

Bridge to Nowhere?



or Bridge to Success?



Captain Mark Bradley
Chief Technical Pilot,
Industry Affairs
Delta Air Lines



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



Transitioning to NextGen

- 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

- 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”)

Not so Fast

- WAUS41 KPCI 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 KPCI 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 KPCI 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.

Strategic - Airmet

G-AIRMET

VALID: 1500 UTC THU 07 AUG 2014

LAX-LGA

410
310

410
280

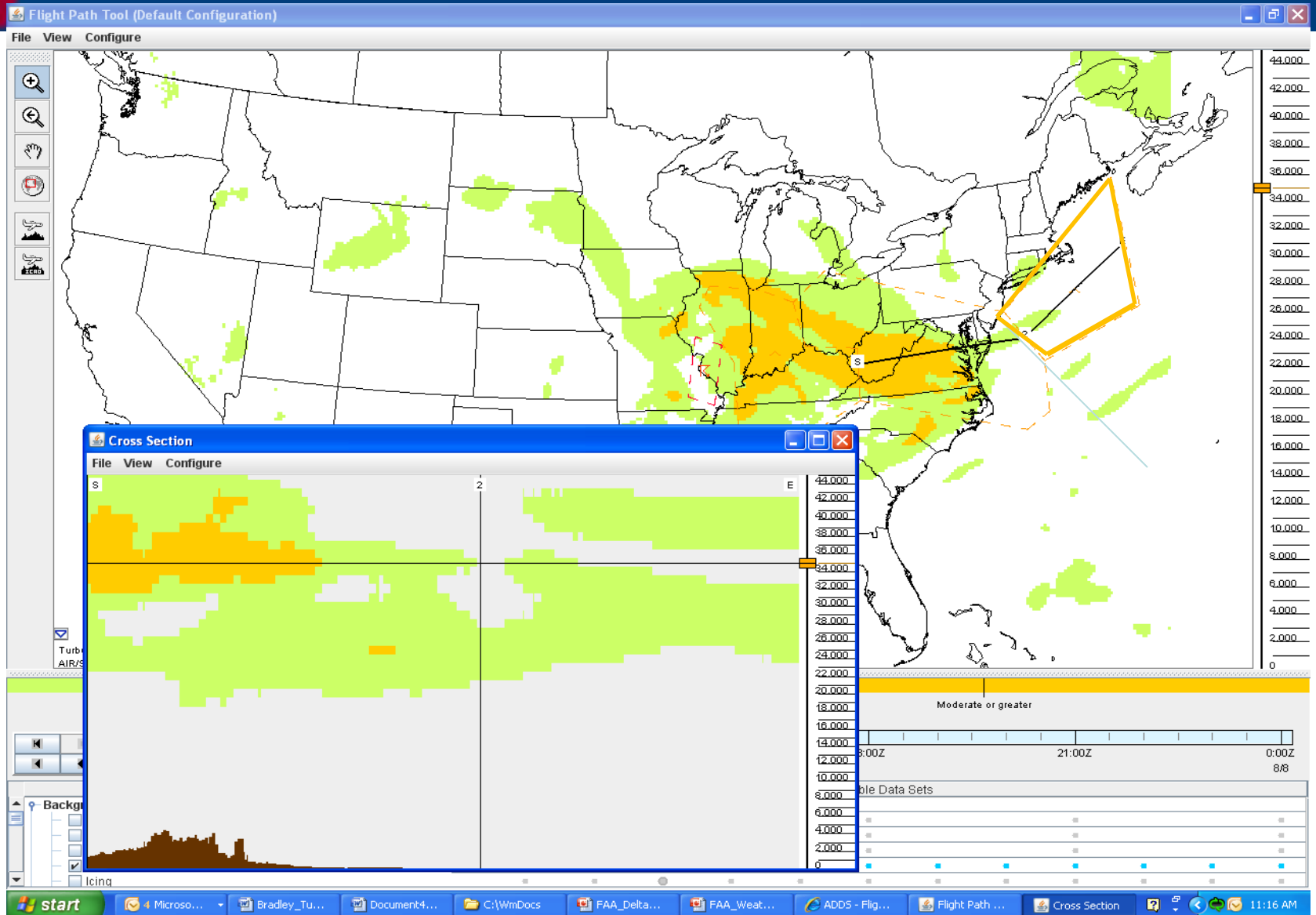
370
250



ISSUED: 1445 UTC THU 07 AUG 2014

- 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

AIRMET GTG Comparison





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

- 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?

- 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!

