

# **Progress in Turbulence Information**

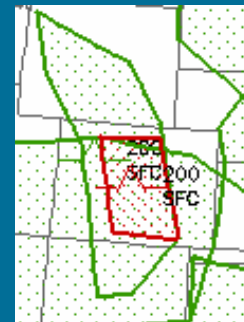
**Clinton Wallace**  
**NOAA/NWS**  
**Aviation Weather Center**  
**Kansas City, Missouri**

*October 19, 2006*

**Friends/Partners in Aviation Weather Forum**  
**NBAA Convention – Orlando**

# Operational NWS Turbulence Products

- **SIGMETs**
  - Issued by AWC, AAWU, and WFO Honolulu for Severe Turbulence or Convection over domestic and oceanic airspace
- **AIRMETs**
  - Issued by AWC, AAWU, and WFO Honolulu for Moderate Turbulence over domestic airspace
- **MIS/CWA**
  - Issued by CWSUs and specialized for needs of the ARTCC
- **Significant Weather Forecasts**
  - 100-FL630: 24 hour forecast issued by AWC and WAFC London for moderate or severe turbulence for entire globe
  - Low-Level: Issued by AWC and AAWU for moderate or greater turbulence
- **Graphical Turbulence Guidance**
  - Supplementary and restricted automated product issued by AWC every hour for turbulence intensity between FL200-FL450



# GFA/G-AIRMET Implementation

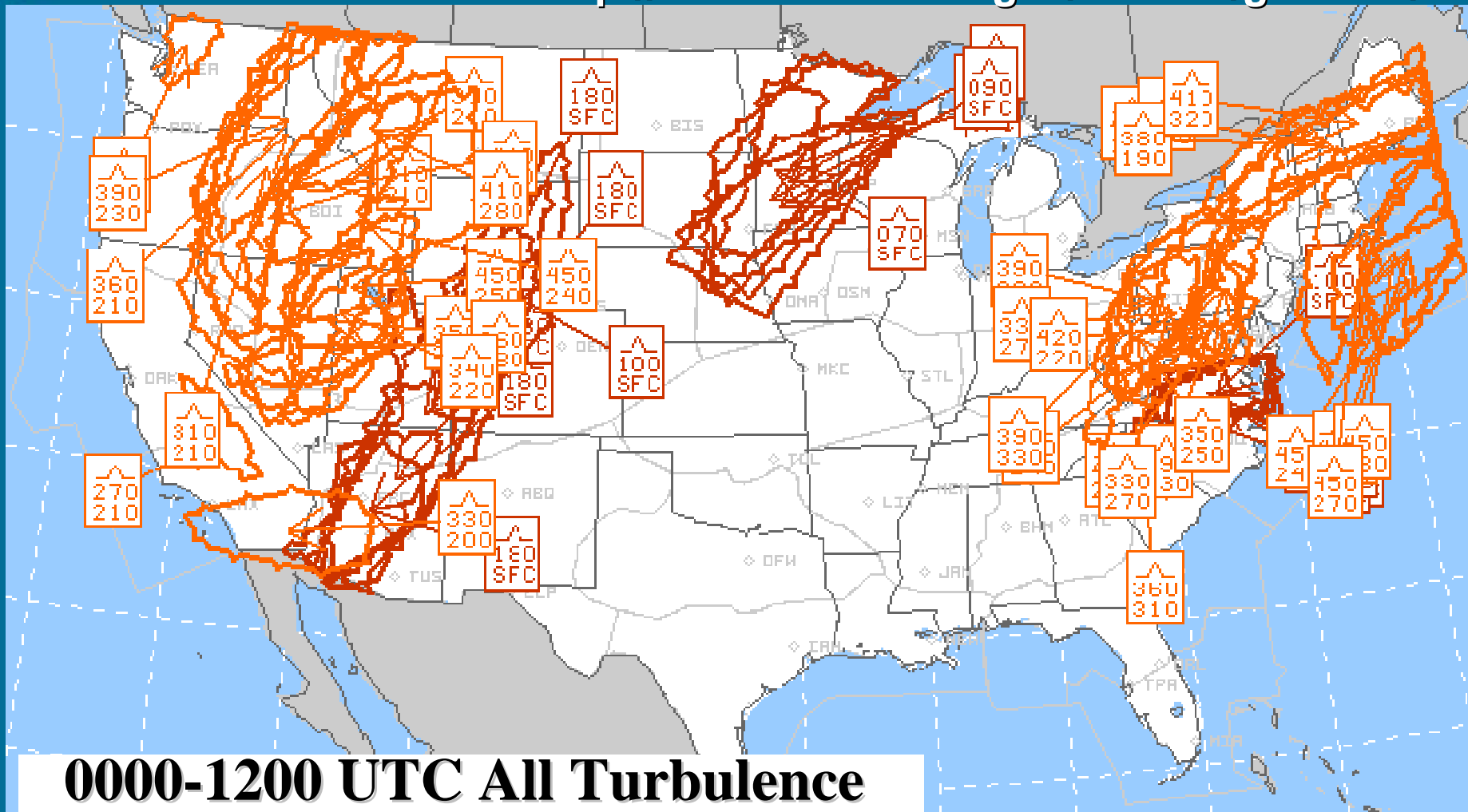
- **GFA Work Group**
  - Government/Industry group est. by FPAW
- **G-AIRMET**
  - Nov 2006: Standardize Text AIRMET
  - Feb 2007: Experimental G-AIRMET
  - Oct 2007: G-AIRMET Supplementary/Unrestricted
  - ~Oct 2008: G-AIRMET Primary
- **GFA**
  - 2009-2011
- **More GFA discussion during Cross-Cutting Issues this afternoon**

# Turbulent Weather in Graphical Forecast for Aviation (GFA)

- **Graphical AIRMET**  
(Includes all criteria in AIRMET Tango)
  - **Moderate Turbulence**
    - *Bases and Tops*
  - **Low-Level Wind Shear**
  - **Surface Winds in excess of 30 knots**
- **Full GFA**
  - **Mountain Waves**
  - **Surface Winds in excess of 20 knots**

# G-AIRMET Example

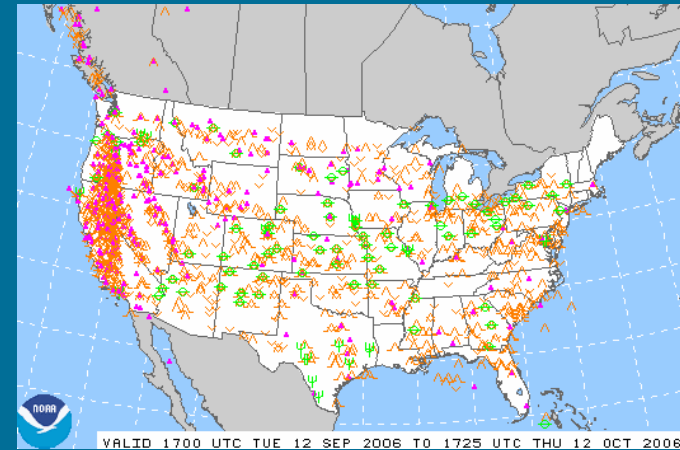
More Demos and Information at  
<http://aviationweather.gov/testbed/g-airmet/>



**0000-1200 UTC All Turbulence**

# Dispatcher PIREP Web Submit

- 20500 PIREPs submitted in last year via AWC Web PIREP submission form
- 77% (15800) of those Turbulence reports
- Organizations wishing to participate should contact AWC



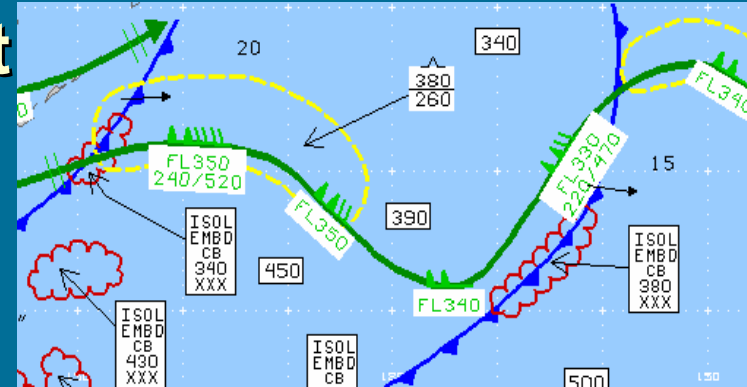
Major Contributors  
Alaska Airlines  
Southwest Airlines  
Delta Airline  
Continental Airlines

[https://aviationweather.gov/exp/pirep\\_submit](https://aviationweather.gov/exp/pirep_submit)



# Turbulence in Significant Meteorological Weather Forecasts

- ICAO Annex 3 requirement
- 24 Hour Global Forecast
- Includes Moderate and Severe Turbulence
- July 2006 became a *DIGITAL* product
  - Distributed in a digital format - BUFR
  - Objects which are being integrated in user systems



# WAFS Global Turbulence Grids

- **Goal is to replace current WAFS SIGWX-Medium (FL100-450) forecasts charts by 2010.**
- **Global gridded Icing, Turbulence, and Convective Clouds by US and UK**
- **US development by NOAA Environmental Modeling Center (EMC)**
  - **Funded by FAA Requirements and Policy**
  - **Plan to develop and test by Feb 2008**
  - **UK's being evaluated by IATA and IFALPA**
- **2008-09: ICAO & WMO plan to conduct user training on the use of gridded WAFS products.**



# Short-Range Ensemble Forecasts (SREF)

- Experimentally produced by NOAA Environmental Modeling Center (EMC)
- Combination of multiple models
  - Different initial conditions or model configurations/parameterizations.
- Level of uncertainty, the most likely forecast outcomes, and probabilities of those outcomes
- Turbulence probabilities
  - Light-Moderate, Moderate, & Severe
  - Ellrod Index

# SREF Probability Moderate Turbulence

Prob of MDT Turbulence between FL330 and FL300. At51H,FCST  
from 09z Oct 07 2006. Verified Time: 12z 10/9/2006

