

WMO AMDAR Programme Overview



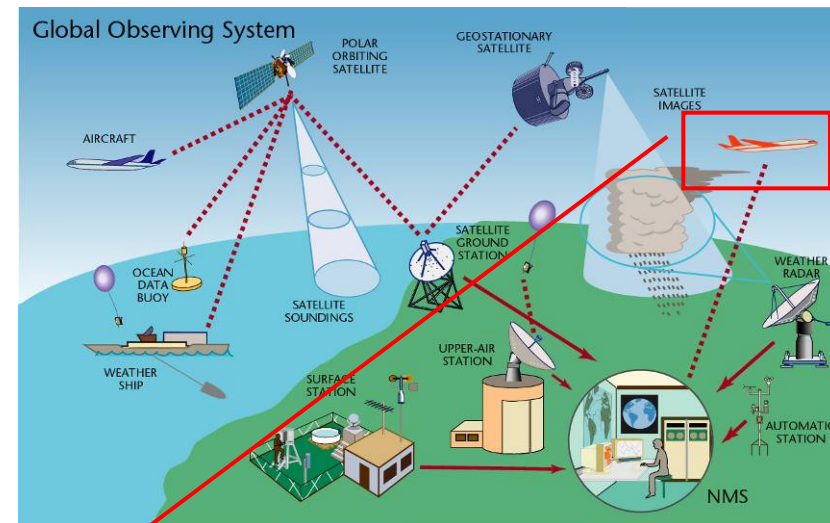
Bryce Ford - presenting on behalf of WMO and NOAA

FPAW Nov 1, 2012

AMDAR Programme Current Status

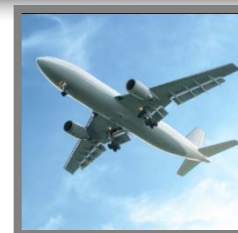
 WMO - World Meteorological Organization (<http://www.wmo.int>)

- 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 Programme Current Status

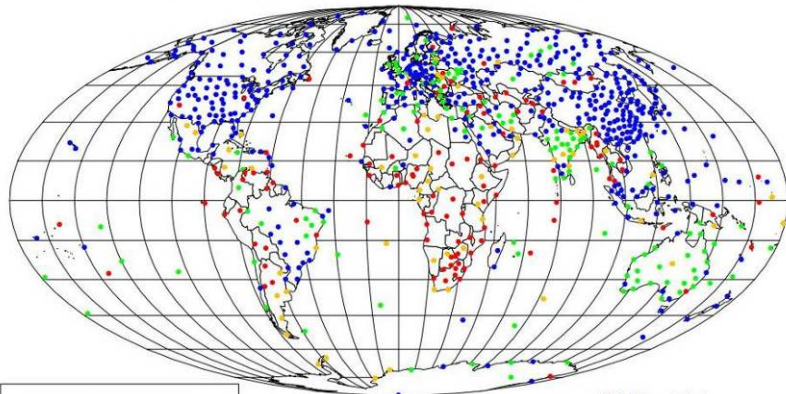
- 📁 10 National & Regional Programme
- 📁 Over 30 Airline Partners
- 📁 Around 2800+ aircraft
- 📁 Approx 295,000 observations per day
- 📁 Supplemented by around 15,000 ADS observations per day



Global Radiosonde Sites

AGM-IWM 1-15/10/2010

Parts A of TEMP reports made at 00 and 12 UTC at RBSN stations



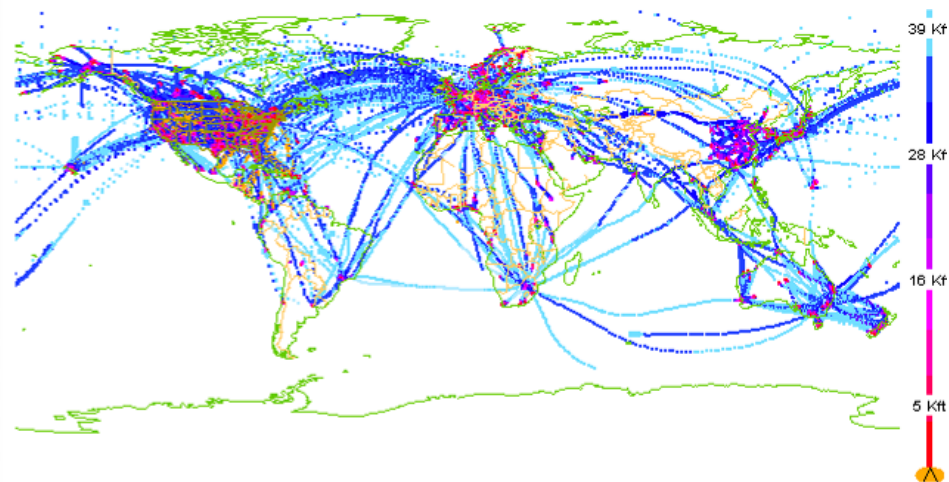
Percentage of reports received:
● 90 to 100 per cent (483 stations)
● 45 to 90 per cent (133 stations)
● Less than 45 per cent (61 stations)
● Silent stations (113 stations)

WMO Secretariat

The designation employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the WMO Secretariat concerning the legal status of any country, territory, city or area.

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

Routes with AMDAR Reporting Aircraft (global)



11-Oct-2012 09:00:00 -- 12-Oct-2012 08:59:59 (368664 obs loaded, 368633 in range, 19331 shown)

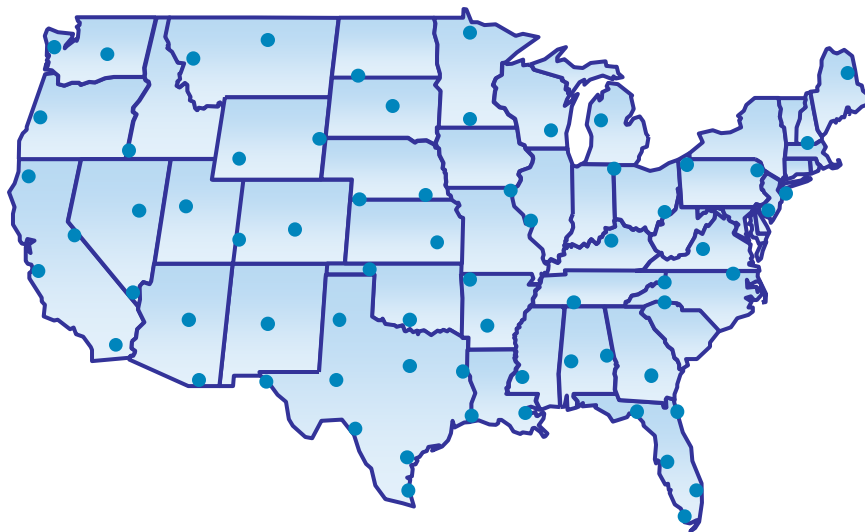
High Spatial Density and
Temporal Density Observations

Enhancing Atmospheric Monitoring

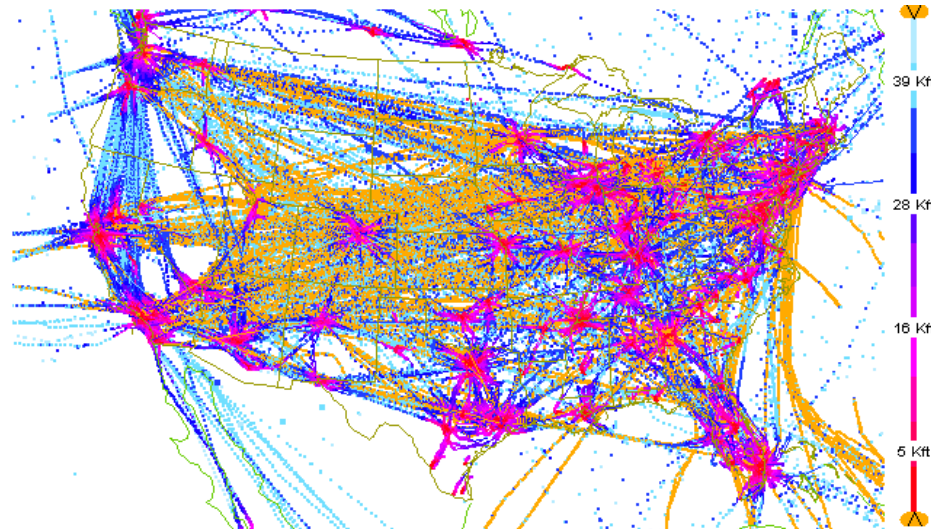


CONUS Radiosonde Sites

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



Approximately 70,
Twice / Day



11-Oct-2012 09:00:00 -- 12-Oct-2012 08:59:59 (368664 obs loaded, 244758 in range, 64295 shown)

NOAA / ESRL / GSD Altitude: -1000 ft. to 45000 ft.

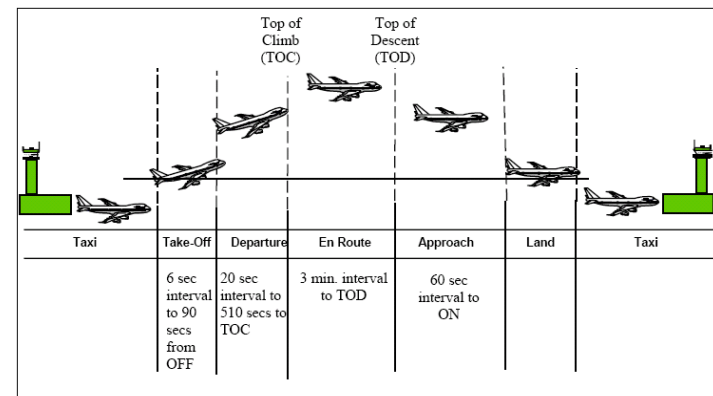
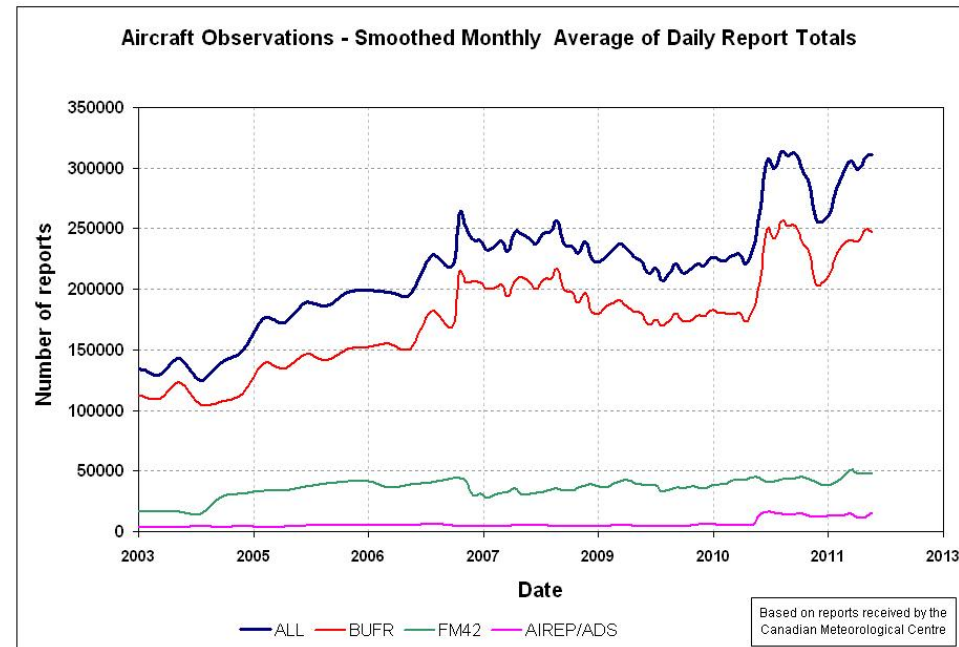
All data

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

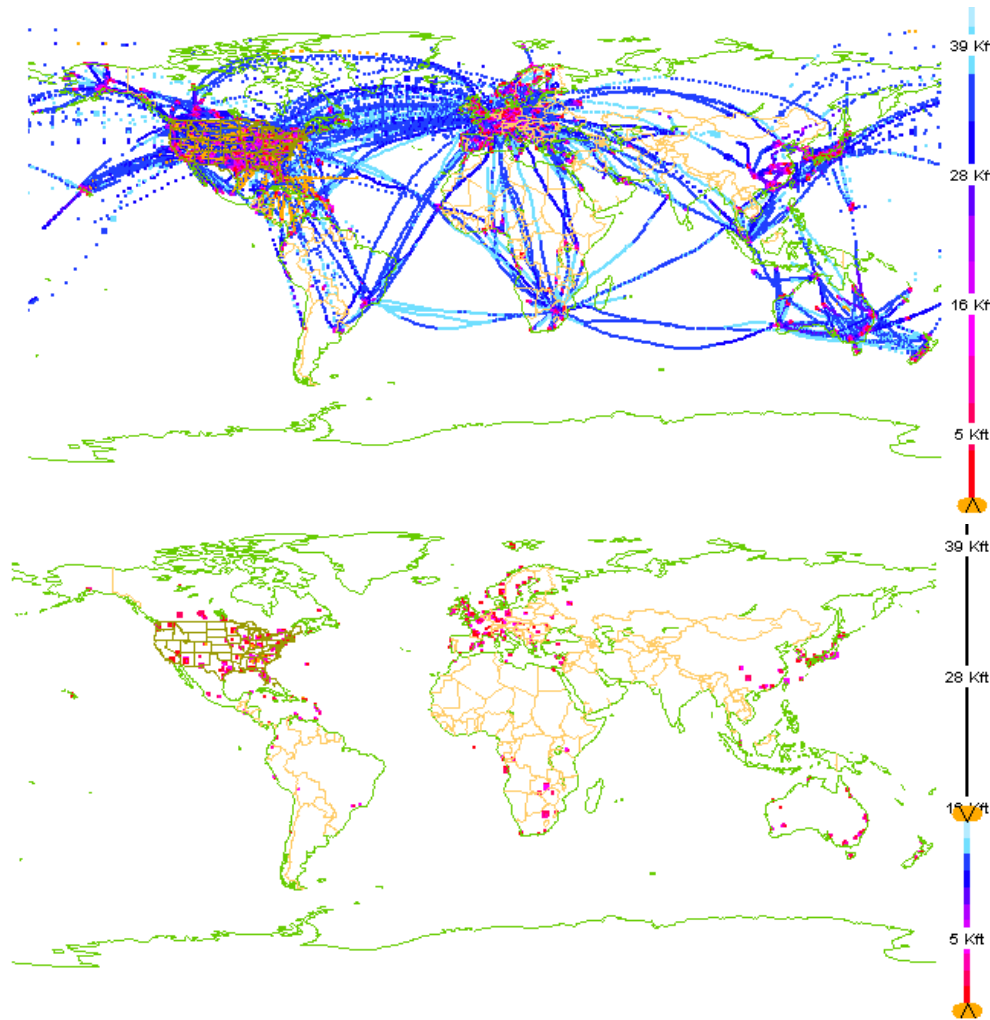
- 📄 Several studies have confirmed that AMDAR is a significant contributor to accuracy of Numerical Weather Prediction forecast models; e.g.
- 📄 Reference Benjamin et al, "Impact of upper-air and near-surface observations on short-range forecasts from NOAA hourly assimilation cycles (RUC and Rapid Refresh)", 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
<https://sites.google.com/a/wmo.int/amdar-news-and-events/newsletters/volume-4-october-2012#TOC-Feature-Technical-Article---Summary-of-Recent-Studies-on-the-Impact-of-AMDAR-data-in-NWP-Forecasts>

AMDAR Programme Current Status



Coverage is not optimal

- Very good coverage over USA, Western Europe
- Good over parts of Asia and Australasia
- Poor elsewhere



17-Sep-2012 10:00:00 -- 17-Sep-2012 13:15:00 (28649 obs loaded, 13075 in range, 795 shown)

AMDAR Programme Changes within WMO

- 📁 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

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