Bridge to Nowhere?

or Bridge to Success?
Transitioning to NextGen

• NextGen Implementation *Plan*
  – We have been planning for years
    • And years
      – And years

• Execution of the plan – via a transition strategy – remains the challenge!

• Performance Based Navigation (PBN)
  • Equipage happening, but will take some time before a major metroplex is firing on all cylinders
Transitioning to NextGen

• **ADS-B**
  – Rule for 2020 equipage in place
  – OEM and operators have concern about meeting the equipage mandate in time

• **Data Comm**
  – Wheels are beginning to turn, but much remains to be done, both for equipage and operational processes
• Weather - We have mature weather capabilities that could be deployed today, but it has not been done
  – Mature data from sensors, e.g. EDR, cloud tops, NEXRAD is not readily available to the flight deck
  – With the advent of wifi to the flight deck, ADS-B applications (FIS-B), we now have a bridge to the cockpit

• We should execute the plan now!!
Delta Turbulence History

• Gore Commission in 1997
• NASA demo - ~2004
  – Aircraft Response Reporting Metric
  – Radar – Reflectivity vs. Threat
  – No Forecast
• NCAR/FAA demo - ~2006
  – Atmospheric state – ICAO STANDARD
  – Robust Forecast – GTG
  – NEXRAD Detection of turbulence
Weather Drivers

- **Safety**
  - Ensure crew has ample time to prepare for potential turbulence events
  - Overly conservative breeds a paradigm of ignorance of seat belt sign usage
- **Better & more reliable customer experience**
- **Efficiency/Emissions** by enabling more efficient trajectories
- **Improved Capacity** = less delays
- **Better turbulence data & tools results in safer, more efficient decisions.** Balancing safety and efficiency is not an “either/or” decision
Current State

• Planning (strategic) vs. Flying (tactical)
  – Strategic – Flight Planning using robust forecasts
  – Tactical – In Flight Decisions using less latent information provided to pilots

• Current tools
  – Reports – Wright Brothers’ PIREPS
  – Forecast
    • Strategic – Airmet
    • Tactical – Chat Room (“like a blind man looking for a pot hole”)
• WAUS41 KKCI 071445
• BOST WA 071445
• AIRMET TANGO UPDT 2 FOR TURB VALID UNTIL 072100
• AIRMET TURB...ME NH MA RI CT NY NJ MD DE VA AND CSTL WTRS
• FROM 70SW YSJ TO 200SE ACK TO 160SE SIE TO 20SE CYN TO 70SW YSJ
• **MOD TURB BTN FL250 AND FL370.** CONDS CONTG BYD 21Z ENDG 21-00Z.

• WAUS41 KKCI 071445
• BOST WA 071445
• AIRMET TANGO UPDT 2 FOR TURB VALID UNTIL 072100
• AIRMET TURB...NJ PA OH LE WV MD DC DE VA NC AND CSTL WTRS
• FROM DXO TO 20SE CYN TO 160SE SIE TO 190ESE ECG TO 160SE ECG TO
• HMV TO HNN TO CVG TO FWA TO DXO
• **MOD TURB BTN FL280 AND FL410.** CONDS CONTG BYD 21Z ENDG 21-00Z.

• WAUS43 KKCI 071445
• CHIT WA 071445
• AIRMET TANGO UPDT 2 FOR TURB VALID UNTIL 072100
• AIRMET TURB...LM MI IL IN KY TN
• FROM 40N BDF TO 30WSW GIJ TO FWA TO CVG TO HNN TO HMV TO GQO TO
• 60SE DYR TO 50NW PXV TO 30WSW BDF TO 40N BDF
• **MOD TURB BTN FL310 AND FL410.** CONDS ENDG 18-21Z.
• Improved forecast models
  – GTG 2.5 moving to GTG 3.0
• Objective reports with lots of coverage
  – DAL, SWA, & UAL – 3 to 4 million/month
• Connectivity to web site
  – WiFi
  – Other
Current Delta Demo

- 80 Line Check Pilots using WiFi Tablets
- 300+ Aircraft Providing Objective Reports
  - 3 to 4 million EDR per month
- Web Viewer Components & Demo
  - Robust forecast – GTG with EDR feedback
  - Reports overlaid on Forecast
  - Vertical Profile
Preliminary Demo Results

• Before
  – ATC Chat 97%
  – Flt. Plan Remarks/Uplinks 3%

• After
  – ATC Chat 18%
  – Flt. Plan Remarks/Uplinks 3%
  – Turbulence Viewer 79%

• Acceptance by crews – Extremely high
Open Issues

• Data sharing – Airline share vast amounts of big data that they own.
• Data hosting – Airline? Gov’t? Private?
• Reporting metric standards
• Forecast evaluations-Public or Private
• Decision makers – What body adjudicates these issues?
Next Steps

• Implementation
  – AC 00-63A (Wx. in the cockpit)
    • Flexibility
    • Advisory Information
    • Category 2 data link (less onerous requirements)

• Solve the open issues to allow for deployment
Let’s Finish the Bridge!