



World Meteorological Organization

COMMISSION FOR BASIC SYSTEMS

OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

Regional Workshop on AMDAR

17-18 August, Panama City, Panama



WORKSHOP REPORT

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WORKSHOP REPORT SUMMARY

1. Workshop Opening

The WMO Regional Workshop on AMDAR was held over 17-18 August 2016 at the Radisson Decapolis Hotel in Panama City, Panama, at the kind invitation of the Dirección de Hidrometeorología (DDH), Panama. The workshop was generously supported by the National Oceanic and Atmospheric Administration (NOAA), USA.

The workshop was opened by the Director of DDH, Mr Edilberto Bolívar Esquivel Marconi, who welcomed all participants to the workshop and to Panama City. Mr Esquivel, cited the importance of both aviation and shipping to Panama and, as a result, the critical importance of support for these industries through weather services and products.

Mr Dean Lockett of the WMO Secretariat also welcomed all participants to the workshop thanking in particular Mr Esquivel and the Dirección de Hidrometeorología for hosting the event, all speakers and presenters, NOAA for its support of the event and, in particular, Ms Pilar Lopez from DDH for her excellent support and work in the organisation, coordination and management of the event in Panama City.

Mr Stephen Pritchett of the USA National Weather Service (NWS) addressed the workshop, welcoming participants on behalf of NOAA and the NWS.

Mr Frank Grooters, CBS Chair of the Expert Team on Aircraft-Based Observing Systems then welcomed participants, briefly describing the aims for the workshop and the role of WMO Technical Commissions in international coordination and development of the AMDAR program as a component of the WMO Integrated Global Observing System and the World Weather Watch Programme.

The List of Participants in the workshop are provided within [Annex II](#).

2. Workshop Programme

The workshop programme consisted of a series of presentations by WMO Member and other experts interspersed with periods of open discussion and questions.

An evening programme following a workshop dinner was held the evening of the first day of the workshop with several presentations made by experts representing some industry bodies related to aircraft-based observations.

The presentations made during the workshop will be available for a limited period of time online at the [workshop website](#) and the Google Drive folder below:

<https://drive.google.com/open?id=0BzDPKbZAaW6XZHhfZWd5ZW1OYzg>

The Workshop Programme is provided within [Annex I](#).

3. Issues, Outcomes and Actions

During Session 3 of Day 2 of the workshop, Mr Grooters provided the workshop participants with a presentation on the opportunities and potential within WMO Regions III and IV to further develop the AMDAR program and increase the availability of aircraft-based observations in the regions in support of both the meteorological and aviation communities. While coverage was very good over the United States, coverage over Canada, Central and

South America and the Caribbean ranged from relatively poor to non-existent and Mr Grooters outlined the key target airlines for recruitment in the region that had been highlighted by the [WMO study on AMDAR Coverage & Targeting for Future Airline Recruitment](#). Mr Grooters urged Member participants to collaborate with their national airlines towards the development of new AMDAR programmes in the region. Mr Grooters and Mr Gilles Fournier, Vice-chair of the ET-ABO, also urged Member participants to assist WMO in the coordination of the Aircraft-Based Observations Programme (ABOP), through endeavours to foster regional collaboration through the WMO Regional Associations III and IV.

Throughout the course of the workshop and during discussion periods, the following key issues, outcomes and actions were highlighted.

Mexico AMDAR Programme

- Mr Humberto Hernandez Peralta, Mexico, informed the workshop that, while it was expected that the Mexico AMDAR programme with AeroMexico would continue to operate under a new contract from 2017, the Mexico SMN had experienced difficulty in making optimal use of the data for operational purposes and would like to request assistance in this aspect from WMO and NOAA.

AMDAR Development in Argentina

- Mr Nicolas Rivaben informed the workshop that, in Argentina, an AMDAR programme had been under development since 2013 through collaboration with Aerolineas and LAN Argentina (LATAM). The initial development with Aerolineas aircraft over 2013-14 had utilised the onboard FMS system but was not able to produce data of sufficient quality to meet WMO standards for provision of the data on the GTS.
- The latest development with LATAM with 4 Airbus A322 and utilising an improved onboard software system is expected to result in an operational programme later in 2016 when data is more widely distributed on the GTS in BUFR format.
- Over 2017-18, Argentina expects to develop a new program with the Aerolineas E190/195 fleet utilising their upgraded avionics systems. This will lead to other initiatives including the development of a data optimisation capability, assimilation of data into the AR-WRF model and the investigation into the potential deployment of water vapour sensors.

Aircraft-Based Observations and AMDAR Development in Brazil

- Mr Martim Matschinske of the Department of Airspace Control (DCEA), Brazil, informed the workshop about aircraft-based observations operations and development in Brazil.
- The Brazilian International OPMET sends ADS-C data automatically to the World Area Forecast Centres, WAFC Washington (KWBCCYXX) and London (EGRRYMYX) in accordance with Annex 3 of ICAO and more than 40,000 messages are collected per month in the Atlantic FIR.
- A comprehensive SITA VHF datalink network over Brazil would be 100% operational by the end of 2016.
- There were 4 large airlines in Brazil with ACARS-equipped aircraft that potentially might contribute to the AMDAR programme in the future.
- The DCEA had been working with TAM Airlines (LATAM) and SITA on the development of a AMDAR programme utilising 7 A319 and 22 A320 aircraft.

- It was expected these data would be available operationally in 2017 in BUFR format.

AMDAR Development with LATAM

- The workshop was informed that the LATAM Airlines Group had the potential to equip around 140 of their Airbus 320 aircraft (including those of LATAM Brazil) with AMDAR capability, however, at the current time, it was not determined how an operational program might be coordinated and supported financially. However, it was expected that data from at least some of these aircraft might be available on the GTS later in 2016 through collaboration with NOAA and Rockwell Collins.

Other Issues

- It was suggested that WMO propose to ICAO and aircraft manufacturers that new aircraft should come standard with the established and approved AMDAR onboard software. It was explained that, while ICAO supported in principle the aims of the AMDAR programme and recognised its benefits, ICAO could not make provisions for meteorological requirements for this type of aircraft-based observations and maintained provisions for ICAO Aircraft Reports (e.g. AIREPs, ADS-C) only.
- It was agreed that the action by ET-ABO in collaboration with ICAO and its WAFCs and with Rockwell Collins, to ensure wider availability and improved quality management of ADS-C meteorological information was important and would be beneficial.
- Rockwell Collins had identified an issue with the quality of Boeing 787 wind vector data and was pursuing the matter with the manufacturer.
- Participants of Jamaica and the Cayman Islands agreed that, while their airlines were not likely to be able to contribute to the AMDAR programme directly, the meteorological agencies of the Caribbean would benefit greatly from better access to and use of AMDAR data.
- In Panama, DDH were not well aware about AMDAR before the workshop but were very interested in AMDAR development as a means to strengthen the services to aviation and Air Traffic Management in the region, especially given Panama's role as an aviation hub in Central America. It was agreed that it was disappointing that COPA Airlines were not represented at the workshop and that they should be contacted regarding AMDAR participation.
- It was agreed that the possibility to have a combined Region III-IV ABOP Regional Implementation Plan (A-RIP) might be beneficial and worth pursuing with the agreement of both Regional Associations.
- Mr Kerry Powery (British Caribbean Territories & Cayman Islands) and Mr Lawrence Brown (Jamaica) volunteered to become member of the Task Team for the development of the combined RA III/RA IV A-RIP.
- The presentation by Mr Richard Mamrosh, NOAA, USA was greatly appreciated and it was suggested that the aspect of use of AMDAR data for forecasting applications should have greater emphasis in future workshops.
- Participants agreed that the NOAA/MADIS aircraft-based observations display system was a valuable tool and requested that regional members be given access.
- Mr Sergio Serrano, Emirates Airways Operations Manager, Tocumen International Airport, agreed that the programme was beneficial to both meteorology and aviation

and would raise the issue of Emirates' participation in the programme with the airline management.

Actions

1. WMO and NOAA to check whether Brazil ADS-C data was being transmitted on the GTS and utilised by Members and data users.
2. WMO to endeavour to identify more National Focal Points for Aircraft-Based Observations within the region.
3. Mr Pritchett and Mr Fournier to ensure that all participants are invited to join the next teleconference meeting on the Region IV A-RIP.

4. Close of the Workshop

Following the completion of the programme of presentations and discussions, Mr Lockett and Mr Grooters again thanked the Dirección de Hidrometeorología for their hosting of the event and for the generous hospitality provided to all participants. Thanks was also expressed to the translators for the excellent translation service they provided throughout the workshop. Mr Alberto Cumbreira provided the closing address to the workshop on behalf of the Director of Dirección de Hidrometeorología thanking all participants and presenters.

ANNEX I – WORKSHOP PROGRAMME

Day 1, 17 August			
Session	Time	Topic or Item	Presenter/Chair
Day 1 Session 1	0830	Workshop Registration	
	0900	Workshop Opening	1. Mr Edilberto Bolívar Esquivel Marconi, Director Hidromet 2. Mr Dean Lockett, WMO 3. Mr Stephen Pritchett, NOAA/NWS 4. Mr Frank Grooters, Chairman, CBS ET-ABO
	0930	Workshop Schedule & Practical Arrangements	Chair, Host
	0940	History of Aircraft-Based Observations & AMDAR	Mr Frank Grooters
	1000	Aircraft-Based Observations and the AMDAR Observing System	Mr Frank Grooters
Break	1030	Coffee/Tea Break	
Day 1 Session 2	1050	Benefits and Impacts of AMDAR Data	Mr Dean Lockett
	1120	Aircraft-Based Observations and AMDAR Data Application	Mr Richard Mamrosh
	1200	Discussion of the morning presentations	Mr Frank Grooters
Break	1230	Lunch break	
Day 1 Session 3	1330	Quality Monitoring and Control	Mr Chris Hill
	1400	Meteorological Services Use of MDCRS/AMDAR Data at NOAA/NWS	Mr Stephen Pritchett
	1430	Airline Perspective of AMDAR Implementation	Mr Rick Curtis
	1500	Argentina AMDAR Programme Development	Mr Nicolas Rivaben
Break	1540	Coffee/Tea Break	
Day 1 Session 4	1600	ABO & AMDAR Potential in the Americas and Caribbean	Mr Frank Grooters
	1630	Panel discussion and feedback from participants	Participants
	1730	End Session 4	
Evening Session	1900	Evening Reception – Radisson Decapolis	
	2000	Water Vapour Measurement	Mr Bryce Ford
	2020	Panasonic Avionic Corporation, TAMDAR System	Mr Neil Jacobs
	2040	Communications and Data Service Provision	ARINC, SITA
	2100	End Day 1	

CBS/OPAG-IOS/ET-ABO/Regional Workshop on AMDAR, Annex I, p. 2

Day 2, 18 August			
Session	Time	Topic or Item	Presenter/Chair
Day 2 Session 1	0900	AMDAR Data Display & Availability	Mr Stephen Pritchett
	0930	EDR Turbulence Reporting	Ms Tammy Farrar (FAA)
	1000	NWP Assimilation	Mr Chris Hill
Break	1030	Coffee/Tea Break	
Day 2 Session 2	Operational Regional and National Programs, Status and Developments:		
	1050	European E-AMDAR Programme	Mr Stewart Taylor
	1120	Canadian AMDAR Programme	Mr Gilles Fournier
	1150	Brazil AMDAR Programme Development	Mr Martim (INMET, Brazil)
Lunch	1230	Lunch Break	
Day 2 Session 3	1400	Final Panel discussion and feedback from participants	ET-ABO Chairman, Presenters, Participants
Day 2 Session 4	1445	Closing Ceremony	
	1500	Workshop Close	
	1500 to 1700	Conference venue will be available for meetings & discussion among meteorological service representatives and national airline representatives.	
	15:30 to 17:00	Tour of Panama Canal - For those wishing to, the Dirección de Hidrometeorología is offering participants the opportunity to take a short tour of the local part of the Panama Canal. Further details will be available during the workshop.	
	18:30	Dinner hosted by Dirección de Hidrometeorología – Atlantic and Pacific Restaurant, Miraflores Locks, Panama Canal.	

ANNEX II – LIST OF PARTICIPANTS**WMO Invited Experts**

Name	From, Country/Organisation	Email
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Gilles Fournier	Gatineau, Canada	gilles.fournier@canada.ca
Stephen Pritchett	Silver Spring, USA	steven.pritchett@noaa.gov
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Chris Hill	Silver Spring, USA	christopher.m.hill@noaa.gov
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WMO Invited Regional Participants

Participant	Country	Email
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Mr Lawrence Brown	Jamaica	l.brown@metSERVICE.gov.jm

Panama Invited Participants

Participant	Organisation	Email
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Mr Alberto Cumbreira	Manager Climatology (interim), Dirección de Hidrometeorología, Panama	
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Mr Alejandro Morales	Jefe del Observatorio MET Albrook	
Mr Celestino Lamboglia	Jefe de Pronósticos MET	
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Airline Participants

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Mr Paulo Sérgio de Oliveira	AZUL Brazilian Airlines, Brazil	