

(12.X.2011)

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

ITEM: 4.1

Original: ENGLISH ONLY

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

PROJECTS, PLANNING AND WORK PROGRAMME

WIGOS Pilot Project for AMDAR – Review and Planning Update

Generic Software Specification for AMDAR

(Submitted by the Secretariat and the AMDAR Panel Chariman)

SUMMARY AND PURPOSE OF DOCUMENT

Provides an update on the status of the WIGOS Pilot Project for AMDAR task to develop a Generic Software Specification for AMDAR.

ACTION PROPOSED

1. The Panel is invited to note the information contained in the document.
 2. The Panel is invited to consider the recommendations made in the document.
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BACKGROUND

1. The development of a Generic (Functional) Software Specification for AMDAR is one of the two longer-term of six tasks associated with the WIGOS Pilot Project for AMDAR (WIGOS-PP-AMDAR).
2. Up until 2011, this task had not been progressed because other WIGOS-PP-AMDAR tasks were considered higher priority.
3. This task was discussed at the AMDAR Panel Preparatory (APP) Meeting that took place in De Bilt over 21 to 22 July 2011 and it was determined that the priority for this task should be raised as it would be a very useful document to have available to members that are wishing to provide specifications for AMDAR software to developers. It was decided that a Description of Work (DoW) should be compiled for this task to determine if it could be carried out under the terms of a WMO Special Service Agreement (SSA), if a suitable contractor could be found.
4. The DoW was compiled (see Appendix 1) and reviewed and approved by the AMDAR Panel Management Group (APMG).
5. Two potential contractors were approached in the 3rd quarter of 2011 and provided expressions of interest (EoI) and quotations for the work to the APMG.
6. Upon consideration and assessment of the submissions made, the APMG determined that Mr Frank Tamis, AirDatec, was the most suitable candidate to undertake the work.

CURRENT STATUS

7. The SSA for this work is currently being processed within WMO with an expected commencement of November 2011 and completion of May 2012.

FUTURE WORK

8. It is expected that the SSA for this work will be activated before this meeting and work will commence by the contractor in November.
9. The AMDAR Panel will be expected to review the work of the contractor at various stages including the draft outline and the first and second drafts of the deliverable document.
10. It is expected that some of the important aspects that the Panel may need to decide upon are:
 - Which requirements should be considered mandatory, i.e. those requirements that form the AMDAR standard for software and the observations programme;
 - The extent to which specific avionics information is included.
11. **Recommendation 1:** The Joint Meeting is requested to endorse the decision made by the APMG to award the SSA for the development of a Generic (Functional) Software Specification for AMDAR to AirDatec;

12. **Recommendation 2:** The Joint Meeting may like to consider the appointment of a review committee to undertake the review of the draft documents of the Generic Functional Requirements for AMDAR Software.

APPENDIX 1

DESCRIPTION OF WORK

Specified by: WMO AMDAR Panel

Specification for: Compilation of a Generic Specification of Functional Requirements for AMDAR Software

Introduction:

The following provides a description of work required to be undertaken for and on behalf of the World Meteorological Organization (WMO) Aircraft Meteorological Data Relay (AMDAR) Panel.

The work may be offered to suitable a Contractor under the terms of a Special Service Agreement with WMO.

This document does not necessarily constitute the full and complete scope and requirements of the work.

Motivation:

The WMO AMDAR Panel, established in 1998 by interested WMO Members, is responsible for the development and maintenance of the WMO Global AMDAR Programme in cooperation and collaboration with other WMO Programmes and affiliated international aviation organizations and companies.

The Global AMDAR Programme is a cooperative observing programme that aims to foster collaboration with international and national airlines for the provision of meteorological data measured and transmitted from commercial aircraft platforms. The Panel seeks to establish methods and standards for the operation of the AMDAR Programme through consultation with members, the aviation industry and other technical experts, appropriate organizations and partner airlines.

The benefits of AMDAR in improving and enhancing the quality of meteorological analyses and forecasts are well known and widely accepted. Evidence of the data's value is well documented in NWP impact studies, articles in meteorological journals and operational case studies.

More information on the AMDAR Panel, its Terms of Reference and its activities can be obtained at: <http://www.wmo.int/amdar/>

In general, AMDAR functionality is provided within the aircraft avionics systems through a software application residing within an avionics computer system with access to the aircraft's data computers and communications systems.

Considerably more detail is available in the AMDAR Reference Manual, WMO-No. 958:

http://www.wmo.int/amdar/Publications/AMDAR_Reference_Manual_2003.pdf

At the current time, the Global AMDAR Programme is primarily based on three distinct software specifications:

1. The ARINC 620-6, Datalink Ground System and Interface Specification, which contains versions 2 through 4 of the Meteorological Report Command Uplink specifications (Chapter 4) and version 1 through 4 of the Meteorological Report (downlink), which, together with Appendices G and H form the "ARINC620 AMDAR Specification".

2. The ASDAR Aircraft to Satellite Data Relay (ASDAR) specification: Software Requirements Specification for the ASDAR Project, version 1 163-00016-44-4, October 1994, Matra Marconi Space; and,
3. The ACARS ACMS AMDAR (AAA) Specifications, version 1 through 3.

The over-arching motivation for this project is to consolidate the above specifications and the additional information within the AMDAR Reference Manual into a generic functional software specification that provides all the functional requirements for AMDAR software in a single document.

Task (Description of Work):

The contractor will, in consultation with and under guidance from the AMDAR Panel Chairperson and the WMO Scientific Officer (Aircraft and Remote Sensing Observations), compile the Generic Specification of Functional Requirements (GSFR) for AMDAR Software.

The guiding principles for this work are the following:

- To be based largely upon the 3 existing AMDAR software specifications supplemented with information from the AMDAR Reference Manual;
- Able to be utilised as a functional software Specification of Requirements (SoR) that can be provided to an avionics software developer as a stand-alone document allowing AMDAR software to be developed with minimal additional information, i.e. additional information should be limited to provision of a specification of non-mandatory requirements within the GSFR;
- Able to be read and understood by representatives of both NMHSs and Airlines with a suitable technical background, i.e. scientists, meteorologists, avionics engineers, etc;
- To be comprised of the following elements:
 - A brief description of the AMDAR Programme, detailed enough to provide only the required background for an avionics software developer;
 - A set of mandatory requirements;
 - A set of highly desirable requirements;
 - A set of optional requirements;
 - Specification of requirements as necessary associated with:
 - adherence to appropriate or mandatory avionics software standards;
 - adherence to appropriate or mandatory avionics communications standards;
 - software certification
 - uplink and downlink functionality;
 - format of downlink messages;
 - algorithms for parameter sampling;
 - algorithms for parameter processing, calculation and derivation;
 - algorithms for data quality control;
 - sources of on-board avionics data;

- interfaces to communications systems;
 - interfaces to necessary avionics computer systems;
 - interfaces to atmospheric instrumentation beyond the standard aircraft and avionics systems (e.g. water vapour);
 - downlink message compression.
- References and guidance for implementation of the software into specific avionics systems (e.g. Honeywell, Teledyne, Rockwell-Collins, Universal and Sagem) where and as appropriate;
 - Examples where necessary or advantageous to provide clarity;
 - Document version control.

It is expected that the following specific items will be **out of scope**:

- Specification of requirements for NMHS or WMO ground-to-ground data formats;
- Specification of requirements for ground-based systems for reception, processing, quality control, redistribution, metadata compilation and storage;
- Deliverables printing, binding, or publishing.

It is expected that the following will constitute the significant project phases and milestones:

1. Research phase;
2. Submission of draft skeleton outline (table of contents, document layout and brief description of content);
3. Submission of First Draft;
4. 1st review phase by AMDAR Panel Members;
5. Submission of Second Draft;
6. 2nd review phase by AMDAR Panel Members;
7. Submission of final version of document – soft copies only provided on digital media.

Note that, at the completion of the project and handover of the final document, all intellectual property and copy rights will be vested in WMO.

It is expected that the Contractor will provide monthly progress reports to the AMDAR Panel Chairman and the WMO Scientific Officer (Aircraft and Remote Sensing Observations).

Timeframe:

It is expected that the following timeframes will be allocated for completion of phases and milestones (times given in weeks from contract establishment – i.e. the total timeframe for completion of the project is 20 weeks or approximately 5 months).

Note that these times do not constitute a calculation or estimation of the time required to be allocated by the contractor to the work, but provide a desirable timeframe over which the work would be completed upon activation of the contract.

1. Research phase - 5 wks;
2. Submission of draft skeleton outline – 6 wks;

3. Submission of First Draft - 10 wks;
4. 1st review phase by AMDAR Panel Members – 14 wks;
5. Submission of Second Draft – 16 wks;
6. 2nd review phase by AMDAR Panel Members – 18 wks;
7. Submission of final version of document – 20 wks.
