Turbulence

Challenges & Potential Solutions
Turbulence Basics

• Drivers – Safety, Capacity, & Efficiency/Emissions
• Primary users- Meteorologist, Dispatcher, Pilot, & Controller
• Solution Components
  – Forecast
  – Tactical/Now cast
  – Reporting
• Challenges
Potential Benefits

• Safety
  - IF EVERYONE IS STRAPPED IN WITH CARTS STOWED, NO ONE GETS HURT.
  - KEY IS NOT TO CRY WOLF & F/A IGNORE WARNINGS

• Efficiency/Emissions
  – Assumptions
  – Range of primary variables - %, Altitude, Time

• Capacity – FAA FOCUS

• Overall - The solutions for all 3 drivers might appear to conflict, but BETTER TURBULENCE KNOWLEDGE CAN DRIVE BETTER SOLUTIONS FOR ALL 3.
Variability in Forecast Tools

• Tools
  – Individual Preference
  – PIREPS (Orville & Wilbur) – Chat Room

• Users – Forecaster, Dispatcher, Pilot
  – Subjectivity & Risk considerations
  – Cumulative Variability

• Results
  – Cabin management – Cry wolf syndrome
  – Bad data & processes = Bad decisions
NCAR

- Team = FAA, NCAR, & Delta
- Metric
  - Sensors, Algorithm, Data link
  - Atmospheric (Sea) State
  - OPEN SOURCE
- Issues
  - Calibration effort
  - Atmospheric state vs. Aircraft response
  - Closure
Solutions

• Forecasting
  – Better forecasting models
  – Government & Commercial
• “Now-Casting”/Tactical – 5-10 minutes
  – Better airborne radars–Enhanced Turbulence
  – Blended NEXRAD Solution = GTG-N
• Reporting
  – EDR (Eddy Dissipation Rate) – ICAO
  – Aircraft response
  – Mix of both metrics – Market driven
• Blended solution using Sensors, Data link, & Displays
Issues

• Validation & Education on Accuracy of data
• Common Procedures for end users
• Displays – Dispatch & Pilot
• Infrastructure requirements
• Different airline business models
• ICAO STANDARDS FOR REPORTING METRIC
Next Steps

• Regulatory Agencies
  – Expand Turbulence Validation Program – Go International
  – Integrate Turbulence/Wx. into Future systems
  – Develop Business case for Turbulence
  – Increase Aircraft Installations

• Airlines
  – Validate Turbulence Impacts
  – Develop Industry Coordination
  – Develop Procedures & Processes
  – Move common picture to all end users
Future Path

• Distractions
  – Airline priority of the day – Mergers, Fuel, Economy
  – FAA Bias
• Political Will
  – FAA – NextGen 4D Weather Cube
  – Airlines – Validate Benefits
• Alternatives for Data Location & Products
  – Airline, Government, Commercial or Mix
  – Costs burden
• Decision Time—Champion Needed