WORLD METEOROLOGICAL ORGANIZATION

WMO AMDAR PANEL
(Fifteenth Session)

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PROJECTS, PLANNING AND WORK PROGRAMME

Development and Maintenance of the Aircraft Observing System QMS

Data Management Framework for Aircraft Observations

(Submitted by Jitze van der Meulen)

SUMMARY AND PURPOSE OF DOCUMENT

To inform the Panel on the current status and plans related to the Data Management Framework

ACTION PROPOSED

1. The Panel is invited to note the information contained in the document.
2. The Panel is invited to comment to this information or make proposals for further developments.

References:

1. Final report Workshop on Aircraft Observing System Data Management (Geneva, Switzerland, 5–8 June 2012)
2. Working documents, related to QMF discussed at this Workshop.

BACKGROUND

Data Management (DM) should be regarded as the management practice related to all (usually numerical) data, generated for services to provide data based information. Assuming the national hydro-meteorological and climatological services as information services, DM can be recognized as part of an information service. In practice, however, DM and the information services (the portals to the user) are organized as separate activities with the national organizations. Nevertheless DM should be organized based on requirements, stated by users (or the information services). In practice data generation and delivery is a world apart with rather autonomous procedures, inclusive quality management.

During the last decades however, the wish to improve the quality of the overall management structure of the national services resulted in a more integrated management structure, such as described by the ISO-9000 standards concept. For WMO this evolution has triggered the development of the WMO Quality Management Framework (QMF). Moreover, a new volume to be incorporated in the WMO Technical Regulations (WMO-No. 49) is drafted. Further details can be found in WMO/QMF - TD No. 1268, "WMO Quality Management Framework (QMF), First WMO Technical Report", February 2005.

For AMDAR based data appropriate DM and quality assessment (QA) are essential elements, because data is provided by a third party. Although the AMDAR Reference Manual gives clear guidance en information on how observational is, or should be generated and how appropriate data management should be organized further implementation is still under development.

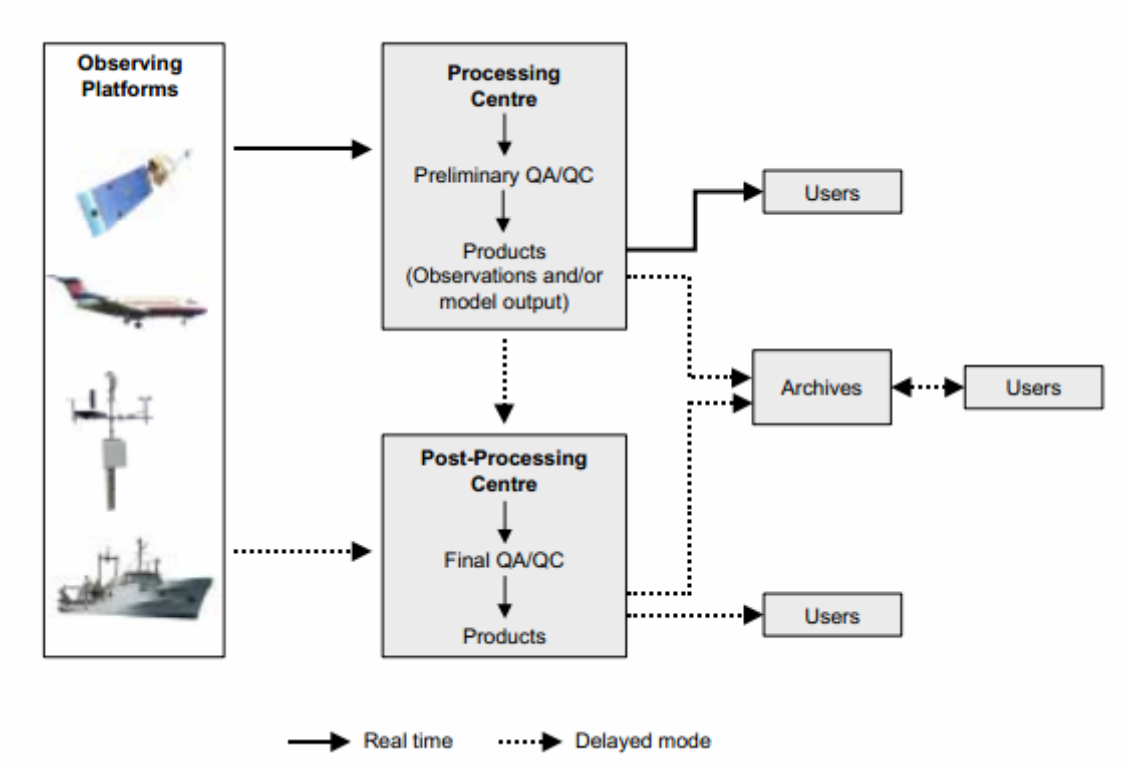
CURRENT STATUS OF AMDAR DATA MANAGEMENT

AMDAR Data Management (AMDAR/DM) is currently best described in the AMDAR Reference Manual (WMO-No. 958) itself inclusive QA. Excerpts from this Manual related to AMDAR/DM are given in Annex I. WMO Manuals and Guides containing general standards or recommendations related to DM inclusive of quality assurance are:

1. Manual on the Global Data-processing and Forecasting System (Man. GDPFS, WMO-No. 485)
2. Guide to the Global Observing System (Guide to the GOS, WMO-No. 488)
3. Guide to Meteorological Instruments and Methods of Observation (CIMO Guide, WMO-No. 8)
4. Guide on World Weather Watch Data Management (WWW/DM Guide, WMO-No. 788, 1993) [1]

The Guide, noted under 2., gives specific guidelines on the levels quality control processes should be organized. The Guide, indicated under 4., updated 20 years ago, gives an view of DM related to the overall management of WWW data and products and is based on the Open System Interconnection (OSI) 7 layer reference model, which is a pure technical approach and not a management or organizational approach.
An interesting publication, issued by OPAG ISS for data management issues is "Study on Integration of Data Management Activities between WMO Programmes" (2004). This document presents an interesting approach on how Data Management can be further developed for WWW and the other WMO Programme. In the report attention is given to real-time data stream, related to the JCOMM/IODE Data Flow, and represented in a simplified form, like:

[1] see http://www.wmo.int/pages/prog/www/WDM/Guides/Guide-on-DataMgt-1.htm



RESULTS FROM THE DATA MANAGEMENT WORKSHOP

To improve the situation on aircraft observations data management practices a Workshop on Aircraft Observing System Data Management was held in June, 2012. Significant outcomes from the Workshop include a proposal for the definition of a new or updated Data Management Framework for the Aircraft Observing System, including the management of AMDAR and other aircraft observations (AO) data sources; the further review and refinement of the metadata requirements; and, recommendations for improvements to the Quality Management System for AO data, including Quality Control, Quality Monitoring and Quality Assurance procedures and processes. One of the primary objectives of the Workshop and a focus throughout was to at least commence the process of developing and defining a Data Management Framework (DMF) that can be documented within the WMO regulatory material as a component of the Quality Monitoring System (QMS) for the Aircraft Observing System. An initial Outline for the Definition of the Global AO DM Framework is provided in Annex II. This outline is based on current WMO policy on DM and QMF and in line with the regulatory materials. Considering about 20 aspects related to AO data processes, a set of 20 items was determined, relevant for further developing the Framework. Taking into account these 20 items the outline of an AO Global DM Framework was designed, as shown in Annex II. It was recommended that this Outline is further developed and is eventually integrated into appropriate WMO regulatory material as part of the Quality Management System for Aircraft Observations and AMDAR. During the workshop a large number of recommendations were formulated for further consideration. An overview of the recommended activities are presented in Annex III.

CONCLUSIONS AND RECOMMENDATIONS

In practice AMDAR/DM is reasonable well outlined in the AMDAR Reference Manual. The documentation is in line with the standard documents, even with the rather outdated WWW/DM documentation. Of interest is that the scheme on a DM structure published in this Manual and shown in Annex I of this document has a higher level of details than all other documents published within WWW/DM.

Relevant for AMDAR/DM is quality assurance of observational data. Because data is generated by the airliners (*i.e.* so-called 3rd party data) and not by the meteo services themselves, quality assurance, especially with regards to the delivery of real-time data is a relevant issue for the AMDAR system. As shown in the AMDAR/DM scheme, a structure can be introduced related to national, regional and global programmes. For the national programmes (and in some cases for regional programmes, as for E-AMDAR), data management shall contain strong interactive links with participating centres and the airliners, inclusive a quality evaluation centre (QEvC), to assure an appropriate performance for the real-time distribution of data. Quality control issues related to off-line data and to the tracking of the general performance of AMDAR data can be covered by monitoring Lead Centres (global data). Within this framework however, the typical aspects of evaluation of data quality based on detailed analyses and in-depth studies is not well recognized. Such studies are essential for further feed-back practices to improve the performance of the AMDAR system.

Although indicated in a number of documents, quality indicators (or flags) should be transmitted together with the data as metadata. Such identifiers can be helpful to assess (or filter) data on forehand by the users (like a NWP centre or for applications like generating profiles). For such practice a simplified structure is most welcome. Examples of classification of data quality is provided in the Guide to the GOS (for land stations). Such a service can be a reasonable solution because evaluation and filtering of single level data (like described in the Manual on the GDPFS) may be time consuming and causing unacceptable timeliness. A simple scheme (with an appropriate algorithm) should be developed. For this practice not only the observational variables (like air temperature and the wind vector), but also positional and time information has to be taken into account.

AMDAR/DM and WWW/DM still lack a well-defined structure. Although QMF has introduced a ISO 9000 standards approach, a more detailed framework should be introduced. The introduction of such a structure doesn't have to be a serious bottleneck, because within the ICT community a number of such frameworks a developed already. Nevertheless, relevant here is the point of view chosen. In the past this point was typically at the site of the data-system developer, providing well described ITIL and ASL frameworks. Nowadays this point is at the users' site. A typical and reasonable simple example is defined by BiSL (Business Information Services Library) with a focus on ICT demand management (to describe the transition phase between Demand and Supply). A short overview of this BiSL concept is provided in Annex IV.
A more schematic overview to be introduced may follow this matrix approach:

Functional	**Applications**	**Technical**
Strategic management	Strategic management	Strategic management
Tactical management • technical component • personal component • overall component	Tactical management • technical component • personal component • overall component	Tactical management • technical component • personal component • overall component
Operational management • on use and practices • functional maintenance	Operational management • on applications	Operational management • operational steering • maintenance infrastructure • technical support and service, helpdesk

The AO DM Workshop produced a large set of recommendations with actions (see Annex III) and a basic outline for the Definition of the Global AO DM Framework (Annex II). It is recommended to endorse the commendations and to further develop the outline for rapid implementation.

ANNEX I

Excerpts from the AMDAR Reference Manual (WMO-No. 958) on Data Management

5. AMDAR data management (AMDARDM).

5.1 AMDARDM can be viewed within the context of the WMO World Weather Watch Data Management (WWWDM) programme. The concept of WWWDM is one of carrying out those activities required to optimise the integration of the Global Observing System (GOS), Global Telecommunications System (GTS) and Global Data Processing System (GDPS). WWWDM functions include:

a) Providing specifications for data representation, including codes and exchange formats, guidelines for the design of databases and storage of observational data and processed information.
b) Defining and designing proper procedures and interfaces, particularly in the area of data processing and telecommunications, to allow Members to obtain the coherent and appropriate sets of data and products required, despite the disparity in the levels of sophistication of technology and techniques of various WWW centres.
c) Monitoring of AMDAR operations and the quality of basic data and output products.

5.4 AMDARDM is discussed in detail in Appendix IV.

Appendix IV

AMDAR DATA MANAGEMENT

1. Introduction.

1.1 AMDAR Data Management (AMDARDM) can be viewed within the context of the WMO World Weather Watch Data Management (WWWDM) programme. The concept of WWWDM is one of carrying out those activities required to optimise the integration of the Global Observing System (GOS), Global Telecommunications System (GTS) and Global Data Processing System (GDPS). WWWDM functions include:

a) providing specifications for data representation, including codes and exchange formats, guidelines for the design of databases and storage of observational data and processed information.
b) Defining and designing proper procedures and interfaces, particularly in the area of data processing and telecommunications, to allow Members to obtain the coherent and appropriate sets of data and products required, despite the disparity in the levels of sophistication of technology and techniques of various WWW centres.
c) Monitoring of AMDAR operations and the quality of basic data and output products.

1.2 AMDARDM applies to all the processes in the AMDAR operational system. This is shown schematically in figure 1 below. It will be noted that the global system consists of several national or regional programmes with overall co-ordination facilitated by the WMO AMDAR Panel through its Technical Co-ordinator. In this appendix each function is described with special

attention to quality management. In addition, detailed information is provided on recommended GTS codes that are subject to WMO technical regulations.

2. Data Management Functions (see figure 1).

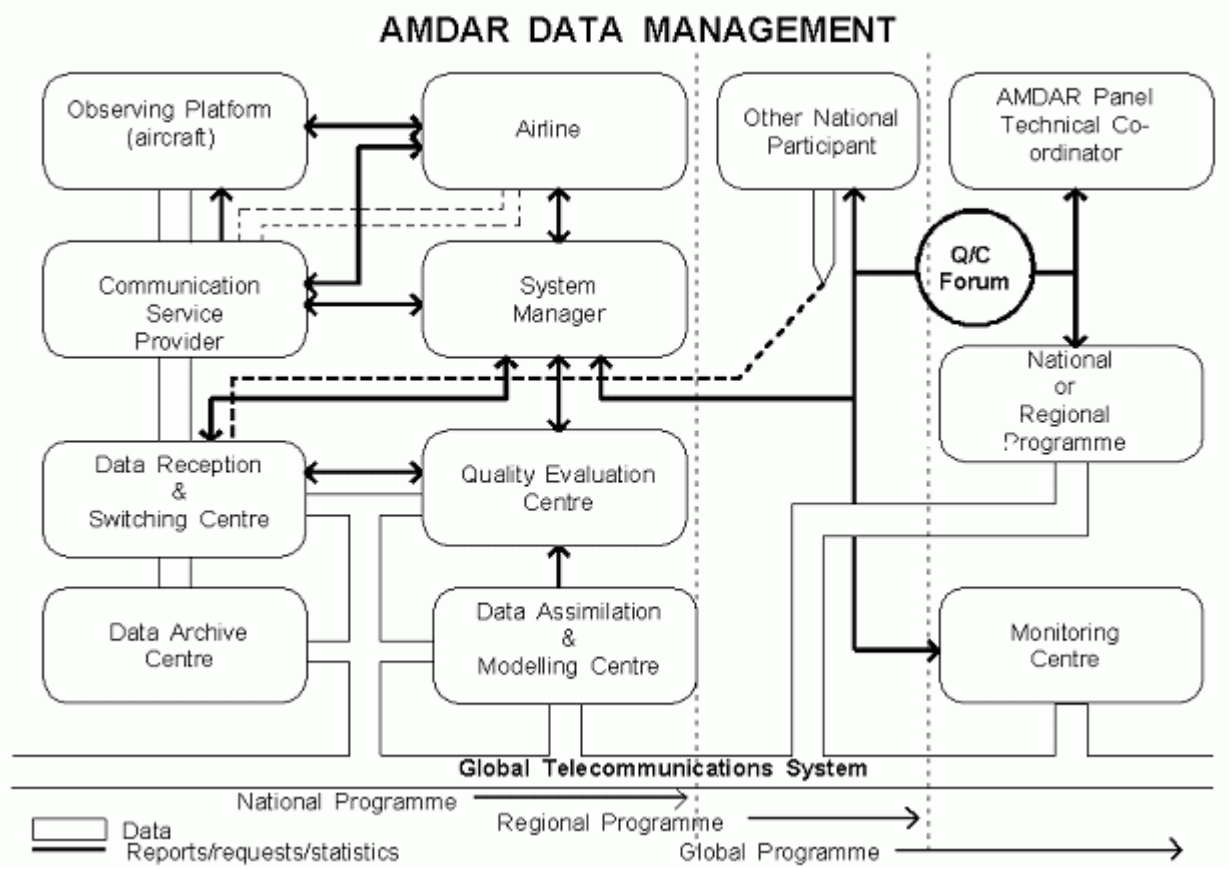


FIGURE 1

2.1 *Observing platform (aircraft)*:
Compute and assemble observational data;
Perform basic quality control (Q/C);
Transmit to ground in approved code.

2.2 *Communications Service Provider*:
Relay observations to ground network (to airline or DRSC);
Maintain error free transmission;
Process uplink commands;
Ensure timely delivery of data.

2.3 *Data reception and switching centre* (DRSC):
Ingest real-time data including data from co-operating programmes;
Perform real-time Q/C;
Assemble rejected data;
Assemble bulletin:
Eliminate duplicates;

Pass all data (except duplicates) to QEV centre;
Pass all data (except duplicates) to Archive centre;
Eliminate additional rejects from QEV list;
Pass accepted data bulletins to GTS and to Numerical Processing Centre;
Assemble and forward reports to System manager.

2.4 *Data Assimilation and Numerical Modelling Centre*:
Assimilate data with other real time information from numerical model and GTS.
Send reject list and other monitoring information to QEV centre (includes external data from GTS)
Put processed products on GTS.

2.5 *Quality Evaluation (QEV) Centre*:
Perform near-real-time QEV on all data including rejects;
Determine reasons for rejected data;
Update reject list, pass to DRSC;
Report to System Manager;

2.6 *System Manager*:
Focal point for AMDAR programme;
Analyse system status;
Initiate Q/C actions internally through airline or communications service provider (as appropriate), notify appropriate airline of consistent bad data;
Programme management including data optimisation and targeting schemes;
Pass status reports, quality statistics and quality notifications to external parties;
Liaise with external programmes and monitoring centres.

2.7 *Airline*:
Implement and manage on-board observing programme;
Action external commands, directly or through up-link control;
Forward AMDAR messages to DRSC (as appropriate);
Rectify problems with aircraft reporting bad data;
Report status to System manager.

2.8 *Regional programme participant*:
Pass data to DRSC;
Action Q/C reports from System manager and external sources;
Provide status reports to System Manager.

2.9 *External Programme*:
Insert data on GTS;
Disseminate Q/C reports and statistics.

2.10 *Monitoring centres*:
Publish quality statistics;
Provide regular platform reject lists to interested parties.

2.11 *AMDAR Panel Technical Co-ordinator*:
Maintain and publish contact list for AMDAR programmes.
Monitor data flow statistics;
Co-ordinate quality reporting activity;
Advise programme managers and users on quality and data optimisation issues.

Co-ordinate AMDARDM activity within the AMDAR Panel.

2.12 *Data Archiving Centre*:
Access all AMDAR GTS data plus rejects from DASC;
Eliminate duplicates;
Q/C and flag data;
Archive by individual aircraft (time series);
Archive by month and area;
Publish data catalogue at regular intervals.

2.13 *Q/C Forum*:
Provide network for interchange and discussion of data management issues, problems, reports, actions and initiatives.

ANNEX II

Outline for the Definition of the Global AO DM Framework

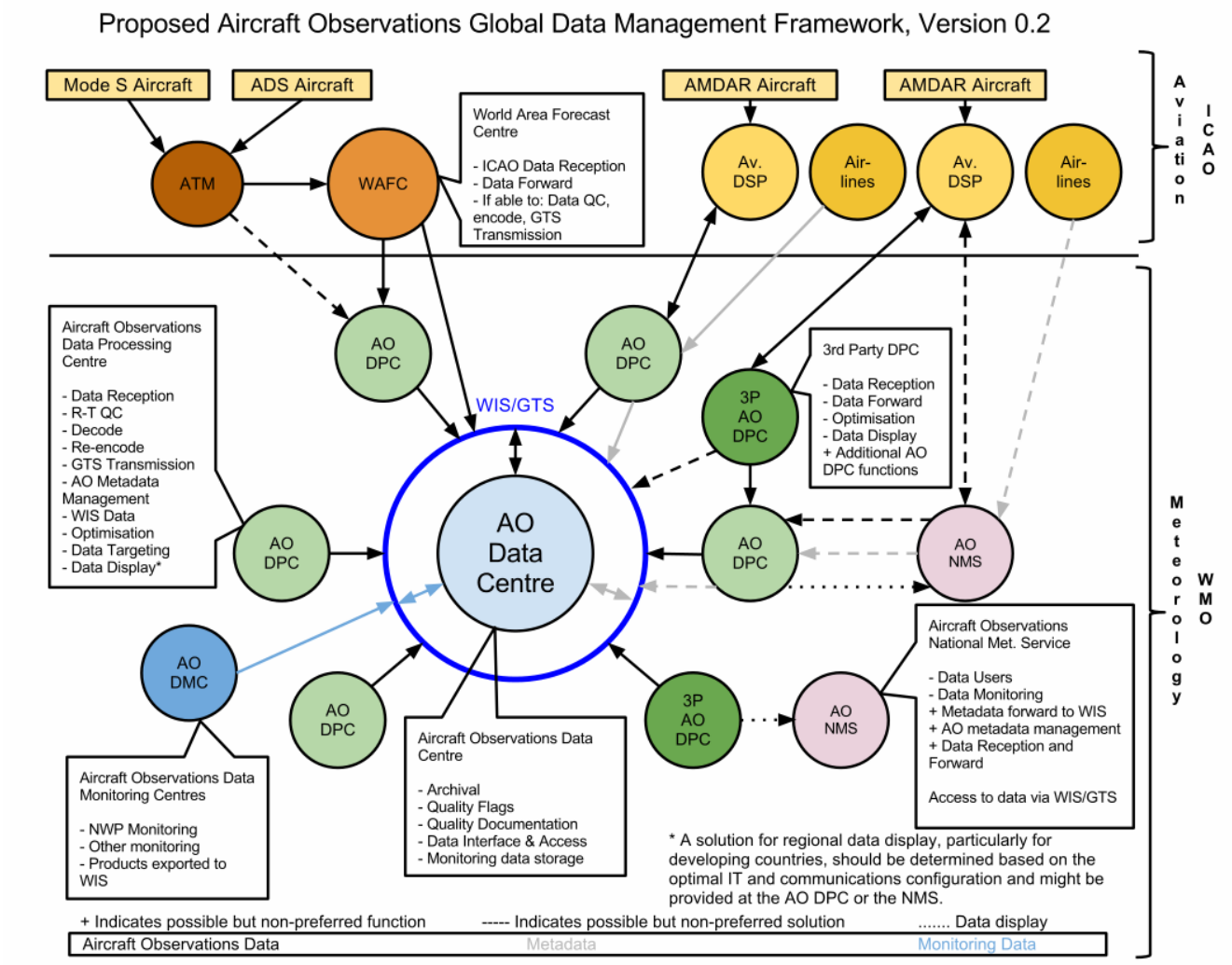
Items, relevant for developing an AO DM outline:

1. *3rd party data*
2. *ADS (ICAO), other new data sources (Mode-S)*
3. *Archiving (data and metadata)*
4. *Delivery (level II data; also profile data for local), relation to time/place resolution)*
5. *Optimization of observations*
6. *data targeting (additional, for applications)*
7. *data coverage (global), provision (e.g. Africa); programme extentions*
8. *Developing countries, special constraints (data comm. issues)*
9. *Data format (incl. resolution)*
10. *Code issues (incl. data header)*
11. *Data display*
12. *Data access*
13. *Data transfer*
14. *Typical data: Atmosph. Composition data*
15. *Phenomena: Icing, Turbulence, use of data (e.g. direct input, verification)*
16. *Timeliness (taking into account Q/C processes)*
17. *Data checking, filtering, flagging (relation with rules, M.GDPFS)*
18. *Excluding aircraft (how to manage)*
19. *Quality control: monitoring (availability), technics (NWP), stages (real time, off-line); flagging principles; archiving; logistics; feed back*
20. *Metadata (definition, use, archive)*

Documentation (overview and review for update)

1. *AMDAR Reference Manual*
2. *WMO regulatory material (TR, incl. Manuals and Guides)*
3. *WWW/DM, ISS/DM*
4. *QMF documentation*

Recommended Framework



ANNEX III

Recommendations and actions, proposed by the AO DM Workshop

Item	Topic	Recommendation	Actions
1	AO Data Management Framework	A data management framework, in line with WMO's QMF and WIS policies and in line with the AMDAR reference manual, shall be further developed to such extent that implementation in national and regional bodies can be carried out. Such a framework may have a generic structure.	1. Incorporate into planning at Panel-15
2	AO Data Management Framework	Universal procedures shall be developed for standard practices to [1] check and flag data in real-time before dissemination over the GTS, and [2] to monitor and evaluate data. Results of these practices should be in a standard format, to be use as metadata, capable for archiving purposes. Moreover these procedures shall be inclusive of feed back practices.	2. Incorporate into planning at Panel-15
3	AO Data Management Framework	New guidance material on data management for WWW practices shall be developed to replace to current Guide on Data Management (WMO-No. 788), which is out of date.	3. Incorporate into planning at Panel-15
4	WMO QMF	The AO DMF design, structure and implementation should take into account the requirements of the WMO QMF	
5	EGOS-IP Requirements	The AO DMF must take into account the objectives and aims for AO of the CBS Implementation Plan for the Evolution of the GOS: 1. Handle expected increases in data volume; 2. Cater for optimization requirements; 3. Cater for data targeting; 1. Manage data associated with new variables such as humidity, turbulence and icing; and, 2. Cater for development of AMDAR capability and implementation of GA aircraft and associated data volume increases.	
6	WIGOS Requirements	The DMF for the Aircraft Observing System should be developed and structured in such a way that is compatible with the plans for the implementation of WIGOS and for the evolution of the GOS.	
7	NWP Requirements	1. Effort should be made to expand the AOS to smaller regional carriers; 2. Quality Control and Quality Assurance should be improved as much as possible prior to data delivery without compromising current data latency levels; 3. A system should be developed for the exchange of global monitoring data and information in support of improved data quality management of the AOS. 4. Additional observed quantities should be incorporated and/or expanded as elements of the AMDAR Observing System, including humidity, turbulence and icing; 5. The system for management and handling of metadata requirements to support both NWP data monitoring and temperature bias correction should be developed; 6. Centralisation of AOS data processing should be given consideration and may benefit NWP by providing a single source for access to AO data; 7. NWP would benefits from access to a long-term archival of AO data in support of NWP reanalysis and observing system experiments.	1. Incorporate into planning at Panel-15 2. QC and QA procedures to be revised and improved; 3. Panel and ET-AIR to work with the Lead Centre and DMCs to develop a centralized storage for NWP monitoring data.

8	Services & Data Users Requirements	1. In order to improve forecasting and verification of turbulence and icing forecast products and services, there is a requirement for increased coverage of both turbulence and icing observations; 2. Investigate how AO data (and possibility other upper-air observations) can be displayed to forecasters, either by a COTS AO display system or the development of an inexpensive software tool; 3. Investigate a method for forecasters and/or users to flag suspect AO data to a responsible network/program manager.	1. Continue developments in area of monitoring of turbulence and icing. 2. Ensure data display is a component of the DMF; 3. Incorporate into design of DMF;
9	Data Policy for AO	1. Future new and updated agreements with airlines are more carefully negotiated so as to specifically ensure compliance with Resolution 40. 2. Take into account varying data policies among AMDAR Programmes in the design and establishment of any online public archive of AMDAR data and it may be necessary to facilitate delayed release of some data so as to comply with specific programme policies. 3. Data archival of the global AO DMF should take into account varying requirements and constraints by individual NMHSs on timeliness and QA.	1. AMDAR Panel & CBS to assist Members with agreements and contracts 2. Incorporate recommendations 2 and 3 in design of the AO DMF.
10	AO Data Display	1. Contacts in African NMSs should be cultivated, and encouraged to ascertain the potential of AMDAR. If this task is not successful, subsequent tasks should not be pursued; 2. Insure that there is useful AMDAR data to be displayed in target African countries; 3. Develop and deploy an AMDAR display system tailored to the infrastructure available in the target African countries; 4. Develop and implement appropriate training; 5. Provide simple AMDAR quality information to forecasters as a part of their display systems; 6. Maintain and enhance person-to-person relationships between AO Data Processing Centers and data providers; and, 7. Display systems should allow feedback from users to AO data managers.	1. Incorporate into planning at Panel-15 2. Investigate and coordinate improved and wider data provision from the existing program over RA I; 3. Incorporate into planning at Panel-15 4. Incorporate into planning at Panel-15 5. Incorporate into design of DMF; 6. Incorporate into design of DMF; 7. Incorporate into design of DMF.
11	AMDAR Air Temperature Bias	1. The global NWP community would benefit from publication of the ECMWF bias correction scheme including the method and units used to estimate aircraft vertical velocity. 2. The AMDAR Panel and the CIMO Leader on Aircraft Measurements should determine a strategy for determining the cause of air temperature bias, which might include approaches to and the involvement of each or any of sensor, avionics and airframe manufacturers.	1. Brad Ballish to request information from ECMWF. 2. Incorporate into planning at Panel-15

12	Data Quality Management	1. Recognize comparisons of aircraft observations to NWP model background fields as a critical component of AO QC. 2. Consider whether or not such comparisons should be done before AO data are exchanged on the GTS. 3. Promote and support the development of a universally available (and interactive) AO data monitoring display system, for use by program managers, airlines, NWP centres and other clients. 4. Consider more frequent reporting of monitoring reports and reject lists, including a daily report and possibly an alerting mechanism. 5. With the concept of an archive of Aircraft Observation being developed as part of the new AO Data Management Framework, consideration should be given to include records of documented aircraft data quality issues and associated corrective action. 6. Semi-automatic near real time monitoring information such as data counts, missing data, higher than normal rejects by the assimilation system, etc. should be exchanged regularly (monthly or more frequently as required and agreed to) between designated centres and data managers (and/or producers). This could include and Alarm/Event system. 7. Consideration should be given to the designation of centres to carry out international QC of Aircraft Observations (WMO and ICAO), possibly before insertion on the GTS. 8. That the data processing model developed as part as the Aircraft Observation Data Management Framework be established in such as way as to accommodate the processing and distribution of WMO and ICAO observations. 9. That distribution of ICAO automated aircraft observations on the GTS be done using WMO approved format (BUFR) with an appropriate template (similar to the AMDAR ones) for clear identification of the source of the data (ADS, MODE-S, Aircraft ID, etc.). 10. The AMDAR Panel and ET-AIR to work with CBS OPAG-ISS and IPET-DRC to investigate changes necessary to the GTS headers for FM94 in order to readily distinguish AMDAR BUFR data from ADS BUFR data. 11. Ideally, the AO data processing model would be agreed to by ICAO. 12. Further experience and studies with data quality aspects from smaller airplanes and regional carriers are needed. Current AMDAR programmes could be encouraged to perform (as permitted) trials with smaller airplanes and regional carriers. Sharing of this experience between AMDAR programmes is very important.	1. Incorporate into design of DMF; 2. Incorporate into planning at Panel-15; 3. Incorporate into planning at Panel-15; 4. Incorporate into planning at Panel-15; 5. Incorporate into design of DMF; 6. Incorporate into design of DMF; 7. Incorporate into design of DMF; 8. Incorporate into planning at Panel-15; 9. Incorporate into planning at Panel-15; 10. Incorporate into planning at Panel-15; 11. CBS and ET-AIR to communicate with ICAO re policy; 12. Incorporate into planning at Panel-15;
13	AO DMF Design & Strategy	1. Further consider the proposed DMF (Appendix III, Reports of Workshop Breakout Sessions, Session 1, Group 1) structural design and its implications; 2. The DMF structural design, once approved and adopted, is incorporated into the documentation of the DMF and the QMS for the Aircraft Observing System within the appropriate WMO regulatory material.	Incorporate into planning at Panel-15.

14	Metadata Management	1. Review the metadata dataset and ensure that it meets the requirements of WMO WIS as well as considering the needs of AMDAR, NWP, Climate and NWS communities, 2. Population of the Metadata dataset(s) to be the remit of the Regional and National AMDAR Programme, 3. Consider infrastructure of developing countries with regards to accessing AMDAR Metadata dataset, 4. Consider development of a Historical Records/Event Log, to be used to track events relative to AMDAR Metadata.	Incorporate into planning at Panel-15.
15	QC & QA Data Processing	1. A system for near-real-time QC monitoring and alerting, possible email-based, should be considered for development and implementation; 2. The existing QC flags in the BUFR format should be utilized for flagging data quality by data processing and monitoring centres, including 3rd parties.	Incorporate into the DMF for AO. Incorporate into planning at Panel-15.

16	Quality Monitoring & Reporting	1. Determine the designation process and requirements for the AO DPCs, considering the monitoring activities as well. 2. Further elaborate the split responsibilities for the quality monitoring between the Lead Centre and the DPCs 3. Establish a list of potential candidate centres that could host and perform the activities of the AO data archival centre. Investigate what sort of designation would be required for a centre to accept responsibility and begin activities. 4. Document and develop the concept of gridded AO quality statistics, and get a few (2 or 3 initially) monitoring centres to begin generation and exchange of this information initially on a monthly basis, including the Lead Centre. Expand into more frequent reporting as agreed to by the contributing monitoring centres. After some trial period, make this information widely available (web sites, etc), and also expand the number of contributors (eventually to all DPCs). 5. Monitoring centres should consider including more frequently updated monitoring statistics and reject list (in addition to the current monthly lists). Proposal should be made by the Lead Centre to contributing monitoring centres. Suggestion: initially start with weekly updates. 6. Consider adding multi-day statistical monitoring information to AO data that goes onto the GTS/WIS. 7. Set up a google (or other) forum to which people can post AMDAR-related messages and select a set of AMDAR data managers to moderate this forum (I.e., approve posts) and respond to messages. 8. A fault event logging system, both for operational issues as well as data quality issues should be part of the operational responsibilities of the AO DPCs. 9. Issues about aircraft data biases to be included in the fault logging system. 10. Convert the E-AMDAR (EUCOS) fault log spreadsheet into a google spreadsheet and allow wide access (read mode only). 11. Consider making the fault log mentioned above editable by users at centers other than the E-AMDAR center. 12. Consider use of bugzilla (http://www.bugzilla.org/about/) or similar system to allow more complete tracking of faults, and more broad participation for adding faults and reporting them fixed. 13. Consider more frequent reporting of monitoring reports and reject lists, including a daily report and possibly an alerting mechanism. 14. Semi-automatic near real time monitoring information such as data counts, missing data, higher than normal rejects by the assimilation system, etc. should be exchanged regularly (monthly or more frequently as required and agreed to) between designated centres and data managers (and/or producers). This could include and Alarm/Event system. 15. Monitoring centres should be encouraged to begin the generation of a daily statistic (e.g. based on last 7-days).	Incorporate into planning at Panel-15.

17	Definition of the AO DMF	1. The Outline of the Definition of the Global AO DM Framework is further developed and is eventually integrated into appropriate WMO regulatory material as part of the Quality Management System for Aircraft Observations and AMDAR. 2. A strategy and plan for the implementation of the AO DMF is developed; 3. The 20 points in the Matrix Overview for the DMF are addressed in the strategy and implementation of the DMF (Appendix V); 4. A process is put in place to review and make changes as necessary to the WMO policy in relation to QC of data and the use of quality flags for the GTS.	Incorporate into planning at Panel-15.
18	Update of Regulatory Material	1. The Guide to the Global Observing System, Edition 2010, needs to be updated to reflect the current status in Aircraft Observations, taking into account the results of the WIGOS Pilot Project for AMDAR, the ET-AIR Workplan and the outcome of the Workshop on Aircraft Observations Data Management; 2. The Manual on the Global Observing System, Volume I, Edition 2011, needs to be updated to reflect the current status in Aircraft Observations, taking into account the results of the WIGOS Pilot Project for AMDAR, the ET-AIR Workplan, the requirements for the AO elements as formulated in the WMO Observing Requirements Database (http://www.wmo-sat.info/db/requirements) and the outcome of the Workshop on Aircraft Observations Data Management; 3. The requirements for AO for the Regional Associations and Antarctica as stated in the Manual on the Global Observing System, Volume II, Edition 2011, need to be updated in accordance with the current status of other observing systems, preferably is support by and cooperation with the Regional Offices, the EC Panel of Experts on Polar Observations and GCW; 4. Other Technical Commissions (in particular CIMO) should be informed about the need for updating the CIMO Guide in those parts where AO is mentioned; 5. The necessary update of the CBS Guidance Material should be included in the ET-AIR workplan and recommended for adoption by the ET-AIR in their forthcoming meeting.	Incorporate into planning at Panel-15.

ANNEX IV

Business Information Services Library

Business Information Services Library (BiSL), previously known as Business Information Service Management Library, is a framework used for information management. BiSL is a public domain standard since 2005, governed by the ASL BiSL foundation[2] (previously ASL Foundation).

The framework describes a standard for processes within business information management at the strategy, management and operations level. BiSL is closely related to the ITIL and ASL framework, yet the main difference between these frameworks is that ITIL and ASL focus on the supply side of information (the purpose of an IT organization), whereas BiSL focuses on the demand side (arising from the end-user organization).

BiSL in ICT demand management

Information management, or ICT demand management, can be split in three major areas:

• Technical / Infrastructure Management (framed by ITIL)

Technical management is the group of processes focusing on the management of the IT infrastructure itself and is supported by the ITIL standard. The IT infrastructure is the underlying layer made of computer systems, network connectivity and end-user devices allowing to operate the application layer and provide them with application functionalities. Technical management is owned by the IT organization.

• Application Management (framed by ASL)

Application management is the group of processes that takes care of the implementation of the evolutions in the applications required to comply with technical or functional requirements. These changes may be required either because the application doesn't work like expected (corrective application maintenance) or because the expectations have changed (what the application needs to deliver has changed). Application management focuses on incremental changes on existing applications, not on the development of new applications, and is supported by the ASL standard, which is subsequent to and partially inspired by the ITIL standard.

• Information Management (framed by BiSL)

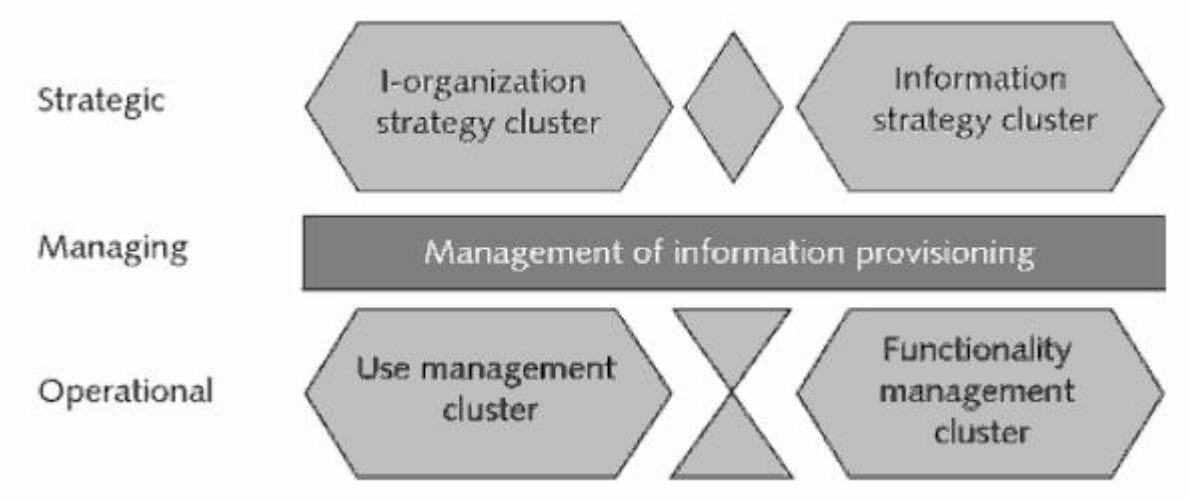
Information management is the group of processes that frames the provisioning and control of the functional requirements that the applications have to deliver to the end-users. :Information management is owned by end-user organisations and enables them to control that the required functionalities are implemented in the applications that the end-users use, or that changes to the applications comply to the expectations. Information management is supported by the most recent BiSL standard.

Three layer cluster concept

Within this structure, all these management areas should be organized based on a three-layer concept:

1. a Strategic cluster, inclusive of general business policies and portfolios (Information strategy cluster dealing with long term policies)
2. a Tactical cluster, inclusive data services (the Management process)
3. an Operational cluster, inclusive daily maintenance, research and development

[2] see http://www.aslbislfoundation.org/



For all of these layers relationships (accounts) will exist with other partners (data deliverers, data users), *i.e.* a use management cluster and a functionality management cluster, typically related to the daily practices.