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
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?
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)