RADAR and Integration

Bill Watts
Why - The Delay Cost

- ATA numbers
  - 86.5 million delay minutes
  - $6.2 billion direct operating costs for airlines (exceeds projected 2005 industry losses!)
  - Social Productivity cost
Weather Basics

• Drivers – Safety, Capacity, Efficiency/Emissions
• Primary Players - Meteorologist, Dispatcher, Pilot, & Controller
• Hazards – Turbulence, Lightning, Ice, Ash
• Solution Components
  – Forecast = BEFORE
  – Tactical/Now cast = DURING
  – Reporting = AFTER
Current State

• Weather causes a significant % of delays
• Weather impact - broadly defined
• Confusion between Display and weather hazards
  – Radar Color vs. Hazard
  – Inferred vs. Measured hazards
• Subjectivity
  – PIREPS (Wright Brothers)
  – Weather interpretation
• Greater hazard is probably economic and passenger delays since Safety Rules
Background – NASA/NCAR

- NASA/Delta Program
  - Enhanced Radar
  - Automated Turbulence Reports (Aircraft Response)
- NCAR/DAL/UAL Program
  - Robust forecast (GTG)
  - NEXRAD Turbulence Detection Algorithm (NTDA)
  - Automated Turbulence Report (Atmospheric State)
Initial E-Turb Display

Two Levels of turbulence (magenta)

- Light-Moderate (speckled)
- Moderate + (solid)
NEXRAD Turbulence Detection Algorithm

NTDA

Moderate turbulence
Severe turbulence

In situ turbulence reports
System Goals

• More & Better Data to drive enhancements in:
  – Safety
  – Capacity
  – Operational Efficiencies/Emissions

• Leveraged technology
  – Recognize Limits of Current State - ATC chat room
  – Integrate the tools

• Policies to support the goals
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 WEATHER KNOWLEDGE CAN DRIVE BETTER SOLUTIONS FOR ALL 3.
Solutions

• Forecasting
  – Better forecasting models
  – NWS, NCAR, NOAA Coordination

• “Now-Casting”/Tactical – 5-10 minutes
  – Better detection of hazards
  – Blended picture of hazards

• Reporting
  – Standards
  – Data clarification

• Blended solution - Sensors, Data link, & Displays
Future Path

• Avoid Distractions
  – Airline priority of the day – Mergers, Fuel, Economy
  – FAA vs. Airline Goals

• Employ Political Will
  – FAA – NextGen 4D Weather Cube
  – Airlines – Validate Benefits

• Decide on Products & Data Handling
  – Airline, Government, Commercial or Mix
  – Cost burdens

• Make a Decision–Champion Needed