 SITA Proposal

5.1.1. The Secretariat reported that several meetings had been held with SITA and with the AMDAR Focal Point for Australia with regard to the possible development of an AMDAR

Application for the SITA cloud IT system. The APMG received a presentation from Mr Thierry LeGall from SITA which demonstrated the concepts and the proposed architecture. The APMG agreed that this system could potentially provide new and existing AMDAR Programmes with a convenient and turnkey solution for AMDAR data reception, quality control, optimization and retransmission with minimal infrastructure costs.

5.2 AirDat and TAMDAR

5.2.1. The APMG was advised by the Secretariat that AirDat would visit WMO on 18 October 2012 to discuss the TAMDAR system and the possibilities for future collaboration with the Aircraft-based Observations Programme.

5.3 Teledyne Controls Software Development for ACMS

5.3.1. The APMG met with Ms Julia Rafailova from Teledyne Controls (TC) who provided a presentation on Teledyne technologies and possible services to and collaboration on AMDAR. The APMG agreed that it would be highly desirable to work with TC towards the possible implementation of a generic AMDAR application that might be available from one or more of the Teledyne aircraft avionics systems, in particular through the Teledyne ACMS "Add-on" library. The APMG determined that the best approach for possible collaboration with TC would be to finalize the AMDAR software Generic Specification currently underway with the aim of providing it as the AMDAR software standard for implementation within avionics systems. The following actions were proposed:

- **Action:** The Secretariat to provide TC with appropriate information and diagrams on AMDAR data flows.
- **Action:** The Secretariat to add Ms Rafailova to AMDAR Newsletter distribution list.
- **Action:** The Secretariat to advise TC when the final version of the AMDAR software Generic Specification is available.

6 Close

The Meeting closed at around 3pm on 31 August 2012.

APPENDIX I
List of Participants

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Participated by Teleconference:

APPENDIX I

List of Participants

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APPENDIX II

Recommended Text for Inclusion in Letters to PRs Requesting Continued Contribution to the AMDAR Trust Fund

As AMDAR Panel activities continue their transition into formal WMO structure, it is important to clarify the financial implications of this move. Historically, Panel activities (including funding the position of the Technical Coordinator) were funded by the AMDAR Trust Fund. The Trust Fund has been funded in large part by voluntary contributions from member states.

Under the new structure, the AMDAR Panel functions will be replaced by an Expert Team on Aircraft-based Observations (ET-ABO) under CBS and eventually a second expert team under CIMO. The integration of AMDAR activities into WMO also allows for support from the WMO regular budget. This support is in the form of funding for:

- Secretariat support for technical coordination of the aircraft-based observations programme; and,
- The AMDAR related activities of the relevant WMO Technical Commissions.

Included in this process is the continuation of the AMDAR Trust Fund and the voluntary contributions by the members. The Trust Fund will be used to support activities such as but not limited to:

- travel to meetings by core ET members in the event the WMO general budget cannot provide support;
- assistance to nations seeking to establish their own AMDAR programmes;
- appropriate WMO administrative costs in support of activities specified in the work plans of the ETs;
- administrative costs incurred by consultant work;
- purchase of equipment and software deemed necessary by the ET work plans; and,
- support for other activities required to meet the ToRs and ET work plans.

It is therefore important that, in line with the Resolution 3 by Cg-XVI (2011), Members continue providing contributions to the AMDAR Trust Fund for the support of technical developments and capacity-building related to AMDAR.

APPENDIX III

Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

From 4.2 (1), Appendix A:

4.2 Decisions for the Open Programme Area Group on Integrated Observing Systems, including the WMO Integrated Global Observing System and the WMO Space Programme (agenda item 4.2)

...

Aircraft-based observations

4.2.3.5 The Commission appreciated the progress made in the transition of the AMDAR programme into the WMO WWW Programme under a new governance structure within CBS supported by the Secretariat. It agreed with the transition plan proposed by the OPAG-IO Implementation Coordination Team at its Seventh session (Geneva, 18-22 June 2012) at the end of which all AMDAR activities are transferred to the appropriate CBS and CIMO working structure. At this time the AMDAR Panel at its final session (Boulder, Colorado, 5-9 November 2012) will cease to operate; however the AMDAR Trust Fund will continue to support activities related to aircraft-based observations under the new governance, recalling the request of Cg-XVI urging Members to continue providing contributions to the AMDAR Trust Fund.

4.2.3.6 The Commission noted recent developments in water vapour measurement for AMDAR and the promising results in the validation of a water vapour sensor through intercomparison with standard instrumentation on research aircraft. It acknowledged that this sensor meets the requirements for wider operational implementation.

4.2.3.7 The Commission recognized the efforts made by Members operating AMDAR programmes to increase the coverage of AMDAR observations over data sparse areas through AMDAR programme expansion and enhancement and encouraged its continuation in line with the associated actions in the Implementation Plan for the Evolution of the Global Observing Systems (EGOS-IP).

APPENDIX III

Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

From 4.2 (1), Background Information Document:

Aircraft-based observations

14. Over the inter-sessional period, ET-AIR has met conjointly with the AMDAR Panel in three sessions. Together, the ET and the Panel have developed and maintained a joint and harmonized work plan that has ensured significant achievements in the work programme of both.
15. The Global AMDAR Programme now comprises 33 airlines, over 2800 aircrafts, and provides around 300,000 observations per day on the GTS.
16. Recent significant programme enhancements include the expansion and improvement of AMDAR data coverage over key areas including Alaska, Africa, the Southwest Pacific and Antarctica and also the completion of an update to the ARINC 620 specification for standardized AMDAR reporting.
17. A contract has been put in place with a consultant for the development of the standard AMDAR software specification of requirements and will ensure a more uniform approach to AMDAR software functionality and data quality.
18. The Panel has also contracted a consultant to undertake a study on the current AMDAR Programme data coverage, carry out a survey of airlines and their operations with respect to the identified data-sparse areas and then propose a set of recommendations for future targeted AMDAR programme development in order to strategically improve AMDAR data coverage.
19. The WIGOS Pilot Project for AMDAR has been well advanced over the inter-sessional period. In particular, a new BUFR Template for AMDAR has been developed, submitted to the IPET-DRC and approved through the fast-track process in 2012.
20. A Workshop on Aircraft Observing System Data Management was held 5-8 June 2012 in Geneva. The outcomes and recommendations of that workshop will lead to further development of the Quality Management System and data and metadata management framework for aircraft-based observations.
21. Considerable progress has been made in the validation of the WVSS-II water vapour sensor through inter-comparison with standard instrumentation on research aircraft, for which the results have been extremely promising and adding to evidence that the sensor meets requirements for full operational implementation. Installations of the latest version of the sensor are well advanced in the USA and likely to commence shortly in the E-AMDAR and Australian AMDAR programmes.
22. The Panel has obtained the full specification of the turbulence algorithm that is currently deployed operationally in the USA. The Panel will review and analyse this information with the intention of developing a strategy and plan for international implementation of this improved turbulence reporting capability for AMDAR.

APPENDIX III

Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

23. The AMDAR Panel and the Secretariat have established a quarterly WMO AMDAR Panel Newsletter, with the first three volumes published in 2012. The newsletter was distributed by email and also made available online
24. The AMDAR Panel has taken a strong role in AMDAR programme expansion through the provision of training and workshops, such as the Regional AMDAR Workshop held in Mexico City, Mexico in November 2012. It will be important that these types of activities continue in the future under the changes being made and proposed to the aircraft-based observations programme and its governance.
25. The transition of AMDAR to WWW under was now near completion and would be finalized by the following actions:
- Finalisation of the governance and programmatic structure under the WMO Technical Commissions and WWW Programme, including new terms of reference for the continuation of the management of the AMDAR Trust Fund after the cessation of the AMDAR Panel;
 - Support in the 17th Financial period (after Cg-XVII) for the aircraft-based observations programme activities from the WMO regular budget.
26. The Plan for Transition of AMDAR Panel activities into the WWW and CBS structures is in the **Annex** to this paragraph.

...

Annex to paragraph 26

THE PLAN FOR THE TRANSITION OF AMDAR ACTIVITIES INTO THE WWW AND CBS STRUCTURES

Background

The WMO AMDAR Panel came into existence under its original Terms of Reference in March 1998 with the following underlying mandate:

The Panel is recognized as a body within the WMO structure, with the endorsement of the WMO Executive Council, fostering active cooperation among Members in the implementation and operation of AMDAR as a component of the WWW Composite Observing System.

Background information on the AMDAR Panel and its current Terms of Reference are available at: <http://www.wmo.int/amdar/AMDARPanel.html>

Whilst WMO has played a key role in providing the AMDAR Panel with administrative support through the Secretariat and in the administration of the AMDAR Trust Fund, both WMO and the Panel have agreed that eventually, once considered by the Panel to be operational, with standards well-defined, the AMDAR system and the governance and programme that supports

APPENDIX III

Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

it, should be fully integrated into WMO under the World Weather Watch Programme and managed by the CBS and CIMO Technical Commissions.

Both the Panel and the Secretariat have made all the necessary arrangements and steps for this process to be near completion and, at the Joint Meeting of the AMDAR Panel and the CBS Expert Team on Aircraft-based Observations in Quebec City, Canada in November 2011, it was agreed that the AMDAR Panel Chairman and the AMDAR Panel Management Group (APMG), should consult with the Secretariat, CBS and CIMO in order to develop and finalize an appropriate governance and programmatic structure and a timeline for the integration process that will ensure that the work of the Panel and its work programme continues in line with WMO Member requirements.

At the third session of the APMG, held in Silver Spring, USA in early 2012, the APMG consulted with Dr Frederick Branski (President CBS) and Dr LarsPeter Riishøjgaard (Chair ICT-IOS) and reached the following decision:

The APMG agreed to work through a process that might allow a proposal for completion of the transition and a new governance structure under the WWW to be presented to the AMDAR Panel 15th Session in November 2012 and to possibly come into effect immediately following this meeting. In order to achieve this and ensure a viable proposal is made, the APMG would, under advice from the Secretariat and the Technical Commissions management, make recommendations and proposals as appropriate to ICT-IOS (May 2012) and CBS-15 (Sep 2012). The APMG would work with Secretariat in ensuring that Panel Members were advised and consulted regarding the transition process in advance of the next Panel Meeting.

A draft proposal for a new programmatic structure for the governance of the aircraft-based observations system under the World Watch Programme, to be managed by the WMO Technical Commissions and the WMO Secretariat on behalf of WMO Members was presented for consideration by CBS.

Aircraft-based Observations Programme Governance Transition

Original Governance Structure

The original governance and programmatic structure of the AMDAR Observing system under the AMDAR Panel is shown in Figure 1 below.

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Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

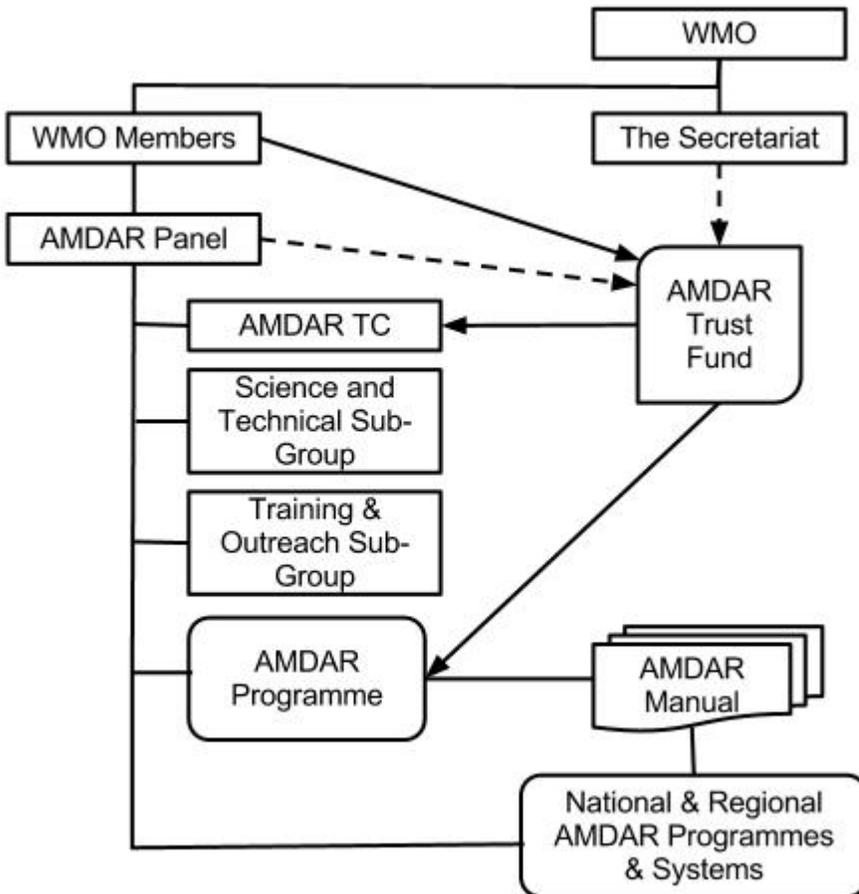


Figure 1: Governance and programmatic structure before integration into WMO. Solid arrows represent funding support and dashed arrows represent funding management.

Current Structure within WMO

Over the past 5 years, the AMDAR Panel, ET-AIR and the Secretariat have undertaken and completed the following activities towards integration of the AMDAR Programme into WMO:

1. Move the responsibility for AMDAR from the WMO Commission for Aeronautical Meteorological (CAeM) to the Commission for Basic Systems (CBS). (Completed);
2. Creation of a new Aircraft Observation Unit (AIR) within the WMO Observing Systems Division (OSD), with the responsibilities for aircraft-based observations. With the newly created AMDAR Technical Co-ordinator position in the WMO Secretariat as the lead for AIR. (Completed);
3. Establish a new Expert Team on Aircraft-based Observations (ET-AIR). (Completed);

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4. The inclusion of AMDAR experts in the Commission for Instruments and Methods of Observations (CIMO) working structure, Upgrading the Global Upper-Air Network (Completed);
5. The provision in the WMO Secretariat's regular budget for the AMDAR Technical Coordinator (2012 – 2015). (Completed).

In addition to the continuation of the AMDAR Trust Fund, there is a need to seek further funding from the regular budget (2015 onwards) to support aircraft-based observations activities under the relevant WMO Programmes.

These steps have now led to the development of a governance and programmatic structure within WMO, which includes a CBS Expert Team on Aircraft-based Observations under OPAG-IOS and the appointment of a Theme Lead on Aircraft Measurements within CIMO under the OPAG-SI. Work has commenced on the integration of AMDAR manuals and reference material into WWW manuals and guides.

Issues with the Current Structure

The AMDAR Panel Management Group (Session 3, 2012), in seeking to address the concerns of the AMDAR Panel regarding the transition and integration process, which inevitably would lead to the cessation of AMDAR Panel activities, identified the following aims and requirements of the governance and programmatic structure within WWW:

The new structure should ensure that:

1. The existing operational aircraft-based observing system continues to be developed and maintained;
2. A programmatic structure is developed that will allow the system to continue to develop in line with the CBS Implementation Plan for the Evolution of the Global Observing System;
3. The work programme of the AMDAR Panel, which is defined within the [Aircraft Observing System Programme Plan](#) continues to be addressed under the new structure, in line with Member requirements and under agreement with the appropriate WMO Technical Commissions management and processes;
4. The AMDAR Trust Fund continues to support the development of the AMDAR observing system and associated activities into the future, including the implementation of water vapour and turbulence measurement.

Proposed Governance and Programmatic Structure

In order to address the issues identified by the AMDAR Panel Members, the following proposal for an altered programmatic structure and new Terms of Reference has been proposed by the APMG to ICT-IOS and CBS. The chief differences between this structure and the one depicted

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Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

in Figure 2, are: the proposed creation of a new Expert Team within CIMO, in place of the Theme Leader; the confirmation of the continuation of the operation of the AMDAR Trust Fund in support of the aircraft-based observations work programme under new Terms of Reference; and, the role of the two Expert Teams under their respective work programmes dividing the work programme of the AMDAR Panel and ET-AIR under the coordination of the Secretariat within the Observing Systems Division.

WMO Aircraft Observing System Governance and Programme

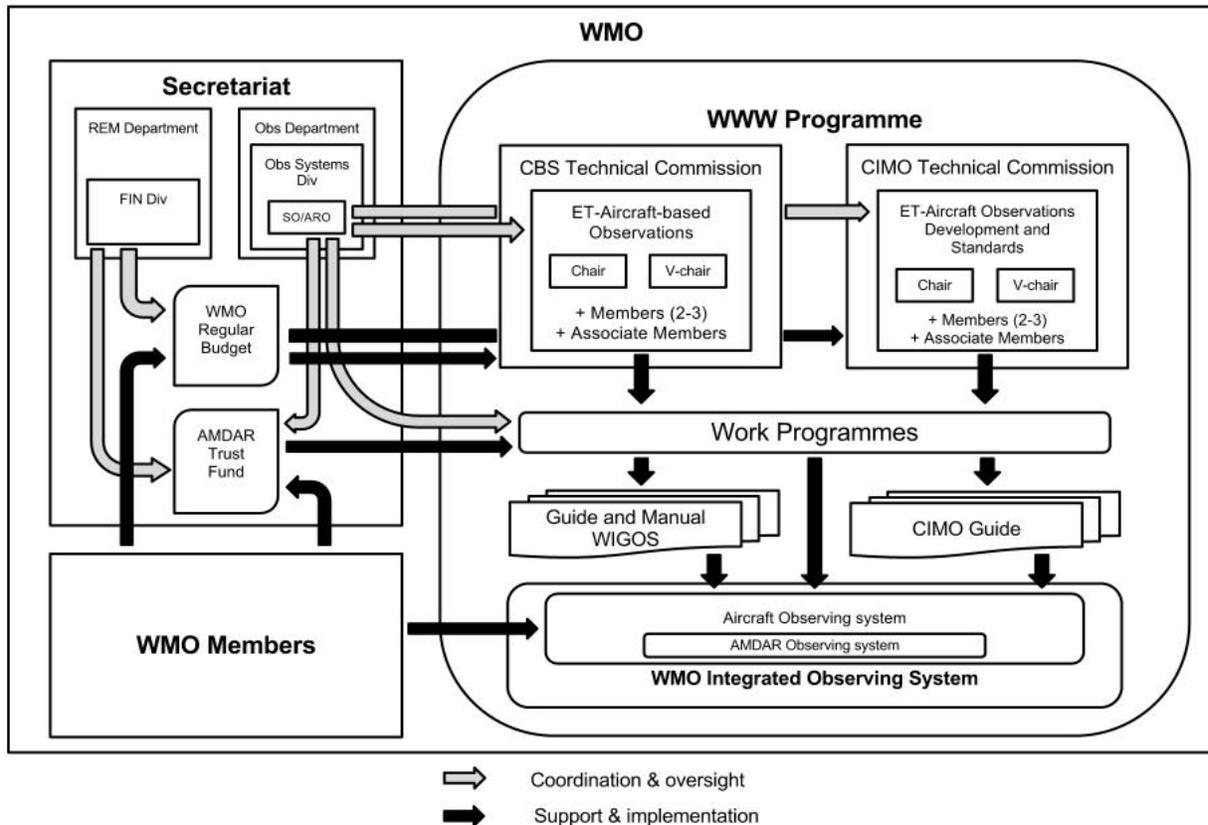


Figure 23¹: Proposed aircraft-based observing system governance and programmatic structure.

Addressing the Issues

The proposed structure addresses the issues as identified above in the following ways:

1. The creation of an Expert Team under CIMO will allow the role of the AMDAR Panel to be split between two Expert Teams, with the CBS team taking on the aircraft-based observations programme development role (see below), whilst the CIMO team should have responsibility for the more technical and standards-related aspects. Envisaging that the two teams would meet every 2nd year in alternative years, this will allow those Members with an interest in meeting annually to attend both

¹ Correction made to original text submitted to CBS.

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- meetings. With a division of the work programme in this way and more formal responsibilities falling to a second ET, this arrangement will also cut down on the coordinative and administrative load of the Secretariat;
2. It is expected that, within the limitations of reasonable logistics and resources, Members will be able to continue to have representation at ET Meetings, at the expense of their own organization as is consistent with current arrangement for attending Panel meetings;
 3. A concept for new Terms of Reference for the AMDAR Trust Fund are defined below;
 4. The imbalance in CIMO representation in relation to aircraft-based observations is addressed.

Until such time as CIMO has been consulted and agreed to the proposed final governance and programmatic structure, it will be necessary to retain the current structure with the responsibility for programme management and operation of the AMDAR Trust Fund (see below) within CBS under the Terms of Reference that have been proposed for the OPAG-IOS Expert Team on Aircraft-based Observations.

Proposed Terms of Reference for Operation of the AMDAR Trust Fund

1. The AMDAR Trust Fund is a Trust Fund within the provisions of Articles 9.7, 9.8 and 9.9 of the WMO Financial Regulations (1991 edition);
2. The unit of account shall be the Swiss Franc. When commitments are made, the appropriate funds will be converted, as necessary, to the currency of commitment in at least the amount of the commitment.
3. The income of the AMDAR Trust Fund will include:
 - (a) Annual voluntary contributions;
 - (b) Funds deposited for specific purposes, hereafter referred to as deposits;
 - (c) Other contributions;
 - (d) Interest on investments as may be made by the Secretary-General in accordance with the provisions of Financial Regulation 12.2;
 - (e) Miscellaneous income.
4. Expenditure of the Trust Fund should be based on the budget for expenditure supporting the work programme of aircraft-based observations programme, as developed by the aircraft-based observations programme management;
5. Approval of requisitions for all expenditure from the AMDAR Trust Fund must be approved by the delegate of the SG within the Secretariat;
6. Expenditure of the AMDAR Trust Fund outside of the budget supporting the work programme must be approved by the delegate of the WMO SG and the aircraft-based observations programme management;

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Extracts of CBS-XV Document 4.2(1) Relevant to Aircraft-based Observations

7. The funds will be used to:
 - (a) Assist in the establishment and operation of programmes of automated meteorological reporting from aircraft;
 - (b) Meet appropriate administrative costs incurred by WMO in providing support to the aircraft-based observations work programme activities;
 - (c) Meet other administrative costs including such items as meetings and consultants;
 - (d) Purchase specified items of equipment and software;
 - (e) Support other activities required to meet the ToR and work programme.
8. Where required by their internal regulations, individual contributors to the AMDAR Fund may wish to negotiate additional conditions governing the application, conditions of deposit and disbursement of funds. Such additional conditions shall not inhibit the efficient and proper use of the AMDAR Trust Fund nor modify the intent of the Fund. They shall require the acceptance in writing by the aircraft-based observations programme management and the Secretary-General of WMO or his delegate;
9. All funds credited to the AMDAR Trust Fund, including those for VCP purposes, shall be subject to these Terms of Reference;
10. In line with the request of Cg-XVI, the Secretariat should continue to seek contributions to the AMDAR Trust Fund from Members on an annual basis in support of technical developments and capacity-building related to aircraft-based observations programme;
11. The AMDAR Trust Fund will be closed when all remaining funds are exhausted.

Proposed Process and Timeline for Completion of the Transition of AMDAR to WWW

The following process and timeline is suggested in order to complete a transition to the proposed final structure.

1. Submission of proposal to CBS-15 (Sep 2012) [ICT-IOS Chair and Secretariat];
2. Cessation of AMDAR Panel (Nov 2012, Session 15) [AMDAR Panel Chair];
3. Meeting (Session 4) of CBS ET-Aircraft-based Observations (2013);
4. Finalization of CIMO role and structure in support of aircraft-based observing system, CIMO-XVI (2014).

If this process is successfully completed, then the Terms of Reference of each CBS and CIMO team would be subsequently redefined and defined as appropriate.

APPENDIX IV

Terms of Reference of ET-ABO

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

- (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.

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from APMG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
1.1.1	Study on data coverage and airline capabilities	1	1. Award SSA	1. APMG	<ul style="list-style-type: none"> SSA awarded in Mar 2012
			2. Manage SSA	2. SO/ARO	<ul style="list-style-type: none"> Commenced
			3. Review deliverables.	3. SO/ARO, A-FPs, (APMG)	<ul style="list-style-type: none"> TBC
1.1.2	Development of AMDAR Programmes for: <ul style="list-style-type: none"> Northern Africa; South and Central America; Southwest Pacific Eastern Europe; Middle East Central Africa. 	1	1. Organise finance for AeroMexico programme.	1. APMG, SO/ARO	<ul style="list-style-type: none"> Commenced
		2	2. Determine potential for data targeting over Africa	2. APMG	<ul style="list-style-type: none"> S.Taylor provided a report to APMG-4 on E-AMDAR capabilities; Survey to be conducted of operation programmes (see Appendix VI Action for 4.5)
		2	3. Determine what capacity there is to use targeted data in Africa	3. APMG	<ul style="list-style-type: none"> Some discussion at Workshop on DM but no other progress.
		2	4. 1 or 2 members of the Panel to undertake fact-finding mission to Africa re programme potential	4. APMG	<ul style="list-style-type: none"> Address in 2013
		3	5. Investigate approach for Emirates AMDAR Programme commencement – assess possibilities for Bahrain, Oman: <ul style="list-style-type: none"> Write generic letter to appropriate PRs and contacts through the Secretariat. 	5. F.Grooters	<ul style="list-style-type: none"> No progress
			6. Write to WMO Regional Association I	6. F.Grooters	<ul style="list-style-type: none"> No progress
1.1.3	Improve and extend Targeted Data Activities	2	All programmes to identify potential for data targeting within their programs. <ol style="list-style-type: none"> Request info from A-FPs Submit information Analyse data Report to APMG-4 	<ol style="list-style-type: none"> SO/ARO A-FPs (Operational) SO/ARO SO/ARO 	<ul style="list-style-type: none"> Survey to be conducted of operational programmes (see Appendix VI Action for 4.5)

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from AMPG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
1.1.4	Develop guidelines for programme development	2	<ol style="list-style-type: none"> 1. Write DoW 2. Review and approval 3. Compilation of Guidelines 	<ol style="list-style-type: none"> 1. SO/ARO 2. APMG 3. SSA or A-FPs? 	<ul style="list-style-type: none"> • No progress.
1.1.5	Contribute to the WMO/CBS RRR Process	1	<p>Develop a methodology for defining the required capabilities for inclusion in the RRR database.</p> <p>Provide data for input to the RRR Obs Systems Capabilities database</p>	SO/ARO	<ul style="list-style-type: none"> • Work will progress on this through the WIGOS Implementation Plan.
1.2.1	<p>Develop optimization systems for:</p> <ul style="list-style-type: none"> • United States AMDAR Programme; • Asia; • Africa; • South America. 	2	<ol style="list-style-type: none"> 1. Study on optimization for Sth Africa AMDAR Programme 2. Study on optimization for US AMDAR Programme (MDCRS) 3. Report on Australian Data Optimisation System 4. SITA Optimisation Development 	<ol style="list-style-type: none"> 1. SO/ARO, G.Khambule 2. SO/ARO, D. Helms 3. SO/ARO, A-FP-Australia 4. SO/ARO seek Pilot Project proposal from SITA. 	<ul style="list-style-type: none"> • Work progressing on 1 through possible SITA development; • No update provided on 2; • Report to Panel-15 • Collaboration with SITA is ongoing.
2.1.1	Implement water vapour sensing measurement	1	1. Investigate Panel ownership of general STC for Airbus 320 family.	1. A.Hoff	<ul style="list-style-type: none"> • No progress.
		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	<ul style="list-style-type: none"> • Status not known.
		1	3. Write a letter to PRs seeking interest in international project for WV implementation	3. SO/ARO	<ul style="list-style-type: none"> • Operational programmes were surveyed on WV IP.
		2	4. Request SSI to provide a "dynamic" document on STC status, issues and processes	4. SO/ARO	<ul style="list-style-type: none"> • Completed by Bryce Ford.
		1	5. Draft a strategic plan for WV implementation	5. SO/ARO, A.Hoff, D.Helms	<ul style="list-style-type: none"> • Commenced.
		2	6. Obtain statements of impact of WVSS-II on airline operations from USA airlines.	6. F. Grooters	<ul style="list-style-type: none"> • Commenced.
2.2.1	Implement turbulence measurement	1	1. Obtain specification for EDR from FAA	1. SO/ARO	<ul style="list-style-type: none"> • Completed.
		1	2. Obtain EDR software package from FAA for use in E-AMDAR	2. SO/ARO	<ul style="list-style-type: none"> • Completed.

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from APMG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
4.1.1	WIGOS Pilot Project for AMDAR	1	1. WIGOS-PP-AMDAR-1 Development of BUFR Template: <ul style="list-style-type: none"> • Coordinate validation; • Report to Code Group • Report to APMG-3; • Report to JM-4 	1. SO/ARO ECMWF/Met Office	<ul style="list-style-type: none"> • Completed.
		1	2. WIGOS-PP-AMDAR-2 Metadata Development: <ul style="list-style-type: none"> • AP-FPs and Review Group to review Metadata sets; • D.Helms to review and define metadata categories; • AP-FPs and Review Group to Review in preparation for AMDAR DM Workshop 	2. PL-IDEQC, SO/ARO, AP-FPs Review Group: SO/ARO, N.Halsey, D.Helms, J.v.d.Meulen,	<ul style="list-style-type: none"> • WIGOS-PP-AMDAR is now no longer maintained as a WIGOS project – roll this project into appropriate areas of the work programme; • Addressed at Workshop on AO Data Management; • S.Taylor working on a implementation plan.
		1	3. WIGOS-PP-AMDAR-3 Develop AMDAR Data Management Procedures: <ul style="list-style-type: none"> • Hold a workshop of AMDAR data management experts in Q2 2012 (Geneva); • Develop a strategy for global AMDAR data management; • Address data display issues; 	3. J.v.d.Meulen, APMG	<ul style="list-style-type: none"> • Workshop held June 2012; • Draft DM Framework skeleton proposed; • See App VI, Item 4.1.
		1	4. WIGOS-PP-AMDAR-4 Validation and Inter-comparison of WVSS-II: <ul style="list-style-type: none"> • Paper on summary of results and conclusions: <ul style="list-style-type: none"> • DoW • Award SSA • Manage SSA • Seek endorsement by CIMO and CBS as a candidate system for operational deployment by Members; • Technique employed by the WVSS-II sensor should be appropriately integrated into the CIMO Guide and CBS guides. • Development of AMDAR Panel Statement of Support for WV implementation leading to WMO endorsement. 	4. APMG	<ul style="list-style-type: none"> • Statement of Support drafted; • These tasks to be incorporated into the WVM Implementation Plan (Activity 2.1.1.6).

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from AMPG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
		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.	1. 1. APMG, SO/ARO 2. APMG 3. A.Hoff	<ul style="list-style-type: none"> • No progress.
		1	6. WIGOS-PP-AMDAR-6 Generic Software Spec: 1. Manage SSA; 2. Review deliverables.	2. 1. SO/ARO; 2. Review group: SO/ARO, D.Helms. HR.Sonnabend, A.Hoff.	<ul style="list-style-type: none"> • Good progress via SSA; • 3rd draft of chapters 1 to 3 in progress.
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	<ul style="list-style-type: none"> • Ongoing
4.2.1	Develop a National and Global Aircraft Observations Data Management Framework	2	1. Re NOAA/ESRL/GSD AMDAR data display determine: <ul style="list-style-type: none"> • Future maintenance of and for this system • Possible change to use of national aircraft IDs 	1. D.Helms	<ul style="list-style-type: none"> • No progress.
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	<ul style="list-style-type: none"> • Completed.
4.3.2	Standardisation of AMDAR within Aviation	3	1. Commence planning for an Aviation Industry event for 2013 re software implementation in new aircraft. 2. Attend the Airlines Association of South Africa AGM, South Africa	1. APMG 2. APMG G.Khambule, 3. APMG	<ul style="list-style-type: none"> • No Progress.
4.3.3	AMDAR Software Development	2	B777 Software Development: 1. Proposal of B777 software development to be made to Meteo-France and E-AMDAR at E-TAG (March 2012) 2. Ownership issues to be addressed at E-TAG (March 2012) 3. Chairman to report to Panel-15 (Q4)	1. F.Grooters 2. APMG	<ul style="list-style-type: none"> • Ongoing.
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	<ul style="list-style-type: none"> • Completed.

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from AMPG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
5.1.1	Aircraft Observations System Website Maintenance	2	1. Review website.	2. C.Weiss, SO/ARO, Y.Lemaitre, J.v.d.Meulen	<ul style="list-style-type: none"> Commenced; Require significant changes to accommodate cessation of Panel and new governance under CBS, CIMO.
		3	1. Technical contractor to update website.	3. SO/ARO	<ul style="list-style-type: none"> No progress.
5.1.2	Impacts and Benefits Document for Aviation	2	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> APMG SO/ARO, B.Ford APMG F.Grooters, SO/ARO 	<ul style="list-style-type: none"> No progress.
5.1.3	AMDAR COMET Training Module	3	Contact COMET re development of a AMDAR course.	APMG(C. Weiss), SO/ARO	<ul style="list-style-type: none"> See App VI, 4.6.
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)	<ul style="list-style-type: none"> SSA in place; Contractor attended Sedona Workshop; Ongoing.
5.1.5	Attend Aviation Meetings	2	Panel to attend AEEC DLUF Meetings in Europe and USA	APMG	<ul style="list-style-type: none"> S.Taylor to attend AEEC DLUF in Sep 2012, see App VI, 4.13.
5.2..1	Aircraft Observations Newsletter production	2	Newsletters Q1, Q2, Q3, Q4	C-TOSG, SO/ARO,APMG, AP-FPs.	<ul style="list-style-type: none"> Newsletters Vol 1-3 published.
N/A	AMDAR Panel Admin	1	1. Update of AMDAR Panel ToR	APMG	<ul style="list-style-type: none"> Completed. Work now subsumed by governance transition process.
N/A	AMDAR Panel Admin	1	2. Manage and finalise the transition of the AMDAR Observing System to WMO	APMG	<ul style="list-style-type: none"> In progress and ongoing
6.1.1	Organization of Panel Meetings	1	1. Confirm meeting location and date	APMG	<ul style="list-style-type: none"> Completed.
			2. Venue and meeting logistics	Host	<ul style="list-style-type: none"> Completed or ongoing.
			3. Info for participants	Host	<ul style="list-style-type: none"> Commenced.
			4. Doc Plan draft	APMG	<ul style="list-style-type: none"> Completed.

APPENDIX V

Notes on Status and Progress on 2012 Work Programme from AMPG-4 Review

M-T Activity	Description	Pty (1-3)	2012 Activities	Responsibility	Comments
			5. Doc Plan	APMG, SO/ARO, A-FPs	• Completed.
			6. 2012 Panel Meeting	SO/ARO, (APMG)	• TBC
6.1.2	Organization of AMDAR Panel Management Group Meetings	1	Organise and hold APMG Session 3	APMG, SO/ARO	• Completed.
			Organise and hold APMG Session 4	APMG, SO/ARO	• Completed.
6.2.1	Reporting and planning associated with ICT-IOS, CBS and ET-AIR	1	1. Finalisation of ET- Work Plan 2013 - 2016 2. ET-AIR Report to CBS	1. APMG 2. ET-AIR Chair	• Completed.
		1	3. Review of EGOS IP	3. APMG	• Completed.

APPENDIX VI

AMDAR Panel Management Group Meeting Session 4 Actions

Agenda Item	Action	Responsible	Due
2.3	Panel Chairman, subsequent to Panel-15, to write to AMDAR Panel Member PRs to inform them of outcomes in relation to the transition process.	Frank Grooters	4 th Qtr 2012
2.4	Dr Axel Hoff and the Secretariat to prepare a document to present to CIMO MG (October 2012) regarding the creation of an Expert Team for aircraft-based observations within the CIMO structure.	Axel Hoff	Oct 2012
2.4	The Secretariat to request review of the new AMDAR Trust Fund Terms of Reference by WMO Legal Counsel and Finance in preparation for review by the Panel and subsequent approval by WMO SG.	Dean Lockett	Oct 2012
2.4	Panel Chairman to present final Trust Fund ToR to Panel-15.	Frank Grooters	Panel-15
2.4	The Panel (Session 15) to draft a proposed Work Plan for ET-ABO.	AMDAR Panel	Panel-15
2.4	Dr Axel Hoff to include a draft Work Plan in the document to CIMO MG (October 2012).	Axel Hoff	Oct 2012
2.5	Chair of ET-ABO to send an email to AMDAR FPs after the Panel Meeting to explain the working of ET-ABO in relation to core and associate membership.	Frank Grooters	4 th Qtr 2012
3.1	The Secretariat to ensure suggested list of invitees receive notification of the Workshop.	Dean Lockett	Oct 2012
3.2	The Secretariat to ensure that an agenda item for the Panel Meeting to follow up on outcomes from the Workshop was appropriately placed on the Panel Meeting Agenda and that Dr Tammy Farrar was invited to attend the Meeting and be present for the relevant agenda item.	Dean Lockett	Oct 2012
3.2	The Secretariat to issue an invitation to Dr Ralph Petersen to attend the Panel Meeting and make a presentation on the outcomes relevant to AMDAR, of the Workshop on Impact of Various Observing Systems on NWP (Sedona, May 2012).	Dean Lockett	Oct 2012
3.2	The Secretariat to invite Mr Halsey, ICAO to address the issue of ADS data quality management, if he is attending the Meeting.	Dean Lockett	Oct 2012
3.2	Carl Weiss to ensure that the Information for Participants document for the Meeting is made available by 14 September.	Carl Weiss	14 Sep 2012
3.2	The Secretariat to ensure there is an appropriate agenda item for the Panel Meeting for Stewart to provide a report on his attendance at the AEEC Datalink Users Forum meeting (Sep 2012), which he would attend representing E-AMDAR and the Panel.	Dean Lockett	Oct 2012
3.2	The Secretariat to issue an invitation to COMET to make a presentation at the Panel Meeting and to ensure the agenda and schedule accommodates this.	Dean Lockett	Oct 2012
3.3	Chairman of Panel to organize and present the Panel Meeting agenda item concerning Panel cessation.	Frank Grooters	Panel-15

APPENDIX VI

AMDAR Panel Management Group Meeting Session 4 Actions

Agenda Item	Action	Responsible	Due
3.3	Mr Stewart Taylor to contact the designer of the AMDAR Panel logo to ascertain if they are willing and able to modify the logo on behalf of the Panel.	Stewart Taylor	Panel-15
4.1	The CIMO Theme Leader on Aircraft Measurements to address the issue of the AMDAR air temperature bias, initially through the development of a plan as a component of the work programme of the appropriate Expert Team.	Axel Hoff	Ongoing
4.1	The Panel Chairman to request that Mr Jitze Van der Meulen continue with the task of documenting the Aircraft-based Observations Quality Management Framework and the Data Management Framework in consistency with the recommendations of the Workshop.	Frank Grooters	Oct 2012
4.1	The Panel Chairman to request that Dr Jitze Van der Meulen take the lead on the task of developing a strategy and implementation plan for resolving the ADS data management issue, including any requirements for modification of the BUFR template or GTS headers.	Frank Grooters	Oct 2012
4.1	The Secretariat and Panel Chairman to ensure that WMO (through the Aeronautical Meteorological Division) indicates support for the IATA proposal at the 7th meeting of the ICAO World Area Forecast System Operations Group (WAFSOPSG), 17-21 Sept, Lima and requests report of the outcome for AMDAR Panel-15.	Frank Grooters, Dean Lockett	Sep 2012 and Panel-15
4.1	The Panel Chairman to respond to NCDG regarding a potential role as Aircraft-based Observations Data Centre.	Frank Grooters	Panel-15
4.2	Mr Stewart Taylor to update the AO Metadata Implementation Plan to include the following elements: 1) Infrastructure requirements; 2) Tasks; 3) Timeline.	Stewart Taylor	Panel-15
4.4	The Secretariat and the Panel Chairman to draft a Description of Work for an AMDAR Development Officer to potentially be employed part-time for 12 months commencing in 2013 and with the primary role of international coordination of AMDAR programme development.	Frank Grooters, Dean Lockett	Panel-15
4.4	The Panel Chairman to draft letters to all Regional Associations regarding Regional AMDAR Development plans and the possibility of working with an ADO.	Frank Grooters	1 st Qtr 2013
4.4	The Secretariat (SO/ARO) to seek approval of D/OBS and SG to represent WMO and the AMDAR Panel at the AASA AGM.	Dean Lockett	Sep 2012

APPENDIX VI

AMDAR Panel Management Group Meeting Session 4 Actions

Agenda Item	Action	Responsible	Due
4.4	The Secretariat and Focal Point for South Africa to investigate possible funding alternatives for the required sponsorship fee for participation in the AASA AGM.	Dean Lockett, FP Sth Africa	Oct 2012
4.4	Mr Stewart Taylor to follow up with ARINC on possibilities for collaboration with RA I airlines.	Stewart Taylor	Panel-15
4.4	The Secretariat to advise the AMDAR Focal Point for Japan regarding this issue and request rectification.	Dean Lockett	Panel-15
4.4	The Secretariat to seek clarification from the Bureau of Meteorology or WMO Information Systems Branch regarding this issue and its resolution.	Dean Locett	Panel-15
4.5	E-AMDAR Management Team to discuss SAWS requirements for data provision in support of their Regional Programme. Any changes to requirements will be amended in the Data Licence Agreement.	Stewart Taylor, Stig Carlberg	4 th Qtr 2012
4.5	The Secretariat to liaise with the AMDAR FP for ASECNA and ascertain the requirement for provision of supplementary AMDAR data from E-AMDAR and identify the funding source for the required data.	Dean Lockett	4 th Qtr 2012
4.5	The Secretariat to survey operational AMDAR Programme Managers to determine the extent and availability of potential supplementary AMDAR data.	Dean Lockett	4 th Qtr 2012
4.5	The Secretariat to investigate the potential for WMO to administer an "International Supplementary AMDAR Data Programme".	Dean Lockett	2 nd Qtr 2013
4.6	Mr Carl Weiss to request COMET to provide a costing for producing a "preview" or "prototype" module for presentation to the AMDAR Panel (Session 15).	Carl Weiss	Sep 2012
4.6	Mr Carl Weiss and the Secretariat to ensure that the ACARS forum on LinkedIn is notified of future Newsletter publications.	Carl Weiss, Dean Lockett	Ongoing
4.7	The Panel to consider the requirement and terms for a study on Future Avionics and Communications Technology Affecting AMDAR under a WMO SSA funded by the AMDAR Trust Fund.	AMDAR Panel	Panel-15
4.7	Dr Axel Hoff and Mr Dean Lockett to add reference to the FAAM and Denchar aircraft trials to the IP.	Axel Hoff	4 th Qtr 2012
4.7	Mr Frank Grooters, Dr Axel Hoff and Mr Dean Lockett to look at an appropriate way to approach and refresh negotiations with Airbus to integrate WVSS into Airbus infrastructure.	Frank Grooters, Axel Hoff, Dean Lockett	4 th Qtr 2012
4.7	Dr Axel Hoff and Mr Dean Lockett to work on the Justification section of the IP.	Axel Hoff, Dean Lockett	4 th Qtr 2012
4.7	Dr Axel Hoff to present the updated version of the IP to the AMDAR Panel Meeting Session 15.	Axel Hoff	Panel-15
4.7	Dr Hoff to coordinate a review of the updated chapter by Dr Jitze Van der Meulen and Mr Dean Lockett by AMDAR Panel-15.	Axel Hoff	4 th Qtr 2012

APPENDIX VI

AMDAR Panel Management Group Meeting Session 4 Actions

Agenda Item	Action	Responsible	Due
4.11	The Secretariat to request that Dr Petersen further this work, possibly either as a component of the AMDAR impact paper or else as a stand-alone document.	Dean Lockett	4 th Qtr 2012
4.13	Mr Dean Lockett and Mr Carl Weiss provide input to Mr Stewart Taylor's presentation to be made to the AEEC DLUF Meeting.	Dean Lockett, Carl Weiss	Sep 2012
5.3	The Secretariat to provide TC with appropriate information and diagrams on AMDAR data flows.	Dean Lockett	4 th Qtr 2012
5.3	The Secretariat to add Ms Rafailova to AMDAR Newsletter distribution list.	Dean Lockett	Sep 2012
5.3	The Secretariat to advise TC when the final version of the AMDAR software Generic Specification is available.	Dean Lockett	1 st Qtr 2013