The FAA's *In Situ* Turbulence Reporting System

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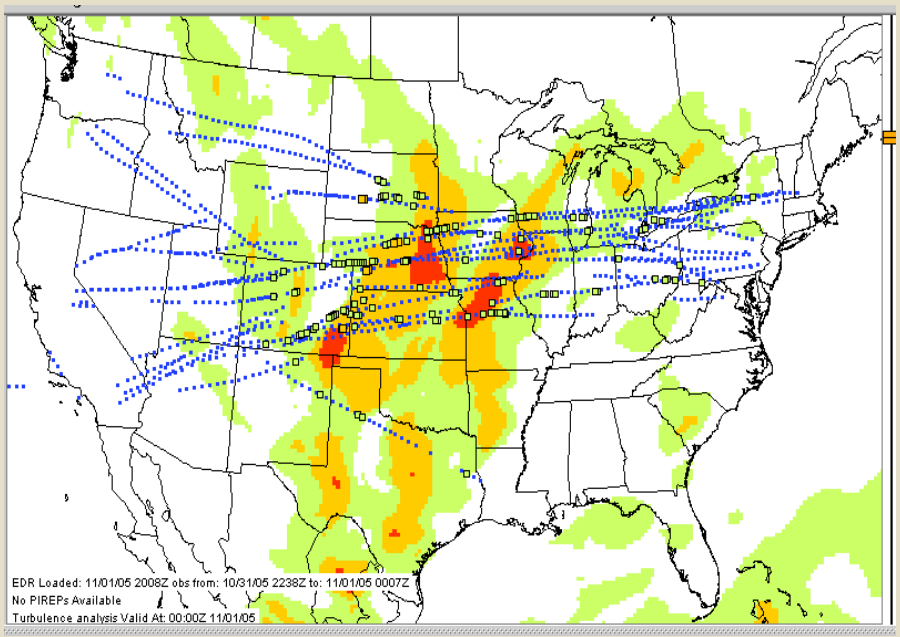
In Situ Turbulence Reporting System

- **Driver:**

  Augment/replace subjective PIREPs with objective state-of-the-atmosphere turbulence measurements.

- **Features:**

  - Atmospheric turbulence metric: eddy dissipation rate (EDR).
  - Position accuracy within 10 km vs average 50 km pireps.
  - 44,000 *in situ* reports per day (UAL) vs. 300-500 pireps/day (above FL200).
  - Adopted as ICAO Standard.



Experimental ADDS website

AWRP

NCAR

EDR *and* RMS-g: Not *either-or*

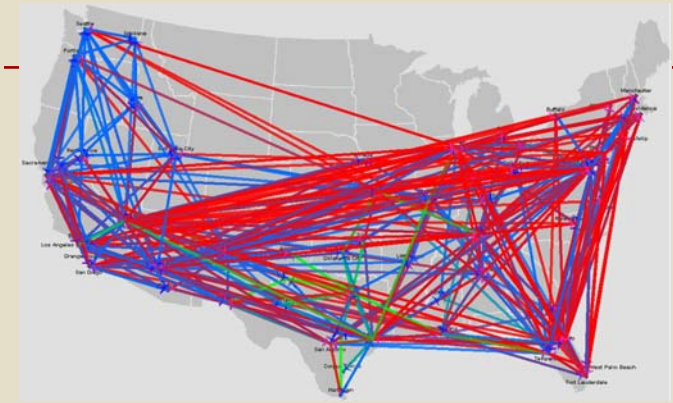
- **EDR is a measure of the turbulent state of the atmosphere, i.e., aircraft independent.**
- **RMS-g is the response of a given aircraft – at a given flight condition – to the turbulence.**

Both are valid quantities

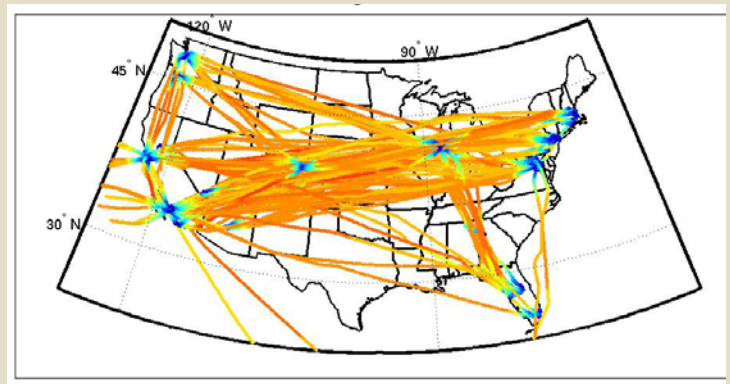
- **Given knowledge of aircraft type, airspeed, altitude and weight, EDR can be converted into RMS-g with good accuracy.**
- **Recommendation: Use EDR as the reporting metric for air-ground, air-air, and ground-air**
  - EDR populates the NextGen 4D data cube.
  - If a specific user wants RMS-g, convert EDR at their location.

In situ EDR reporting status/plans: Implementation

- **SWA**
  - Flight testing within next 1-2 weeks
  - Fleet implementation on ~ 280 737-700s in CY07
- **Delta**
  - Software delivered
  - Larger scale implementation/testing over the next 2 months
  - 120 737-800s in CY07-08
- **NWA**
  - Preliminary discussions in April
  - Major effort to begin in FY08
  - 140 Airbus 319/320s
  - 56 787s
- **AAL**
  - Ongoing discussions
  - Delta may provide engineering support
  - Implementation timing is TBD
- **UAL**
  - Update 757s to wind-based algorithm?



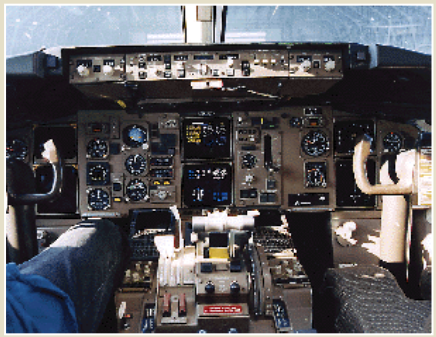
SWA route structure



UAL 757 route structure

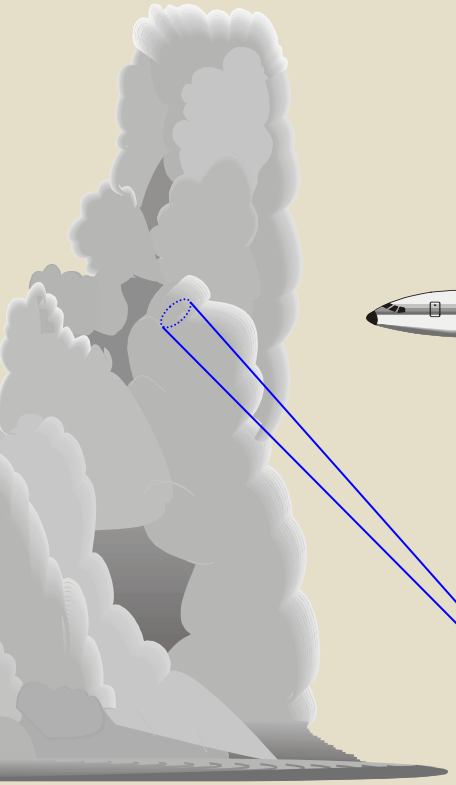
Turbulence Nowcasting/Forecasting System

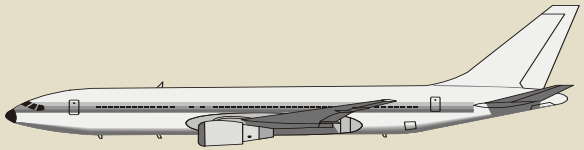
Merges all current turbulence observations with forecast grids.



Cockpit display or alert (RMS-g)

Dispatch, ATC, etc.





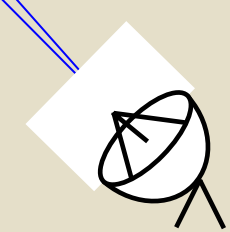
In situ EDR reports, *PIREPs*,

4D data cube updated every ~15 min

GTG forecast grids (EDR)

Convective turbulence diagnostic (EDR)

Wx satellite data



Radar (NTDA) turbulence grids (EDR)