

WORLD METEOROLOGICAL ORGANIZATION

ET-AIR-3 and AMDAR Panel-14/Doc. 3.4.1(6)

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

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AMDAR PROGRAMME STATUS

Status Reports on National and Regional AMDAR Programmes

Established AMDAR Programmes

Status Report Germany

(Submitted by Deutscher Wetterdienst, DWD)

Summary and purpose of document

This document provides information on the activities and plans for the German AMDAR Programme.

ACTION PROPOSED

1. The Panel is invited to note the information contained in the document.
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PROGRESS / ACTIVITY REPORT

Current Status:

1. The Fleet's Status

The German part of the EUMETNET-AMDAR fleet currently consists of aircraft operated by

- Lufthansa Passage,
- Lufthansa Cargo,
- Lufthansa CityLine.

The configuration is as follows (based on information of July 2011):

Aircraft Model	Active	
	2010	2011
A319-100	25	27
A320-200	43	46
A321-100	20	20
A321-200	17	26
A330-300	15	15
A340-300	26	26
A340-600	24	24
A380-800	1	7
B737-300	63	62
B747-400	29	30
CRJ-900	12	12
MD11-F	17	18
TOTAL	292	313

The total number of aircraft has been increased to 313.

2. Aircraft with Humidity Instruments

On three of the Airbus A319 the humidity sensor type WVSS-II is operated (SpectraSensors Inc.). Because of known reasons all of the three sensors (version of the year 2006) show biases mainly on the dry side between - 10 % and - 20 % of relative humidity. During the last 12 months no changes have been done for the 3 existing humidity aircraft of the Lufthansa fleet. The replacement by instruments of the latest generation is planned.

3. Optimization

In the German fleet the main part of costs is coupled to the amount of data transmitted via the worldwide communication networks. In order to save data transmission costs the system E-ADOS (E-AMDAR Optimisation System) ensures an adjustable and equally distributed data coverage in time and space without redundancies. The airlines of Lufthansa, Finnair and KLM belong to the E-ADOS

pool of coordinated activation. The AMDAR activity of aircraft within this pool is structured by configurable priorities of aircraft, airports and regions. For example a small amount of special aircraft like those with humidity sensors can get a high priority level. In these days the three units in the Lufthansa fleet are set to the standard level until the a new generation of instruments is installed later. On demand the atmospheric data sampling is targeted to sites beyond the standard range of EUCOS.

Development and other Activities:

4. Test Flights with New Generation Humidity Instruments on Research Aircraft

Of the new WVSS-II generation (year 2009) two units each have been flown in 2011 on two different test beds:

- BAe 146 operated by FAAM (Facility for Airborne Atmospheric Measurements, UK):
In a piggy-back mode the WVSS-II units are operated together with reference humidity instruments during routinely scheduled campaigns. For the second instrument an alternate sample air inlet is tested. It provides an increased pressure in the sample gas flow to yield sufficiently dry conditions even without electrical heating of the sampling tube. In doing so, the locally increased absolute humidity shall lead to an extension of the instrument's operation range by an altitude of about 100 hPa or more.
- Lear Jet 35 on behalf of EUFAR (European Facility for Airborne Research):
In the flight trial DENCHAR (Development and Evaluation of Novel Compact Hygrometer for Airborne Research) two WVSS-II units have been part of a comparison between several sophisticated humidity measurement techniques.

First quick views show a consistency of the instrument's performance with the good climate chamber results of one year before. Detailed evaluation is in progress.

Future Plans:

5. Continued Humidity Instrument Tests

The piggy-back operation on the FAAM aircraft will be continued.

6. Humidity Instrumentation of the Fleet

It is planned to replace the old WVSS-II humidity sensor units operated up to now on three aircraft by those of the latest version. Within the next 2 years, a number of at least 6 additional aircraft of the Lufthansa fleet will be equipped with humidity instruments. Contract negotiations with the airline Lufthansa are in their final phase.

7. Software Upgrades

The Lufthansa fleet will have to get the ARINC 620 upgrade. As a precondition the ground software for receiving and GTS transmission of the downlinked data will have to be upgraded for both the new ARINC 620 as well as the latest BUFR template version. By all this the overdue improvement of the humidity's resolution as well as increased resolutions of time stamps, position values and humidity together with new parameters such as GNSS and quality control data will be available on GTS.
