

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS

OPAG ON INTEGRATED OBSERVING SYSTEMS

WMO REGIONAL WORKSHOP ON AMDAR

Nairobi, Kenya, 25-26 June 2015

FINAL REPORT

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GENERAL SUMMARY

1. INTRODUCTION

The WMO Regional Workshop on AMDAR, Nairobi, Kenya was held at the Nairobi Safari Club Hotel over 25-26 June 2015 at the kind invitation of the host, the Kenya Meteorological Service (KMS) and supported by the WMO Commission for Basic Systems and its Expert Team on Aircraft Based Observing Systems (ET-ABO). The workshop was conducted in English and participants consisted of those Region I WMO Members invited by WMO, having national airlines targeted for participation in the Aircraft Meteorological DATA Relay (AMDAR) programme and also others invited by the host. The list of participants is provided in Annex I of this document. The workshop program is provided in Annex II.

It should be noted that this AMDAR workshop was the first of two expected workshops to be held in WMO Region I in 2015, with a second planned to be held in December 2015 in Morocco and especially targeting but not limited to French-speaking Members.

The aims of the workshop were to provide participants with detailed knowledge about the establishment, requirements and operational aspects of the WMO AMDAR programme and to initiate and conduct discussions with and provide advice to participants on aspects of co-operation, leading to initiative to set up national or regional AMDAR programmes.

2. OPENING OF THE WORKSHOP

The workshop opening ceremony commenced at 9 am on 25th June 2015 and was presided over by Mr James Kongoti, Director of KMS and Permanent Representative to WMO, with Guest of Honour, Professor Judi Wakhungu, Cabinet Secretary of the Ministry of Environment and Natural Resources. Participants were first welcomed by Mr Elijah Bukachi on behalf of KMS, Mr Frank Grooters on behalf of CBS and Mr Dean Lockett on behalf of the WMO Secretariat.

Mr Kongoti welcomed participants to Nairobi and to the workshop and expressed his appreciation and thanks to the organisers. Mr Kongoti told the participants that Kenya was very interested in partnering with one or more of its national airlines in the development of a Kenya AMDAR programme and that Kenya would benefit well from such a development.

Professor Judi Wakhungu also welcomed participants and expressed her gratitude and pride that Kenya was to host the first WMO regional workshop on AMDAR in Africa. She spoke of the benefits that the AMDAR programme offered to KMS, the aviation industry and to the wider Kenya and African communities and urged participating meteorological service and airline representatives to work together to rapidly advance the development of AMDAR programmes in Africa. Professor Wakhungu identified the nature of the AMDAR programme as a public private partnership between government meteorological services and commercial airlines, offering a reliable and stable means of delivering much-needed upper air meteorological data with economic efficiency.

3. WORKSHOP PROCEEDINGS

3.1. Workshop Day One

Following the workshop opening, Mr Frank Grooters provided two presentations, the first on the history of aircraft-based observations dating back to the early twentieth century and the second on the development of the AMDAR observing system from the late 1980s as the successor to the WMO Aircraft to Satellite Data Relay (ASDAR) programme.

In the second session of day one, Mr Dean Lockett gave a presentation on the detailed aspects relating to the design and implementation of national AMDAR programmes, including requirements for upper air data, infrastructure and ongoing programme costs, AMDAR software development and testing, systems and data management and data display and use. Mr Lockett then made a presentation on the technical aspects of AMDAR data quality control and monitoring.

Following lunch, the first session of the afternoon focused on the benefits and impacts of the AMDAR programme and the data derived from it. Mr Lockett presented the benefits that AMDAR data provided to WMO meteorological services and described the significant positive impacts that these data have on improving forecast skill and products for a range of meteorological application

areas including but not limited to aeronautical meteorological forecasting and service provision. In a second presentation Mr Lockett then showed how these benefits to meteorology provide flow-on benefits to the aviation industry and in particular to participating airlines, that can realize real and quantified benefits, particularly when coupled with corresponding and complementary actions in improved flight operations and aircraft management.

Ms Gaborakwe Khambule, South Africa, then provided the workshop with a presentation on the South African AMDAR programme, describing the benefits that the South African Weather Service (SAWS) derives from its national programme and also the experience of South African Airways (SAA) as the partner airline. SAA has provided testimony that it has quantified a significant benefit in terms of savings on fuel costs through improved and dynamic use of weather information that is improved with its own contribution of data through the AMDAR programme. SAA calculates savings of the order of several million US dollars per annum through the use of more accurate and current wind information in pre-flight fuel-loading and both pre-flight and in-flight route planning.

In the final session of the first day, Mr Elijah Bukachi, Senior Assistant Director of KMS, provided the workshop with a presentation on the operations of the Kenya Meteorological Service and the expectations KMS has in benefiting from and making use of AMDAR data that might be made available through the implementation of an AMDAR programme in partnership with Kenya national carriers. KMS was confident that improvements to meteorological services and forecast products would result from the availability of AMDAR data over the Kenya region. This would in turn lead to benefits to the aviation industry, airlines and also to the Kenya public arising from use of the data in public weather and commercial industry weather applications. The final presentation of the day was provided by Mr Frank Grooters who discussed some important technical considerations and aspects of AMDAR development in Africa, in particular the key airlines targeted for participation, the required communications infrastructure and issues and the benefits of regional international collaboration on programmatic activities such as data processing and sharing.

3.2. Workshop Day Two

The first session of day two focused on regional technical and planning aspects. Mr Frank Grooters provided a presentation on the activities of the CBS Expert Team, ET-ABO, in working with the WMO Regional Association I (Africa) on the development of an Aircraft Based Observations Regional Implementation Plan (A-RIP). This plan identified many key activities and priorities for AMDAR and aircraft-based observations development. It includes WMO initiatives for provision of supplementary AMDAR data from operational AMDAR programmes and the possible establishment of a Central Africa AMDAR programme in collaboration with the avionics company Flyht and utilising the AFIRS system.

Mr Elijah Mukhala from the WMO Regional Office, Kenya, then provided the workshop with a presentation on the African Ministerial Conference on Meteorology (AMCOMET), which is the intergovernmental authority on meteorology in Africa and provides a high-level policy mechanism for the development of meteorology and its applications in Africa. Mr Mukhala informed the workshop that AMDAR is a Flagship Programme within the AMDAR Implementation and Resource Mobilization Plan, under Strategic Pillar 3: Improve access to meteorological services in particular for marine & aviation sectors. AMDAR was also a good example of a Public-Private Partnership, leveraging the core competencies of the private sector to enhance the provision of weather and climate services that meet end-user needs.

In the second session of the morning of Day 2, Mr Dean Lockett provided a presentation on alternative, new and developing technologies in aircraft-based observations, including water vapour measurement utilising the Water Vapour Sensing System (WVSS-II), turbulence monitoring and the Tropospheric Airborne Meteorological Data Reporting (TAMDAR) system. This was followed by a presentation submitted by ASECNA outlining the development of AMDAR as a project and component of the ASECNA five-year planning cycle, in collaboration with WMO and CBS.

Final Discussion, Participant Feedback and Plans

As the final component of the formal part of the workshop and before lunch on day two, Mr Grooters led a session of discussion among all participants on the AMDAR programme and its potential for development in Africa and in particular within those countries represented at the workshop. A summary of the key points is provided below:

- Angola: The representative believed that an AMDAR development was possible and would be advantageous but relied on favourable management decisions to proceed based on recommendation by the participant and the willingness of the airline to participate. Representatives of TAAG Angolan Airlines were also favourable in perception in relation to the merits of the programme and the potential to contribute to reductions in airline fuel costs through improved flight operations and subject to a demonstrated business case. It was agreed that high level national government and ministerial support would be advantageous. Representatives of both the airline and the NMHS were enthusiastic about follow-up discussions.
- Egypt: The participant agreed that the benefits of the programme were clear and represented an opportunity for Egypt and its meteorological service in partnership with its national airlines. Contact with EgyptAir had been made with a request for completion of the avionics survey and correspondence would continue in the near future. Advice from SAWS had also been sought.
- Ghana: Was most interested in the availability of AMDAR data from other programmes, given the lack of a national carrier that might contribute to the programme. It was agreed that support from the civil aviation authorities would be very beneficial in convincing airlines to participate. Mr Quao Stephen of Ghana Civil Aviation would ensure that AMDAR was raised as a topic for consideration at the next meeting of the regional civil aviation authorities committee.
- Mauritius: As Mauritius had been a contributor to the earlier ASDAR project, AMDAR would be seen in a favourable light by both the NMHS and the national carrier. The representative would provide feed back to the director of the meteorological service and also contact the national airline in the near future and present the benefits of the programme. It was expected that participation in the programme would be of great benefit to Mauritius given its susceptibility to severe weather, which acutely affected aviation operations in the country.
- Namibia: The NMHS representative would report to management on return and would seek to initiate further discussion with Air Namibia following up on that which took place during the workshop. It was expected that funding the initial costs of establishing the programme would be a significant issue and potential hurdle to overcome. The representative of Air Namibia was convinced of the benefits of the programme and was keen to follow up with both airline management and the NMHS in the development of a business case and plans for collaboration.
- Ethiopia: Has plans and a budget for AMDAR development over 2015-18 as a component of its modernisation programme. The representative expected to organise in the near future a national AMDAR workshop aimed at convincing stakeholders of the benefits.
- Kenya: Both NMHS and airline representatives were very enthusiastic about the programme and the potential for collaboration in the near future. KMS was very keen to work with Kenya Airways towards programme development and was confident that it might be capable of fulfilling a role as a regional aircraft-based observations data processing

centre. Availability of finances was identified as a key risk associated with moving ahead with programme development. Representatives of Kenya Airways recognised the enormous benefits of the programme and agreed that the airline would likely benefit through improved flight operations and fuel cost savings. Highlighted that it would be important to come to agreement early on programme costs and how these would be met, particularly in relation to ongoing communications costs, which would not be insignificant. The Government needed to recognise that the benefits of the data were universal and available to applications outside of the aviation industry and that, therefore, there was justification in the sharing of programme costs. The airline representatives believed that the meteorological services need to be proactive and convincing in presenting the programme and its benefits to airline managers and decision makers. A sample data set of messages was requested by the airline representative to allow an initial estimation of operational message delivery communications costs of a potential AMDAR programme. A close collaboration with and even a possible visit to South Africa would help with programme development and establishment with a view to taking advantage of SAA experience and not “reinventing the wheel”. Funding for the initial stages of the project would be sought from the Kenya Government, AMCOMET and other potential funding sources.

Afternoon Meetings of Meteorological Service and Airline Representatives

A series of meetings was arranged for the afternoon between meteorological service and airlines representatives of Angola, Namibia and Kenya, in which the participants would take the opportunity to discuss the issues and aspects of the AMDAR programme identified during the workshop and with a view to further collaboration between the national parties in the future.

3.3. Workshop Closure

A short closing ceremony was conducted, with Mr Dean Lockett speaking on behalf of WMO and thanking the workshop host and organisers, the presenters and the participants for their various contributions to the workshop. Mr Elijah Bukachi on behalf of the Director of KMS thanked WMO for supporting the regional workshop and the presenters and participants for their enthusiastic input. Mr Raymond Masuku of Air Namibia and Mr Raphael Kangethe of Kenya Airways thanked all workshop organisers and presenters on behalf of all participants. The workshop closed at around 12:30pm, 26 June 2015.

ANNEX I**LIST OF PARTICIPANTS**

NAME	TITLE	ORGANIZATION	COUNTRY	Tel:	EMAIL
Mr. James Kongoti	Director KMS	KMS	Kenya		kongoti@meteo.go.ke
Mr. Makanga Shukuru	Flight Operations	FLY 540	Kenya	0724-280872	williammakanga@yahoo.com
Mrs. Khambule G. Esther	SM: MET Aviation	SA Weather Service	South Africa	+27795322909	gaborekwe.khambule@weathersa.co.za
Dr. Quao Stephen	Aviation Met Inspector	Ghana Civil Aviation	Ghana	020-8199039	snyarkotey@yahoo.co.uk
Mr. Gathika Benson	Engineer	Kenya Airways	Kenya	0723774590	Benson.gathiaka@kenya-airways.com
Captain Butt Martin	Captain	Kenya Airways	Kenya	0713462818	Martin-butt@kenya-airways.com
Dr. Okoola Raphael	Lecturer	University of Nairobi	Kenya	0722306904	rokoola@uonbi.ac.ke
Mr. Nasser Salem	Director of Data	Egyptian Met	Egypt	01007034143	nasser.salem@ema.gov.eg
Ms. Kimutai Joyce	Meteorologist	KMS	Kenya	0724708605	kimutaijoy@gmail.com
Mr. Masuku Raymond	Manager Flight OPS	Air Namibia	Namibia	+264811227267	Raymond.Masuku@airnamibia.acro
Mr. Grooters Frank	Chairman CBS ET-ABO		Netherlands	+31611225867	fgrooters@gmail.com
Mr. Tafesse Regassa	Director AMSD	NMA Ethiopia	Ethiopia	0911856083	Regassa.gurmu@gmail.com tafesseg@yahoo.com
Mr. Mbithi Daniel	Principal Meteorologist /OIC	JKIA	Kenya	+254(0)722664897	mbithi@meteo.go.ke mbithi_d@yahoo.com
Mr. Ahago Vitalis	Regional Officer	ICAO	Kenya	+2547622397	VAhago@icao.int
Mr. Ambenje Peter	Deputy Director	KMS	Kenya	+252722769879	ambenje@meteo.go.ke
Mr. Machio Harrison	Safety Manager	CAA	Kenya	0722849930	Harrison.machio@kaa.go.ke
Mr. Lutumba Tima	Head of Met. Water	INAMET	Angola	+244930192933	Gatumba.tima@inamet.gov.ao
Mr. Souza Djalma	FLT OPS Engineer	TAAG Angolan Airline	Angola	+244914752035	djalma.sousa@flytaag.com
Mr. Njeru Nyaga	Senior Engineer	KCAA	Kenya	0721854190	paanyaga@gmail.com

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NAME	TITLE	ORGANIZATION	COUNTRY	Tel:	EMAIL
Dr. Mukhala Elijah	Representative	WMO	Kenya	0731794078	emukhala@wmo.int
Mr. Akoolo Samuel	Communications	KCAA	Kenya	0733949288	akoolo71@gmail.com
Mrs. Ramessur Surekha	Ag. Divisional Meteorologist	MMS	Mauritius	230 57896753	surekra@gmail.com
Ojala Roselyn	Deputy Director	KMS	Kenya	0723756080	ojala@meteo.go.ke
Mr. Guilherme Antonio	IT OPS	TAAG-ANGOLA	Angola	+244923497144	Antonio.guilherme@flytaag.com
Mr. Paterson Sean	Airport Services Manager	Qatar Airways	Qatar	+254 734988684	nbokzgr@qatarairways.com
Mr. Gicheru Winstone	AERO Met Inspector	KCAA	Kenya	+254 721339267	wgicheru@KCAA.or.ke
Mr. Aloyce Kimata	OPS coordinator	FLY 540	Kenya	+254 721351740	a.kimata@outlook.com
Mr. Claudius Ogundu	SMTO	KMS	Kenya	+254 722989897	claudiusogundu@gmail.com
Mr. Arodi Domnick	Meteorologist	KMS	Kenya	+254734818178	arodioginga@yahoo.com
Mr. Okatch Danish	Snr AIS Officer	KCAA	Kenya	+254722393721	dokatch@kcaa.or.ke
Ms. Anderson Albertina	Meteorologist	NMS	Namibia	00264814950612	Albertina57@gmail.com
Mr. Kangethe Raphael	Business Analyst	Kenya Airways	Kenya	+254786131530	Raphael.kangethe@kenya-airways.com
Capt. Nathwani Prital	Captain	Kenya Airways	Kenya	+254735515464	Prutal.nathwani@kenya-airways.com
Mr. Nalianya John	Manager OPS Control	Kenya Airways	Kenya	+254721885225	John.nalianya@kenya-airways.com
Mr. Omukuba Martin	Quality Assurance	Kenya Aerotech	Kenya	+254721165526	Omukuba.martin@kenya-aerotech.com
Mr. Gitia Francis	Manager Engineering	Kenya Airways	Kenya	9734220442	Frabcus.gitia@kenya-airways.com
Mr. Christopher Meiselal	Met. Supt.	KMS	Kenya	+254 733946672	Meiselal@meteo.go.ke
Mr. Elijah O. Bukachi	Senior Assistant Director	KMS	Kenya	+254722239502	E_bukachi@yahoo.co.uk
Mr. Daniel Wepukhulu	HOCAD	KMS	Kenya	+254 733488624	dnlwepukhulu@yahoo.com
Mr. Kizito Oundo	Met. Officer	KMS	Kenya	+254 724 056461	kizitoamua@gmail.com
Ms. Jemima Mwebia	FLOE	Kenya Airways	Kenya	+254720740942	Jemimah.Mwebia@kenya-airways.com

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NAME	TITLE	ORGANIZATION	COUNTRY	Tel:	EMAIL
					jamielkaggs@gmail.com
Ms. Lydia Wambugu	Secretary	KMS	Kenya		lwambugu@meteo.go.ke
Ms. Bahati Musilu	Communication	KMS	Kenya	+254 721 433 979	bahati@meteo.go.ke
Mr. Samuel Mwangi	DD Forecasting	KMS	Kenya		mwangi@meteo.go.ke
Mr. Peter Ambenje	DD Technical Services	KMS	Kenya	+254 769879	ambenje@meteo.go.ke pambenje@yahoo.co.uk
Mr. Dean Lockett	Scientific Officer, Aircraft & Remotely- sensed Observations	WMO	Switzerland	+41 730 8323	dlockett@wmo.int
Mr. Frank Grooters	Chair CBS Expert Team on Surface Based Observing Systems	WMO CBS	The Netherlands	+31 30 2293250	fgrooters@gmail.com

ANNEX II – Workshop Program

Day 1, 25 June			
Session	Time	Topic or Item	Presenter/Chair
Day 1 Session 1	0830	Workshop Registration	
	0900	Workshop Opening	1. Honourable Guest Speakers 2. Mr Dean Lockett, WMO 3. Mr Frank Grooters, Chair CBS ET-ABO
	0930	Workshop working arrangements	KMS Host
	0940	History of aircraft-based observations including AMDAR	Mr Frank Grooters, ET-ABO
	1000	The AMDAR Observing System	
Break	1030	Coffee/Tea Break	
Day 1 Session 2	1050	Design and Implementation of an AMDAR Programme	Mr Dean Lockett, WMO
	1150	Data Quality Monitoring and Control	
	1210	Discussion of the morning presentations	Chair: Mr Frank Grooters
Break	1230	Lunch break	
Day 1 Session 3	1330	Benefits and Impacts of AMDAR Data	Mr Dean Lockett, WMO
	1400	Meteorological Services Use of AMDAR Data	Ms Gaborekwe Khambule, SAWS
	1430	Airline Perspective of AMDAR Implementation	
	1500	Expected Benefits of AMDAR Development in Kenya	Mr Elijah Bukachi
Break	1540	Coffee/Tea Break	
Day 1 Session 4	1600	Region I AMDAR Development and Technical Aspects of Programme Implementation	Mr Frank Grooters, WMO, NMHS Representatives
	1645	Panel discussion and feedback from participants	Panel
	1730	End Day 1	

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Day 2, 26 June			
Session	Time	Topic or Item	Presenter/Chair
Day 2 Session 1	0900	Region I Implementation Plan and Projects	Mr Frank Grooters, ET-ABO
	0930	WMO Regional Office for Africa and AMCOMET	Dr Elijah Mukhala, WMO
Break	1030	Coffee/Tea Break	
Day 2 Session 2	1050	New Developments and Other Related Systems and Technologies	Mr Dean Lockett, WMO
	1110	Status Report of ASECNA AMDAR Development	
	1130	Final Panel discussion and feedback from participants	
	1200	The way forward Final Summary and Report Notes	Chair: Mr Frank Grooters, ET-ABO
Lunch	1230	Lunch Break	
Day 2 Session 3	1330	Afternoon set aside for discussion among meteorological service representatives and national airline representatives. Conference venue and meeting rooms will be available.	
	1600	Workshop Close	