Initial User Feedback Regarding the Use of EDR Information in Turbulence Forecasts

Presented to: Turbulence Impact Mitigation Workshop 2

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Background

- The AWRP Turbulence Product Team is developing the next iteration of the Graphical Turbulence Guidance (GTG) product (GTG 3.0)
- 3 proposed changes in GTG 3.0
  - Present turbulence nowcast and forecast categories using Eddy Dissipation Rate (EDR) values and/or ranges
  - Addition of Mountain Wave Turbulence (MWT)
  - Provide turbulence information down to the surface
- Given the potential change in the product presentation, user feedback is critical.
- User focus groups and on-line surveys were employed to gather initial user feedback regarding the proposed changes.

Focus Group/Survey Objectives

- Review proposed changes
- Gather initial feedback regarding proposed changes
- Gather initial feedback regarding presentation concepts
- Identify potential issues associated with using EDR information

Data Collection Methods

User focus groups were conducted in Washington DC and at the FAA Technical Center in Atlantic City, NJ. Upcoming focus group at Delta Airlines.

- Intended to collect initial user feedback
- Small group sessions (4-6 users)
- Facilitated discussions focused on proposed changes, utility of new information and suggested presentation concepts
- Washington D.C. group conducted on July 21, 2014 and included Commercial and GA pilots, aviation forecasters, and FAA flight safety.
- FAA Technical Center group conducted on August 14, 2014 and included 5 GA pilots (All IFR, 2 CFIs)

Data Collection Methods

On-line survey was open for 3 weeks to collect feedback from users in the aviation community

- 15 respondents: 5 from GA focus group, 10 from community at large
- 5 GA pilots, 6 Commercial Pilots, and 4 Aviation Forecasters
- All but one user were familiar with GTG and had used the product

Results:
Knowledge of GTG 2.5

Results: Knowledge of GTG 2.5

- Almost all of the users were familiar with and used the current GTG product.
- Only 2 out of 15 survey respondents knew which aircraft weight class the GTG intensity categories were mapped to
- Only 4 out of 15 survey respondents knew how to apply the GTG information to their specific aircraft type and weight

Results:
Eddy Dissipation Rate

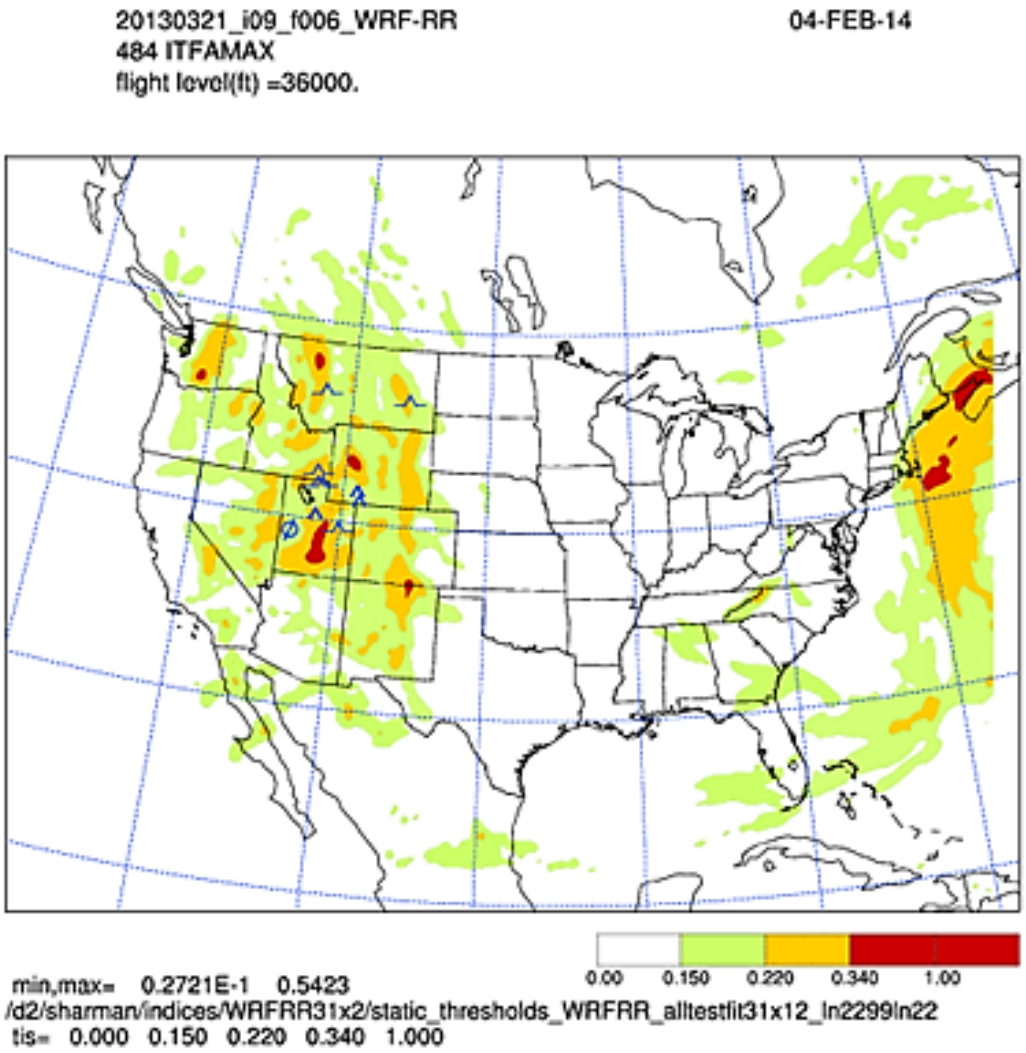
Results: Eddy Dissipation Rate (EDR)

- Many of the users from both the focus groups and the survey respondents stated they were familiar with EDR in general.
- All users indicated they would use a GTG product based on EDR values or ranges as opposed to intensity categories
- Three possible EDR presentations were shown to focus group users

EDR Presentations

Proposed for GTG 3.0

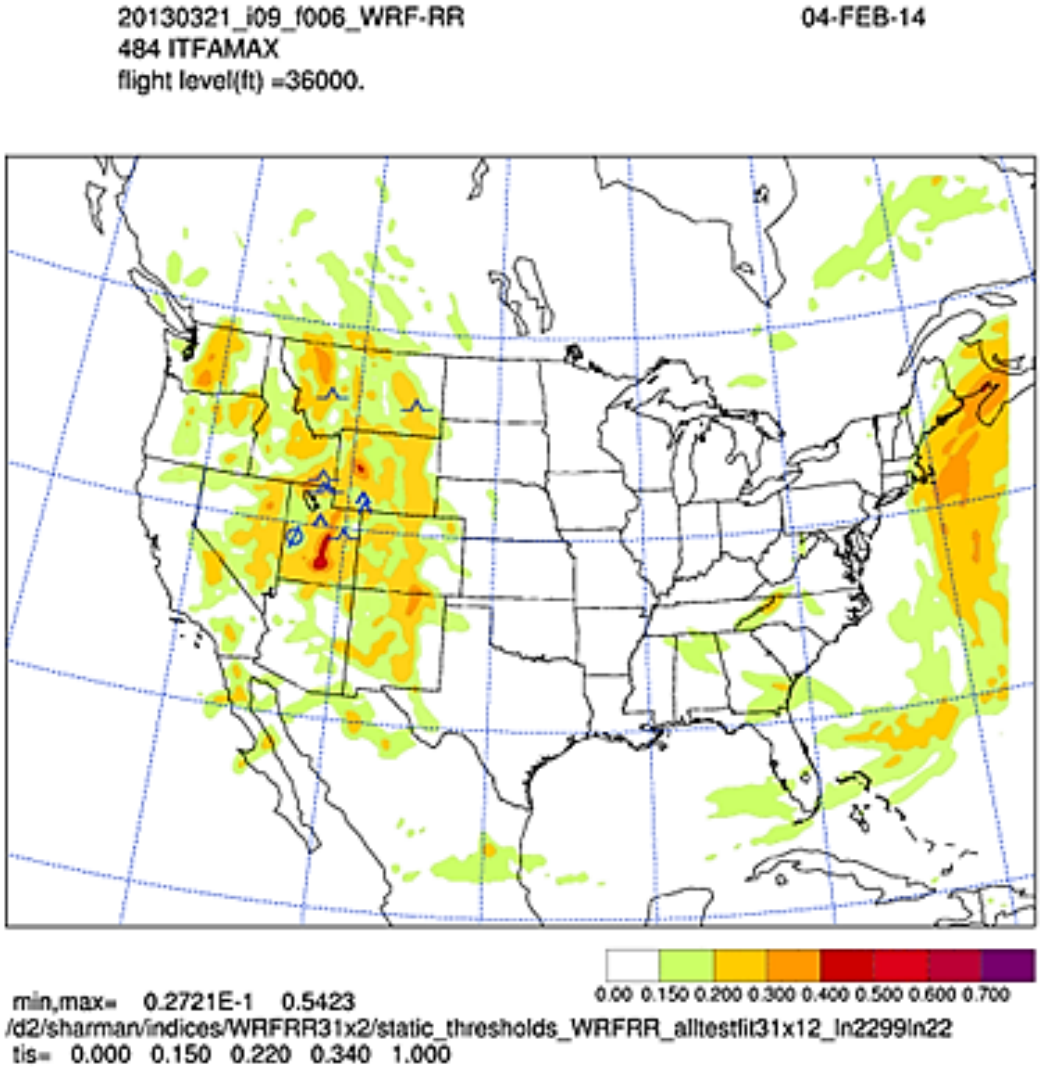
Based on current categories expressed as EDR values



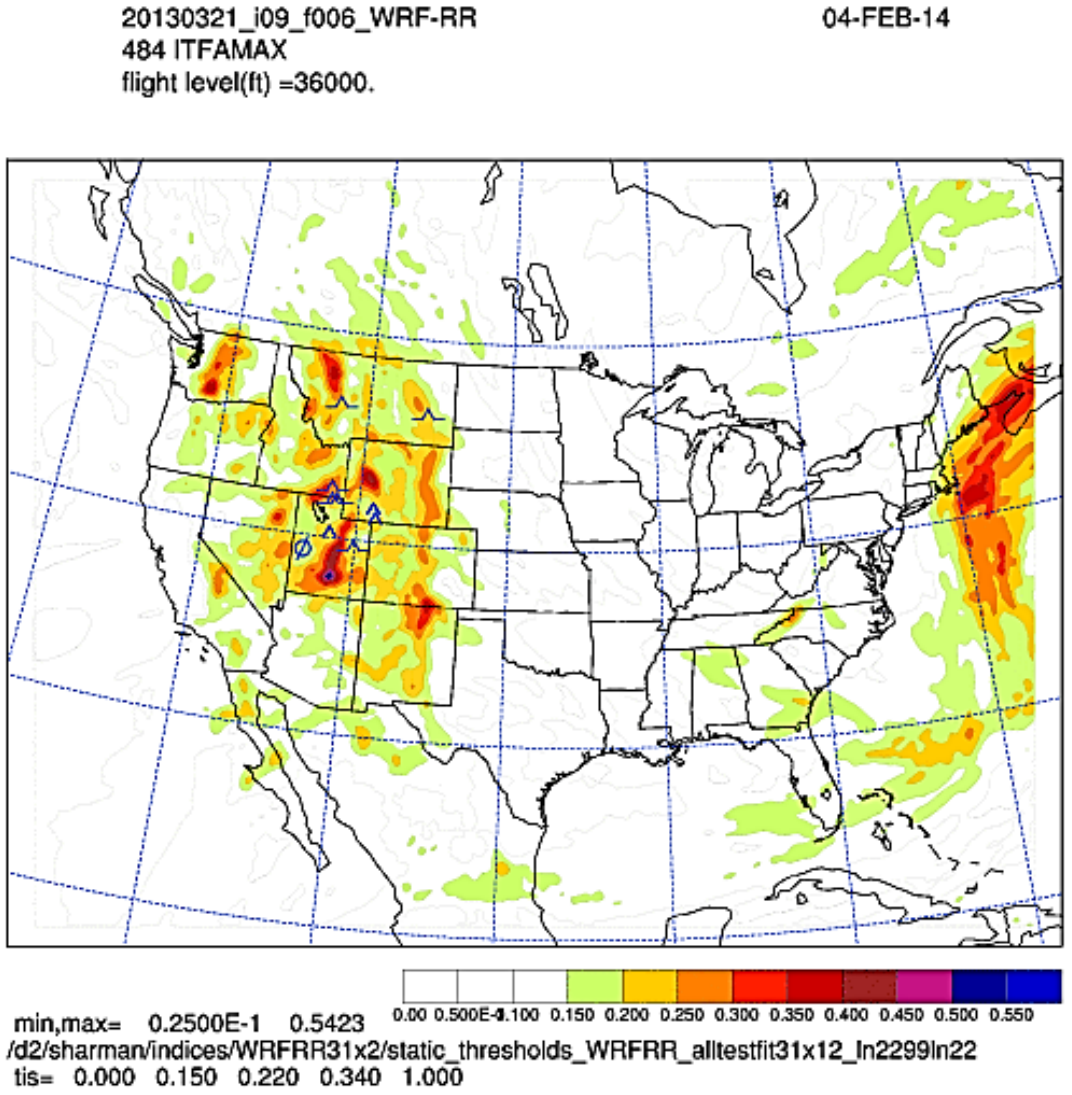
EDR Presentations

Proposed for GTG 3.0

EDR interval 0.1 ^$m^{2/3}$ s^(-1)



EDR Presentations



Proposed for GTG 3.0

EDR interval 0.05 $m^{2/3} s^{-1}$

Results: EDR

- Most users indicated either .1 or .05 EDR interval scale would be acceptable
- Most focus group users and 13 out of 15 survey respondents indicated a reference table would improve their ability to apply EDR values to specific aircraft types and aid interpretation

Aircraft Weight Class	Takeoff Weight (lbs)	None	Light Turbulence	Moderate Turbulence	Severe Turbulence
Light	< 15,500	.00-.05	.06-.10	.11-.15	.16+
Medium	15,500 – 300,000	.00-.10	.11-.26	.27-.35	.36+
Heavy 727, 737, MD-80, A320	>300,000	.00-.14	.15-.30	.31-.40	.41+

Results: EDR

Some potential issues were identified by focus group users:

- Guidance regarding the use of EDR will need to be developed. The guidance should include:
  - Description of EDR
  - How EDR is reported
  - How EDR should be applied to aircraft
- Determine how PIREP reporting categories will map to EDR values

Results:
Mountain Wave Turbulence

Results: Mountain Wave Turbulence

- GTG 3.0 is an automated forecast which forecasts both CAT and Mountain Wave Turbulence (MWT)
- All focus group users noted they would use the MWT information.
- Focus group users were split in their opinions regarding the display of MWT. Some users preferred to have MWT displayed as a stand alone product while others wanted an option for a MWT overlay.
- The majority of survey respondents indicated they would use the MWT information, however, they preferred to have MWT display as an overlay

Summary

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- Aviation users are open to the presentation of EDR information
- The development of a reference table relating EDR ranges to intensity categories is suggested
- Guidance or training describing EDR as well as its use and application is recommended
- Aviation users would also use Mountain Wave Turbulence information. Stand alone vs overlay presentation requires further investigation