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COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP
ON INTEGRATED OBSERVING SYSTEMS

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EXPERT TEAM ON AIRCRAFT-BASED OBSERVING SYSTEMS
FIRST SESSION

ITEM: 3.1

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STATUS OF THE AIRCRAFT-BASED OBSERVATIONS PROGRAMS

Report for United States of America Operational National Program

(Submitted by Carl Weiss, USA)

SUMMARY AND PURPOSE OF DOCUMENT

Provides a status report on the national AMDAR Program for the
United States of America

ACTION PROPOSED

The Session is invited to review and discuss the content of the document.

Appendices

1. Program Metadata
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2013 U.S. AMDAR MDCRS PROGRESS / ACTIVITY REPORT

Current MDCRS Status:

1. Approximately 2025 aircraft operated by seven U.S. airlines (American, Alaska, Delta/Northwest, FedEx, United, United Parcel Service, and Southwest) are equipped to participate in the US AMDAR program.
2. On average, approximately 1500 of these aircraft provide an average of nearly 275,000 observations daily.

MDCRS Development and other Activities:

1. NOAA and the FAA continue discussions with ARINC to start development of an optimization capability for MDCRS data. The intent of these talks is to examine the feasibility of entering into a contract for data optimization services.

Future MDCRS Plans:

1. The U.S. is planning to take steps to increase aircraft meteorological data coverage over data-sparse areas of the world. This 2-year project will complement radiosonde soundings for global and regional weather prediction. Specifically, this project will seek to expand current aircraft observational capability via:
 - En route Alaska Airlines data from off the U.S. west coast
 - U.S. MDCRS carriers flying to destinations in Africa, South America and the Islands in the Western Pacific (Micronesia)
 - Partnering with the WMO AMDAR program to enlist countries in these same areas to begin their own AMDAR programs
 - Available data from regional U.S. carriers (including TAMDAR)

Observing system experiments will play an important role in demonstrating the value of these aircraft observations for operational forecasting. Quality control of the data also will be a key component of the project. After the 2-year project period ends, support will be sought to maintain and optimize the flow of data operationally.

2. Future budgets will continue to play a critical role in capacity expansion and optimization activities.
 3. NOAA will continue to work with the WMO to bring Aeroméxico online as an AMDAR provider.
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2013 U.S. WVSS-II PROGRESS AND ACTIVITY REPORT

Current WVSS-II Status:

1. 20 additional Southwest Airlines aircraft have been equipped with WVSS-II sensors, bringing the total for Southwest to 87 operating units. Adding the 25 systems on UPS aircraft, makes the total 112 WVSS-II sensors reporting water vapor measurements.
2. This fleet produces about 2000 profiles (upwards of 50,000 moisture observations) of the atmosphere daily.

WVSS-II Development & Other Activities:

1. NOAA continues to work with ARINC and SpectraSensors, Inc. to seek FAA Supplemental Type Certification (STC) for the B737 800-series airframe. This is an important activity as older 300-series airframes will be replaced by these more modern aircraft.

Future WVSS-II Plans:

1. UPS has indicated an interest in installing additional WVSS-II systems using Airbus aircraft. United Airlines also has inquired about participating in the WVSS-II program. These leads will be followed up.
 2. Southwest Airlines is interested to continue installing more WVSS-II units on their aircraft under the existing contracts with NOAA. This too, will be investigated.
 3. As with MDCRS, future budgets will continue to play a critical role in WVSS-II expansion activities.
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2013 U.S. OUTREACH/TRAINING PROGRESS AND ACTIVITY REPORT

Current Outreach Status:

1. The U.S. continues to promote AMDAR at various events and venues.
2. The U.S. also continues to seek new opportunities to promote AMDAR.

Outreach Development & Other Activities:

1. At the 2013 Experimental Aircraft Association's (EAA) AirVenture (July 29 – August 4), the National Weather Service (NWS) again promoted AMDAR activities at its exhibit. An AMDAR poster was displayed at the NWS booth along with a WVSS-II unit. Response from the visitors again this year was very supportive of the program.
2. Carl Weiss represented the AMDAR program at the Airline Electrical Engineering Committee – Data Link Users Forum (AEEC–DLUF), February 5-7, 2013 in Phoenix, Arizona, USA. The purpose of attending was to keep AMDAR issues in front of the airline engineers and to make contact with industry representatives.
2. Bryce Ford (SpectraSensors, Inc.) promoted AMDAR/WVSS-II at the following events:
 - American Meteorological Society (AMS) 93rd Annual Meeting, January 5-10; Austin, TX
 - Visit of South African delegation to the USA, February 5; Washington, DC (Tammy Farrar [FAA] gave a talk on turbulence detection and Jeannine Hendricks [ARINC] spoke on MDCRS and WVSS-II)
Friends and Partners of Aviation Weather (FPAW) Summer Meeting, July 24; Washington, DC
 - AMS Summer Meeting, August 12; Boulder, CO
4. SpectraSensors, Inc. has a presence on LinkedIn for their products including WVSS-II. More details can be found at:

http://www.linkedin.com/company/spectrasensors/wvss-ii-atmospheric-water-vapor-sensing-system-855524/product?trk=biz_product.

5. Southwest Airlines, in conjunction with ARINC and NWS, is finalizing production of a 2½-minute promotional video highlighting their participation in the WVSS-II program. The video begins with an overview on the manufacturing and installation of the sensor and then highlights the partnerships between NWS, ARINC and Southwest Airlines. The video concludes with how the WVSS-II system operates and how the water vapor data collected contribute to improved weather forecasts and the benefits the data offer.

This collaborative effort will show the data's value (among other benefits) to

- help improve on-time performance and safety
- increase operational efficiency and
- provide better customer service

This video will be made available to Southwest Airlines employees and customers over various communication vehicles as well as social media. Accurately characterizing the distribution of

atmospheric moisture through this innovative use of the nation's commercial aircraft ultimately will benefit the nation's air transportation system.

Future Outreach Plans:

1. As in 2013, NWS and the U.S. AMDAR program plans to continue promoting AMDAR, including WVSS-II, at EAA AirVenture and the National Business Aviation Association (NBAA) Convention and other appropriate events. Also, we hope take advantage of new outreach opportunities that present themselves during the upcoming year.
 2. All ET members are encouraged to promote AMDAR in their activities and to notify me (*carl.weiss@noaa.gov*) of these events.
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Current Training Status:

1. The U.S. continues to employ AMDAR data in the training developed for NWS forecasters.

Training Development & Other Activities:

1. AMDAR data have been used in aviation weather training produced by COMET at the request of African nations to respond to WMO forecaster competency requirements. AMDAR soundings were used to show their utility in forecasting low stratus and fog, in addition to other applications.

Future Training Plans:

1. Rich Mamrosh (NWS Green Bay, WI) is planning a study to compare AMDAR data to aviation forecast products, specifically SIGMETs and AIRMETs, issued by the U.S. Aviation Weather Center.
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APPENDIX 1**PROGRAM METADATA****2013 U.S. Operational Fleet**

Airline	Country of Airline	Aircraft Type (e.g. B737-400)	Number of Aircraft	AMDAR Software	Format On GTS (BUFR / FM42)
Delta	US	B737, B757, B767, B777, MD88, MD90	398	N/A	BUFR
UPS	US	B727, B747, B757, B767, A300, DC8, MD11	177	N/A	BUFR
American	US	B737, B757, B767, B777, A300, MD82, MD83	386	N/A	BUFR
Southwest	US	B737	79	N/A	BUFR
United	US	B737, B747, B757, B767, B777, A319, A320	284	N/A	BUFR
FedEx	US	B757, B777, A300, A310, DC10, MD10, MD11	60	N/A	BUFR
Northwest	US	B747, B757, A319, A320, A330, DC9	152	N/A	BUFR
Alaska	US	B737	119	N/A	BUFR
Continental	US	B737, B757, B767, B777	326	N/A	BUFR

Program Coverage *TO BE DETERMINED...*

[If possible, provide here a summary estimate of the national or regional AMDAR program coverage as at July 2013. Indicate in the last column which measure is being used as necessary. Information should ideally be based on 1 month of data.]

Airport Country	Airport Name	Airport ID (IATA)	Profiles per day/week

Notes

- a) [Include here any notes on the above program coverage including a brief description of how the metadata was compiled.]

Program Potential Coverage *TO BE DETERMINED...*

[If possible, provide here a summary estimate of the national, international or regional AMDAR program **potential** coverage as at July 2013. Data should be provided here only for airports that are able to be serviced by the **existing operational national or regional AMDAR fleets** (i.e. enabled through configuration or optimisation control alteration) and only for those airports **not** listed under Program Coverage. Information should ideally be based on 1 month of data.]

Airport Country	Airport Name	Airport ID (IATA)	Profiles per day/week

Notes

- a) [Include here any notes on the above program coverage including a brief description of how the metadata was compiled. Please also indicate what practical measures would/might be necessary to activate this potential source of AMDAR data and, if possible, an indication of the likely cost per unit of data (estimates only).]

Program Potential International Coverage *TO BE DETERMINED...*

[If possible, provide here a summary estimate of the **international** AMDAR program **potential** coverage as at July 2013. Data should be provided here for airports that are able to be serviced by the equipping of international-operating aircraft within the fleets of **existing** AMDAR partner airlines (i.e. enabled through implementation of AMDAR software for the aircraft fleet) and only for those airports **not** listed under Program Coverage and Program Potential Coverage. Information should ideally be based on 1 month of data.]

Airport Country	Airport Name	Airport ID (IATA)	Airline & Fleet (Aircraft model)	Profiles per day/week

Notes

- b) [Include here any notes on the above program coverage including a brief description of how the metadata was compiled. Please also indicate what practical measures would/might be necessary to activate this potential source of AMDAR data and, if possible, any information on avionics type and AMDAR software requirements.]