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| **WORLD METEOROLOGICAL ORGANIZATION**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **COMMISSION FOR INSTRUMENTS AND**  **METHODS OF OBSERVATION**  **CIMO MANAGEMENT GROUP**  **Thirteenth Session**  Offenbach, Germany 7 – 9 December 2014 |  | CIMO/MG-13/Doc. 3.1(4)  (27.XI.2014)  \_\_\_\_\_\_\_  ITEM: 3.1  Original: ENGLISH |

**WORK PLAN OF THE CIMO EXPERT TEAM ON AIRCRAFT-BASED OBSERVATIONS (ET-AO)**

(Submitted by J. Van der Meulen and S. Taylor)

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| **Summary and purpose of document**  This document provides information on the proposed Work Plan for Expert Team on Aircraft-based Observations. |

**Action proposed**

The Meeting is invited to note the structure and content of the draft Work Plan, and to approve the Workplan.

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**Appendix:** Draft Workplan of ET-AO

**WORK PLAN OF THE CIMO EXPERT TEAM ON AIRCRAFT-BASED OBSERVATIONS (ET-AO)**

1. **INTRODUCTION**

The proposed Work Plan for the Expert Team on Aircraft-based Observations is contained in the Appendix for the consideration and approval of the CIMO Management Group.

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**APPENDIX: Workplan of ET-Aircraft-based Observations (2014-2018)**

| **No.** | **ToR** | **Task**  **Description** | **Person Responsible** | **Action** | **Deliverables / Outcome** | **Comm.** | **Deadline for Delivery** | **Status (%)** | **Comments** | **2014**  **Budget**  **Estimate** | **2015 Budget Estimate** | **2016 Budget Estimate** |
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| 1 | 1) | Coordinate with CBS ET-ABO on Work Plan & Budget | Ch-ET-AO, SO/ARO | 1. Representative of ET to attend ET-ABO-2 (2015); 2. Work Plan & Budget to be compiled & approved on at least an annual basis. 3. Regular Work Plan WebEx sessions to be held. | Harmonised Work Plan & Budget for the ABO Program.  Report to ET-AO | Q4 2014 | Ongoing | N/A | * Chair attended ET-ABO-1 |  | 2.3K |  |
| 2 | 2) | Meeting of ET-AO | Ch-ET-AO, SO/ARO | Meeting of ET-AO, Q2 2015  Meeting of ET-AO, Q1 2018, prior to CIMO Session | 1. Work Program advanced; 2. Report to CIMO | Q4 2014 | Q1 2018 | 0 | Meeting of TT-AO-1 held 18-20 Feb 2014. |  | 15K  (WMO RB) |  |
| 3 | 3) | Investigate AMDAR Temperature Bias | S.d.Haan | 1. Review of relevant reference material 2. Consultation with avionics/sensor experts | 1. Report to ET-AO and CIMO 2. CIMO IOM Report | Q1 2014 | Q2 2015 | 25 | May require funding to complete a study on onboard issues, such as deicing.  Ref: [WMO AMDAR Panel Aircraft Observing System Data Management Workshop, Section 5.1](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/other/Aircraft_Observations_Data_Management_Workshop_June_2012_Final_Report.pdf), |  | 1K |  |
| 4 | 3) | AMDAR and water vapor measurement (WVM) integration into existing avionics and airframes | A.Hoff, G.Meymaris, S.Stringer, B.Ford, SO/ARO | 1. Drafting and review of plan. 2. Finalise plan as part of the ABOP Strategy & Implementation Plan (A-SIP) | Strategic Plan | 2012 | Q1 2015 | 75 | This needs to be harmonized with the the A‑SIP.  Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf). 4.2.1.  Incorporate:   * Ownership of STCs * Collaboration on STC costs * Integration into airframes   AMDAR Software requirements |  |  |  |
| 5 | 3) | AMDAR and water vapor measurement (WVM) as standard accessory on commercial aircraft | A.Hoff, G.Meymaris, S.Stringer, B.Ford, SO/ARO | 1. Drafting and review of plan. 2. Finalise plan as part of the ABOP Strategy & Implementation Plan (A-SiP) | Strategic Plan | 2012 | Q1 2015 | 50 | Incorporate:   * Formulation of IP into WMO Project, perhaps in collaboration with ICAO.   Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf) 4.2.1. |  |  |  |
| 6 | 3) | Turbulence (EDR ) Implementation in AMDAR - Develop IP for EDR | G Meymaris, S.Taylor, T.Farrar, SO/ARO | 1. Drafting and review of plan. 2. Teleconferencing of collaborators. Liaise with NCAR on software requirements; 3. Identify possible airline partner for trial. | EDR IP | Q3 2013 | Q1 2015 | 50 | Possibly include:   * A trial program with a European airline (the E-AMDAR Team discussing possibility with Air France). Delay in discussing with airline.   Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf) 4.2.2. |  |  |  |
| 7 | 3) | Turbulence (EDR) Implementation | G Meymaris | 1. In collaboration with ET-ABO, undertake activities as required to facilitate AMDAR EDR monitoring program. | * EDR monitoring program operational | Q2 2015 | Q4 2018 | 0 |  |  |  |  |
| 8 | 3) | Study on Current & Future Comms & Technology Impact on AMDAR | SO/ARO, S.Taylor, D. Arodi. | 1. Write Statement of Work 2. Identify consultants 3. SSA in place   Monitor progress | 1. Kick off webex with consultant (Sep 2014). 2. Study and recommendations produced. Two sections to cover Executive Summary and Technical terminology. | Q3 2013 | Q1 2015 | 20 | Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf) 4.3.2. | 6K | 24K |  |
| 9 | (4) | Update and maintain the AOSFRS | ET-AO |  | AOSFRS Maintained | Q4 2014 | Q4 2018 | 0 | * No current requirement for updates identified |  |  |  |
| 10 | 4) | AMDAR Software Development & Availability | S.Taylor, SO/ARO | 1. Approach Teledyne Controls re AOSFRS implementation; 2. Approach other avionics vendors | Integration of AMDAR into avionics systems. | Q3 2013 | N/A | Ongoing | Work towards availability of AMDAR software as a catalogue item of delivery for avionics systems.  ET-AO agreed on more proactive approach possibly involving face to face meetings necessitating travel of Members. | 5K |  |  |
| ET-AO, SO/ARO | Development of Generic AMDAR Onboard Software Modules:   1. Determine viability of project. 2. Develop Description of Work and requirements. 3. WMO Tender for job. | Suite of generic AOSFRS-compliant modules for deployment with participating airlines and avionics vendors. | Q3 2014 | Q4 2015 | 10 | * Initial discussions with vendors. * Honeywell and Teledyne contacted. * Other vendors and aircraft manufacturers to be contacted (Q4 2014). |  | 200K |  |
| 11 | 4) | Boeing 777 AMDR Software Dev. | Ch-ET-AO, Ch/ET-ABO, SO/ARO, | 1. Finalise negotiations with AFR and KLM in consult. with E-AMDAR & Meteo-France 2. Review quotation; 3. Provide advice on specifications and requirements. | B777 AMDAR Software application | 2012 | Q2 2015 | 20 | * Combined action with ET-ABO * Project has been further delayed. * Next meeting arranged Nov 2014.   Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf) 4.4.7. |  | 20K |  |
| 12 | 4) | Develop and specify standard for AMDAR Data Optimisation System | D.Body | 1. Determine requirements (consult with FPs); 2. Draft specification; 3. Conduct review; 4. Publish spec. | Addition to WMO guidance material. | Q4 2014 | Q3 2015 | 25 | Develop a functional specification that can be included in the Manual on WIGOS or in CIMO Guide |  |  |  |
| 13 | 5) | Monitor & Review reports from WVSS testing | A.Hoff | 1. Review reports. 2. Report to TT-AO-1 3. Provide summary report on DENCHAR test results. 4. Provide ET-AO and ET-ABO with updates. | 1. Report to CIMO. 2. Updates to ETs. | Q3 2013 | Ongoing | N/A. | Ref: WMO AMDAR Panel Session 15 [Fin. Rep](http://www.wmo.int/pages/prog/www/GOS/ABO/AMDAR/panel/reports/AMDAR_Panel_XV_Final_Report.pdf) 4.2.1. |  |  |  |
| 14 | 5) | Monitor & report on impact assessment results of TAMDAR humidity & other parameters by MetOffice | ET-AO | 1. Review reports and analyse results. 2. Report to ET-AO-1. 3. Provide updates to ET | Report to CIMO | Q3 2013 | Q2 2015 | 20 | Delay to installation of TAMDAR on FAAM aircraft, now scheduled for Oct 2014. |  |  |  |
| 15 | 3) | Develop & Implement plans for AMDAR & WVSS inter-comparison | S.d.Haan | 1. Determine requirements; 2. Analyse options; 3. Draft Plan; 4. Implement & report (IOM). | AMDAR & WVSS Inter-comparisons Plan | Q4 2013 | Q2 2015 | 20 |  |  |  |  |
| 16 | 6) | Prepare a paper on the status of WVSS-II validation | B. Ford & Collaborators | 1. Prepare outline and scope 2. Identify contributors 3. Research and draft 4. Review 5. Publish | IOM Report | Q3 2013 | Q4 2014 | 90 | Provide a summary on all scientific and operational aspects of the WVSS-II sensor and prepare a paper to be published as an IOM report. |  |  |  |
| 17 | 6) | Review & Update Aircraft-based Obs Reg. Mat. In CIMO Guide | ET-AO | 1. Review current status of material and identify requirements for update; 2. Coordinate & undertake update; 3. Review and complete; 4. Provide to CIMO Editorial Board. | CIMO Guide on Aircraft-based Observations updated. | Q1 2014 | Q4 2018 | 0 |  |  |  |  |
| 18 | 7) | Attend meetings of relevance to AMDAR Technical Dev. | ET-AO, SO/ARO | 1. Develop list of aviation committees and reps on P&C wiki. | Meetings attended.  Reports produced for CIMO and Secretariat | Q2 2013 | Ongoing | N/A | This may include:   * Meeting with avionics vendors; * SO/ARO & S.Taylor met with A.Hoff in Dec 2013 in Offenbach for Task 19. | 5K | 12K | 10K |
| 19 | 4) | Maintenance of AEEC ARINC 620 Specification | S.Taylor, SO/ARO, A. Hoff | 1. As necessary, work with AEEC DataLink Systems Sub-Committee to maintain the Met. Report in the ARINC 620 standard. | Met. Report V6 defined in the AEEC ARINC 620 spec. | Q4 2013 | Q4 2014 | 95 | * Will require travel support for work team and to attend AEEC meetings | 4K |  |  |
| 20 | 4) | Interaction with AEEC AOC | ET-AO, SO/ARO | 1. Review existing documents and reports to determine requirements for ET-AO 2. Seek membership of AOC and attend meetings | Liaison with Aviation Industries.  Report to ETs where appropriate. | Q2 2014 | Ongoing | N/A | * SSC and AOC are trying to harmonize requirements for data link in A633 and A620. * ET-AO should determine any implications for AMDAR. |  |  |  |
| 21 | 3) | Study of UAV technologies. | ET-AO | 1. Investigate possible applications of UAV/UAS developments for reporting of meteorological parameters. 2. Attend meetings of relevence | 1. Reports to ET-AO and CIMO. 2. Mission Report from UAV Conference (Oct 2014). | Q3 2014 | Ongoing | N/A | * Chair ET-AO will attend UAV Conference Oct 2014. * UK Met Office are investigating UAV technology for meteorological research. |  |  |  |