The WMO AMDAR Program

**AMDAR Programme Current Status**

- **WMO - World Meteorological Organization** ([http://www.wmo.int](http://www.wmo.int))
  - Manages and maintains the World Weather Watch (WWW) Programme in cooperation with Members (National Meteorological and Hydrological Services) and partner organizations

- WWW Programme is responsible for operation of the WMO Integrated Global Observing System (WIGOS), supporting: Numerical Weather Prediction, Public Weather Services, Disaster Warning and Recovery, Climate and Meteorological Research, and **Aeronautical Meteorology**

- The Aircraft-based Observing System is a critical component of the WMO WIGOS

* AMDAR = Aircraft Meteorological Data Relay, a WMO program
AMDAR Programme Current Status

- 10 National & Regional Programme
- Over 30 Airline Partners
- Around 2800+ aircraft
- Approx 295,000 observations per day
- Supplemented by around 15,000 ADS observations per day
Enhancing Atmospheric Monitoring

 Approximately 790, Twice / Day 
  (If Reporting at all)

Global Radiosonde Sites

Routes with AMDAR Reporting Aircraft (global)

High Spatial Density and Temporal Density Observations
Enhancing Atmospheric Monitoring

CONUS Radiosonde Sites

Approximately 70, Twice / Day

Routes with MDCRS/AMDAR Reporting Aircraft (U.S.)

High Spatial Density and Temporal Density Observations
AMDAR Programme Current Status

- AMDAR is the core component of the Aircraft-based Observing System:
  - ~ 95% of all AOS data (supplemented by ICAO AIREPs, PIREPs, and ADS)
  - Data derived from vertical profiles and enroute reports of meteorological parameters according to meteorological specification
  - Data quality is equivalent to radiosonde
  - Impacts on forecasting ability of weather services to aviation are significantly positive
Impact of AMDAR Data: Meteorological Data Use

- Surface & Upper Air Wind & Temps forecasts
- Thunderstorm genesis, location and severity
- Wind shear location and intensity
- Winter Precipitation type, location, and intensity
- Low cloud formation, location and duration
- Fog formation, location and duration
- Turbulence, location and intensity
- Jetstream, location and intensity
Impact of AMDAR Data: NWP Model Data Use

Several studies have confirmed that AMDAR is a significant contributor to accuracy of Numerical Weather Prediction forecast models; e.g.

Reference Benjamin et al, “Impact of upper-air and near-surface observations on short-range forecasts from NOAA hourly assimilation cycles (RUC and Rapid Refresh)”, Sedona Workshop, May 2012
http://www.wmo.int/pages/prog/www/OSY/Meetings/NWP5_Sedona2012/2a1_Benjamin.pdf

Further info in the Oct 2012 AMDAR Newsletter
Coverage is not optimal
- Very good coverage over USA, Western Europe
- Good over parts of Asia and Australasia
- Poor elsewhere
Development of the AMDAR Programme currently under management of the WMO AMDAR Panel - about to change:
- Final Meeting of AMDAR Panel in Boulder, November 5-9, 2012 after which the Panel will cease to operate
- Future management/governance of the AMDAR Programme will be through WMO and its Technical Commissions
  - CBS - Commission for Basic Systems; responsible for coordination and development of Aircraft-based Observations as a component of GOS
  - CIMO - Commission for Instruments and Methods of Observations; responsible for coordination and development of the technical, scientific and standards aspects

Plan for 2 Expert Teams (ET) of WMO Members in the future
- One ET for each Commission (CBS and CIMO)
- Expert Teams to meet on biennially in alternating years
Aircraft-based Observations - Plans for Future

- Plans in line with CBS Implementation Plan for Evolution of the Global Observing System (to 2025):
  1. Priority for development of Region I (Africa) and Region III (So. America)
  2. Expand and enhance coverage
  3. Develop optimization capability
  4. Implementing/Expanding water vapor measurement for AMDAR system
  5. Enable Data Targeting - i.e. production of data and modification of reporting for synoptic weather, climate, and other applications
  6. Ensure integration into aviation standards and practices
  7. Develop AMDAR or Aircraft-based Obs for GA aircraft
Future Plans

Aircraft-based Observations - Plans for Future

Key projects/tasks over next 5 to 10 years:
- Consolidate regulatory material within WMO
- Finalize AMDAR software standard
- Expand AMDAR over WMO Region I (Africa) and Region III (So. America)
- Integrate AMDAR software into major avionics systems for supply from catalogue
- Implement/Expand water vapour measurement on the AMDAR platform
- Integrate WV sensor as deliverable from factory floor on request
- Integrate EDR standard within AMDAR
- Extend ground-based data optimization control and program efficiency
- Extend international global AMDAR fleet
- Extend vertical profile coverage to smaller regional airports and hubs