Progress in Automated Turbulence Observations from Aircraft

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The Need for Automated Turbulence Reports

- Turbulence can be a very dynamic and spatially localized phenomena – hence the need for real-time measurements.
- Pilot reports are problematic in that they are subjective measures of the aircraft response to the turbulence – not quantitative measures of the atmosphere.

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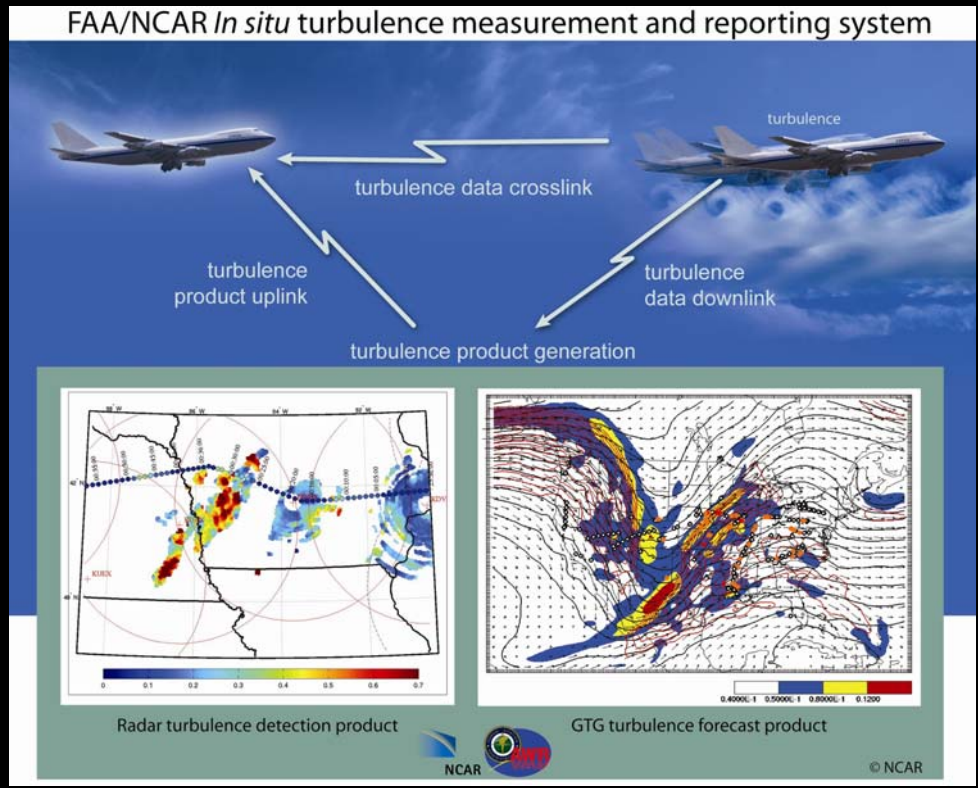
In situ Turbulence Measurement and Reporting System

Goal: To augment/replace subjective PIREPs with objective and precise turbulence measurements.

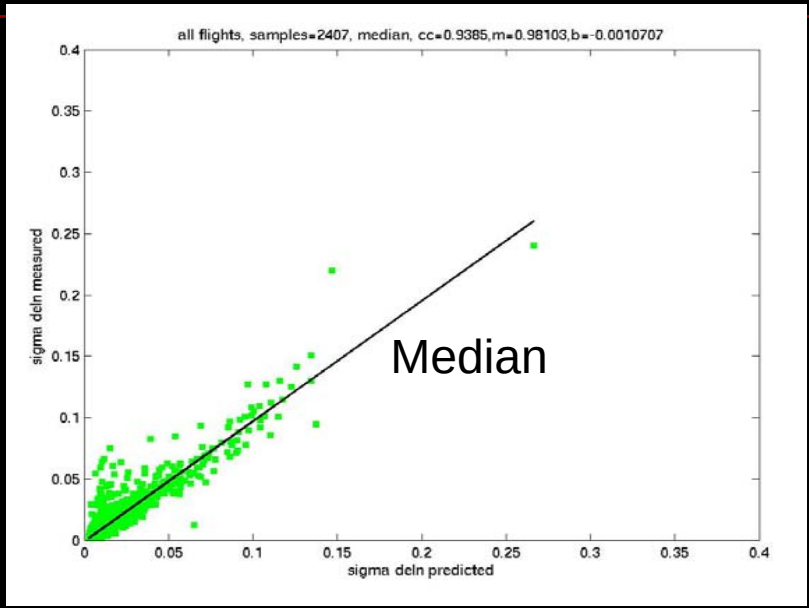
Features:

- Atmospheric turbulence metric: eddy dissipation rate, (EDR).
- EDR can be scaled into aircraft turbulence response metric (RMS-g).
- **Adopted as ICAO Standard**



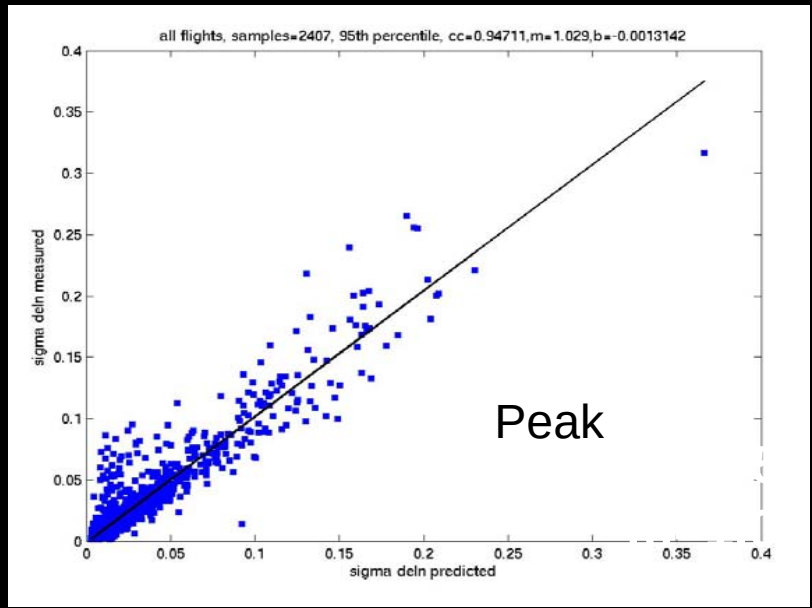
Conversion Between EDR and RMS-g: Illustrated with Data from NASA B-757 Aircraft

Measured RMS-g



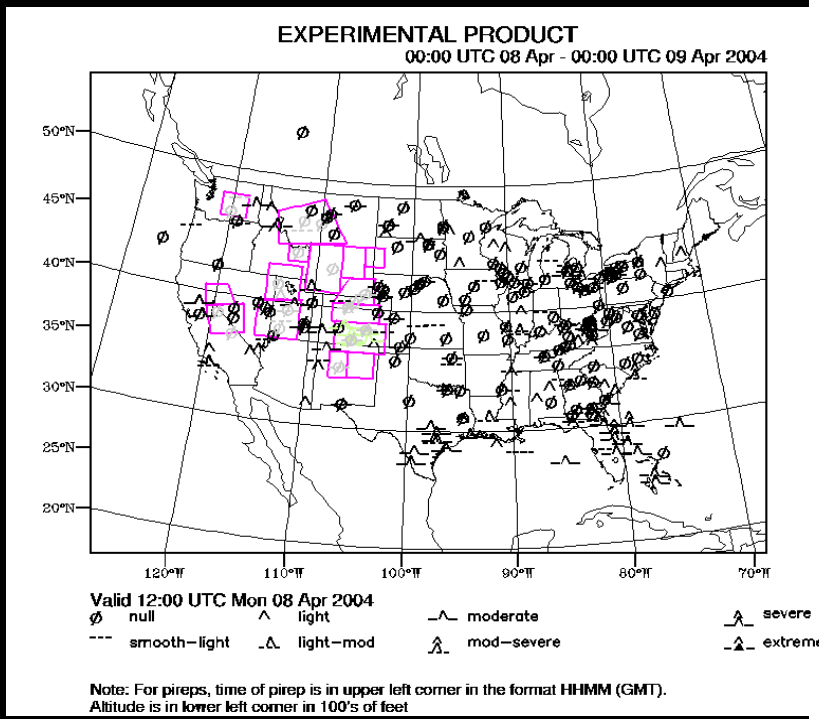
EDR-predicted RMS-g

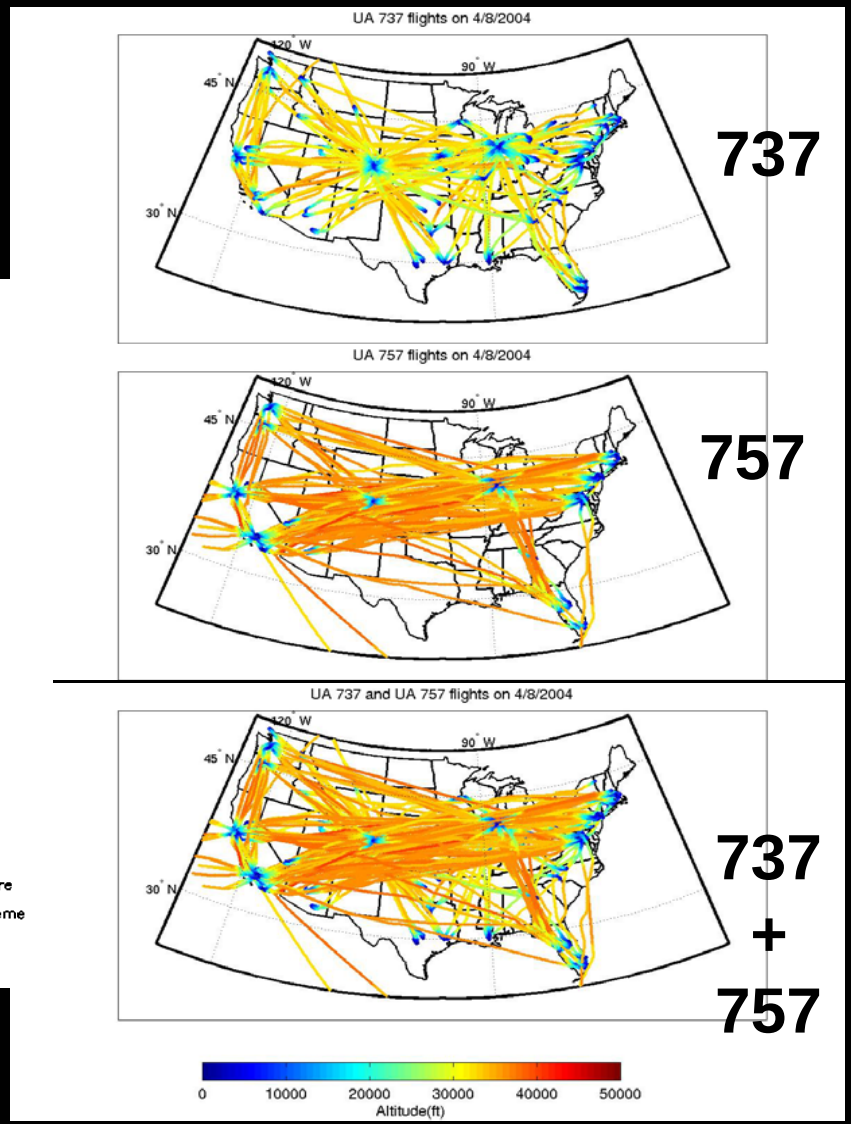
2407 one-minute samples



Increase in Spatial/temporal Coverage: UAL EDR Reports Compared to pireps

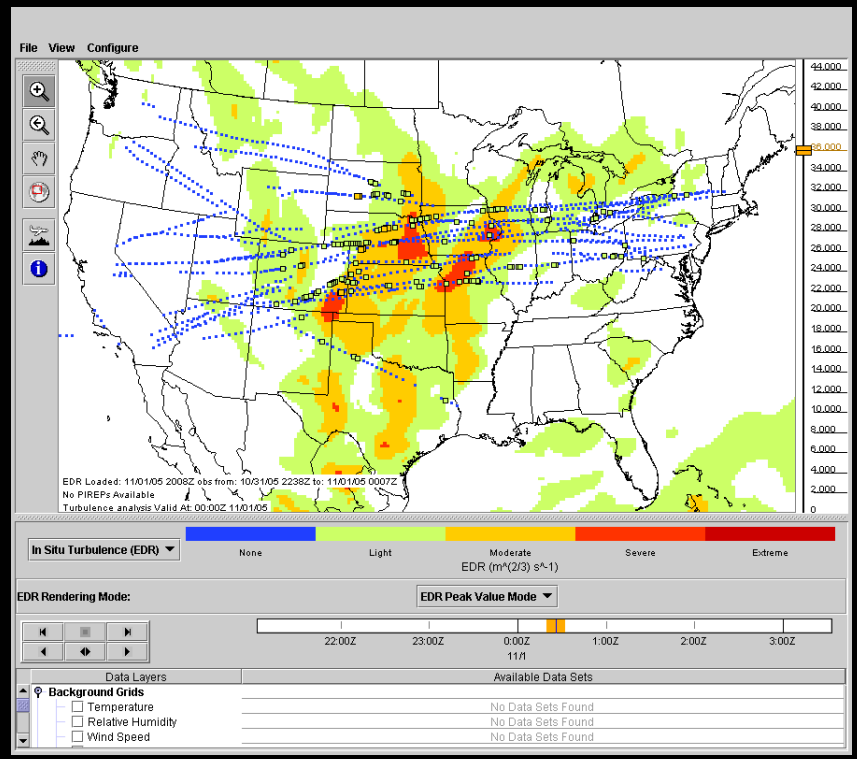
1.3 million EDR reports/month from 100 or so aircraft - compared to 55k pireps from all aircraft. Imagine with 400 SWA aircraft added!





EDR on Experimental ADDS

- Display contains EDR reports, pireps, GTG.
- Movie loops, cross-sections, etc…
- Currently in use by UAL Meteorology.
- Soon to be in use by UAL Dispatch and AWC forecasters.



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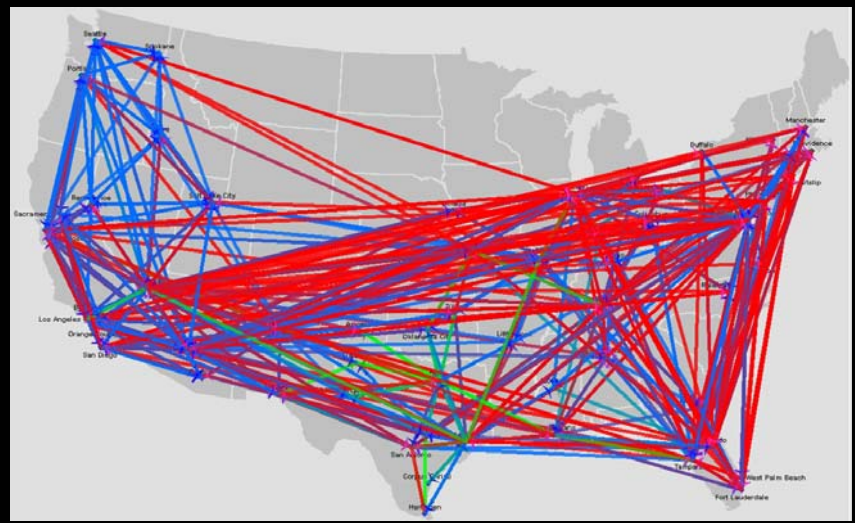
Major Upcoming Activities

- SWA implementation in CY06.
- Uplink demonstration with UAL in CY06.
- EDR ingest into GTG2: operational, Fall ’06.



SWA Route Structure