



Federal Aviation  
Administration

# Airborne In Situ Weather Observations Government Perspective

Presented to: Friends and Partners of Aviation  
Weather

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# Airborne In Situ Weather Observations Government Perspective

- Current Status
  - MDCRS Contract
  - Eddy Dissipation Rate (EDR)
  - Graphical Turbulence Guidance (GTG)
  - Future Efforts
- Optimization
  - Right-sizing Program – Airborne Obs Component
  - Need for interagency/industry-level agreements

# Airborne In Situ Weather Observations

## MDCRS Contract Update

- Current contract with ARINC expires Mar 31, 2011.
- Market survey currently out on FAA Business Opportunities website
  - <https://faaco.faa.gov/>

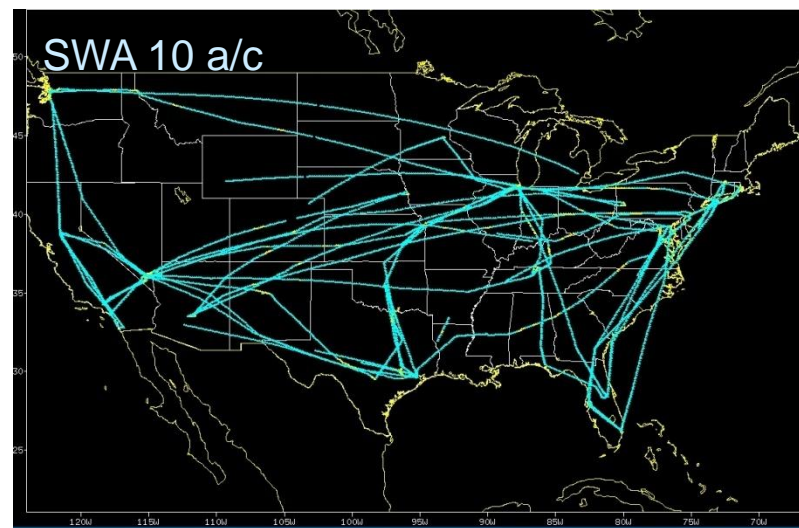
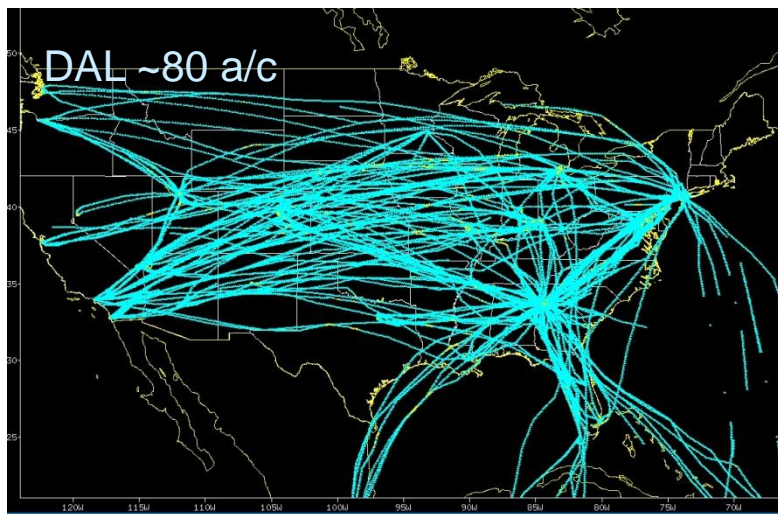
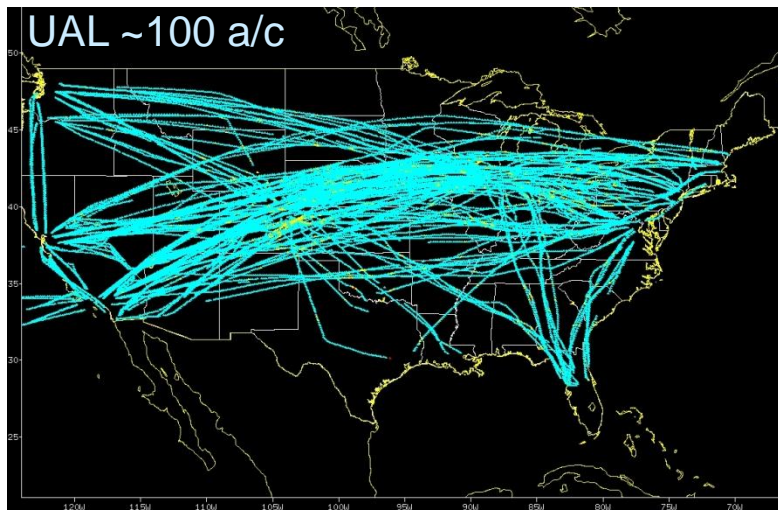


# Airborne In Situ Weather Observations

## Eddy Dissipation Rate (EDR)

- Current Deployments
  - DAL ~80 737NGs
  - UAL ~100 757s
  - SWA 10 737s (FY10)
- FY11
  - Continue SWA deployments
  - Begin deployment DAL and UAL 767s
    - Transoceanic coverage

# Average 24 hour EDR coverage



# Airborne In Situ Weather Observations

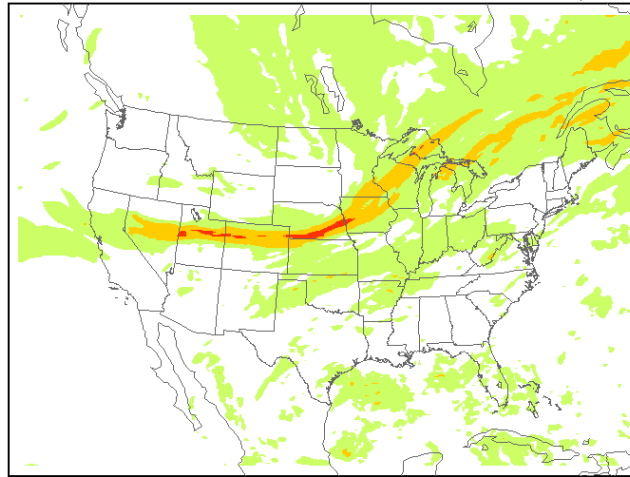
## GTG2 Implementation

### GTG

The GTG is an automatically-generated turbulence forecast product that supplements AIRMETs and SIGMETs by identifying areas of turbulence. The GTG is not a substitute for turbulence information contained in AIRMETs and SIGMETs. It is authorized for operational use by meteorologists and dispatchers.

Turbulence forecast at FL330

09 hr forecast valid 0000 UTC Tue 11 Sep 2007



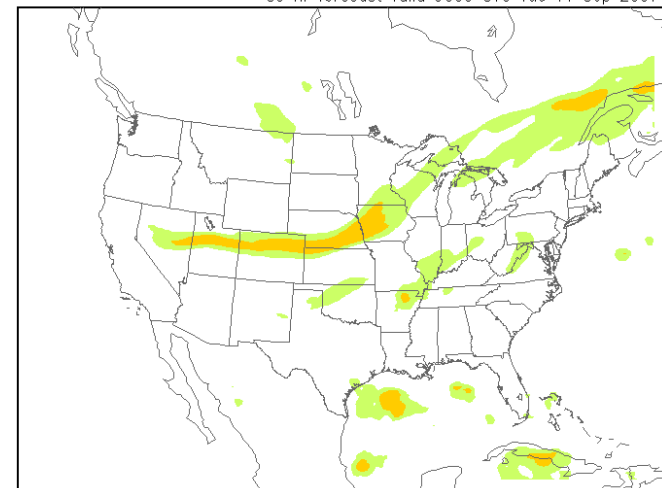
None LGT MOD SEV Extreme

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Turbulence forecast at FL330

09 hr forecast valid 0000 UTC Tue 11 Sep 2007



None Light Moderate Severe or greater

- GTG2 incorporates EDR observations
- GTG2 implemented operationally at AWC 1Qtr 2010

# Projected GTG releases – next 7 years

Version	Capabilities	Op. date*/enter NWEC
GTG1	Upper levels RUC20	3/2003*
GTG2	Improved GTG1 +Mid levels +Uses UAL in situ	2/11/2010*
GTG2.5	13 km WRF RR Mid levels +VWA insitu	1/1/2011
GTG3	13 km WRF RR +MWT Optimized use of insitu 1-12 hrs	3/31/2012
GTGN1	NTDA2/DCIT/insitu GTG3 mid+upper levels, 0-15 min	6/30/2012
GTG4	Improved GTG3 Ensembles/Probabilistic forecasts all altitudes, full WRFRR domain	FY15
GTGN2	NTDA3 GTG4 0-FL450, 0-1 hr	FY15
Global GTG	Global – GFS based	FY15
GTG5	Improved GTG4 CIT/HRRR	FY17
GTG6	Improved GTG5 ≤ FL650	FY19

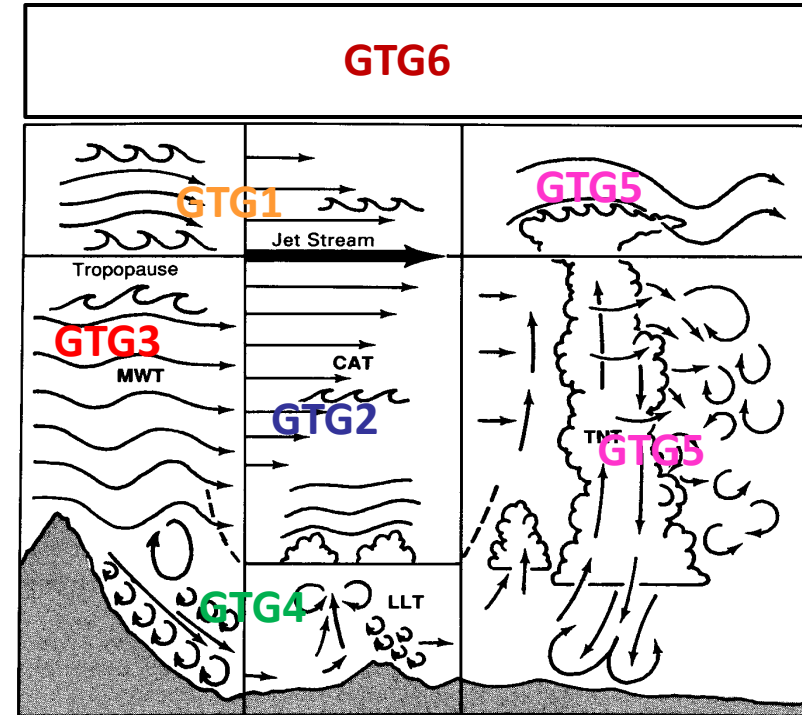


Figure 1-16. Aviation turbulence classifications. This figure is a pictorial summary of the turbulence-producing phenomena that may occur in each turbulence classification.

Source: P. Lester, "Turbulence – A new perspective for pilots," Jeppesen, 1994

# Airborne In Situ Weather Observations

## Future Efforts

- Future EDR Deployments
  - “When is enough, enough?”
  - NAS cost-benefit needed for possible future government buy-ins
  - DAL EDR Proof of Concept Demo
    - Attempting to document benefits to NAS capacity and flight operations
    - Data collect on-going, thru mid-January 2011



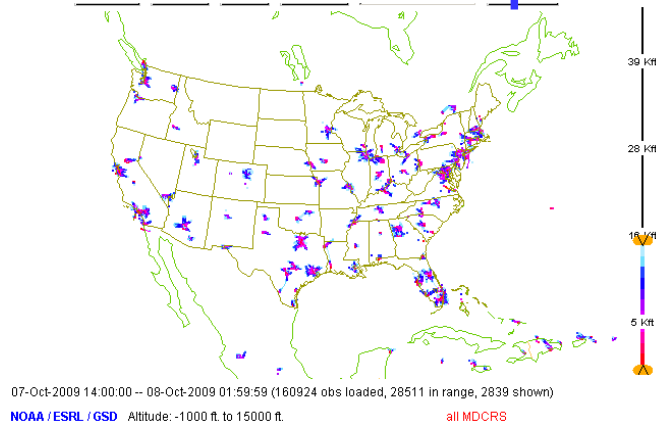
# Airborne In Situ Weather Observations

## Future Efforts

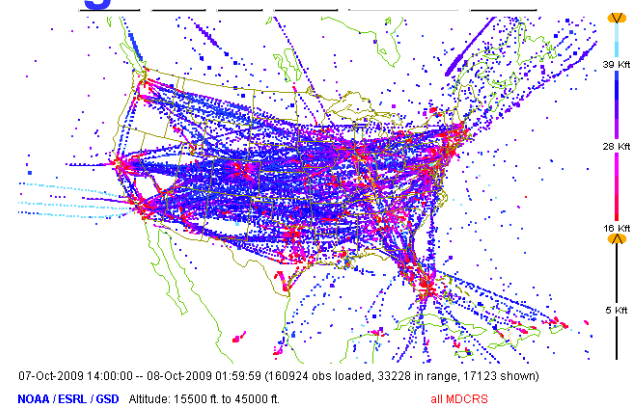
- MCR on contract for EDR NAS cost-benefits study
  - Purpose:
    - To determine delays due to Clear Air and Convectively Induced Turbulence
    - To quantify the amount of avoidable turbulence delays that EDR could be expected to mitigate
  - Preliminary results available in FY11

# Airborne In Situ Weather Observations Optimization

## Spatial Coverage



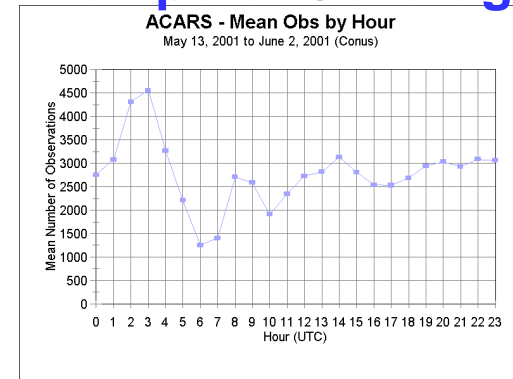
*SFC-FL150*



*FL150-400*

- The selection of specific aircraft to obtain the data required to meet the government's forecasting needs while reducing redundant or unnecessary observations that increase communications and processing costs.

## Temporal Coverage



# Airborne In Situ Weather Observations Optimization

- FAA Right-sizing Program: Airborne Obs Component
  - Baseline of current airborne sensor capabilities near complete
  - Concept of Operations in development
  - Requirements analysis underway
  - Gap identification (Super Density Terminal Ops) FY11
  - Gap Identification (En Route) FY11-12
  - Mitigation strategy development/demos FY12

# Airborne In Situ Weather Observations Optimization

- Cooperative strategy development
  - FY11 – Governmental interagency agreements
  - FY12 – Government/Industry interagency agreements
    - Cost responsibilities?
    - Data access?



# Airborne In Situ Weather Observations Summary

- FY10:
  - SWA EDR deployments begun
  - GTG2 implemented operationally
  - DAL EDR Demo On-going
- FY11:
  - Begin DAL/UAL 767 EDR deployments
  - Optimization – Right-sizing Activities
  - Conclude DAL EDR Demo and Cost Benefits Analysis
- Future (FY11/12 →):
  - Optimization
  - Cost and data sharing policy/agreements development

- **Back Up Slides**



# Airborne In Situ Weather Observations Terminology

- **AMDAR** – Aircraft Meteorological DAta and Relay: A WMO-sanctioned international program of nations with air carriers that provide automated weather observations.
- **MDCRS** – Meteorological Data Collection and Reporting System: US analog of AMDAR, a private/public partnership.
- **ACARS** - Aircraft Communications, Addressing, and Reporting System: The name of a datalink service provided by Aeronautical Radio, Inc. (ARINC) that sends information between aircraft and ground stations.
- **TAMDAR** - Tropospheric Airborne Meteorological DAta Reporting: “AirDat's network of patented airborne sensors...which provide a continuous stream of real time observations....”. (<http://www.airdat.com/./index.php>)

