FAA Air Traffic Organization (ATO)
Weather and Operational Performance

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Management Objectives

• Can FAA identify/prioritize the constraints in the system?
  – *Air Traffic Flow Management Delay, Taxi-Out Delay*

• Is FAA making the most efficient use of capacity?
  – *Capacity, Throughput, Capacity Efficiency*

• Is FAA providing efficient flight trajectories to operators?
  – *En-Route Additional Distance, Level Flight*

• How will FAA respond to questions of Airline schedule delay, on-time performance?
  – *On Time Performance, Change in Block Time*
Metric Inter-Dependencies

Schedule Delay

- ANSP Investment
  - Traffic Management Initiatives
  - Airspace Design

- Airport Maintenance
- Airport Expansion

ATC/ATM performance

New Technology

Capacity & Airport Infrastructure

Weather

- Low Visibility
- High wind
- Convective weather

Other Drivers (SAA)

- Schedule Peaks
- Crew Scheduling
- Equip problems, etc.

Performance Analysis
ATOSysOps

FAA Air Traffic Organization
Data Sources

• Archived Trajectory and Flight Plan Data
• Aviation System Performance Metrics (ASPM)
  – Key Event Times: Scheduled Filed Actual,
  – Basic METAR
• Air Traffic Flow Management Delay (OPSNET)
• National Traffic Management Log (NTML)
• Weather Sources
  – METAR
  – NCAR Wind Data at 6-hour intervals
ATFM Delay by Category - FY2016

- WEATHER Visibility 29.7%
- WEATHER Wind 23.2%
- WEATHER T-Storms/Severe 17.9%
- VOLUME 16.5%
- WEATHER Snow/Ice/Winter Ops 7.0%
- RUNWAY/TAXI 2.1%
- OTHER 2.3%
- WEATHER Rain 1.0%
- EQUIPMENT 0.3%
ATFM Delay by Region - FY2016

Percent of Delay

- Northeast - 40.2%
- SFO - 13.7%
- Chicago - 7.3%

Performance Analysis
FAA Air Traffic Organization
ATFM Delay by Facility - FY2016

Largest Increases in Delay
- EWR - Wind & Visibility
- ZMA - Volume
- MSP - Visibility & Wind
- DCA - Visibility

Largest Decreases in Delay
- ORD - Equipment
- PHL - Visibility & Snow/Ice
- JFK - Runway/Taxi
- BOS - Wind & Visibility

Other Important Changes
- SFO
  - Increase in Wind delay
  - Decrease in Visibility delay
The top 5 airports highlighted in red constitute 89% of total TMI wind delays.
Most wind delays occurred in October, December, March, and April
Linking Wind Conditions to Delay

OPSNET and METAR data are showing similar patterns. However, not exactly matching. To be further examined by looking at:
- different days
- Trajectory characteristics, arrival fix, runway used... etc.
Capacity Efficiency
Calculating Demand

- Demand based on **Filed Times** or Empirically by a **Best Achieved Trajectory**

- Flight Demand is from **Benchmark Arrival Time** (un-impeded time) until **Actual Arrival Time**
Arrivals into JFK

April 30, 2016 HR 12:00 -1259
13L, 22L - 30 Arrivals, TAER 100

April 15, 2016 HR 19:00 -1959
22L, 22R - 39 Arrivals, TAER 88.64
Flight Efficiency KPI – EnRoute

Actual vs. Flight Plan vs. Great Circle vs Best Achieved vs. Wind Optimal
Impact of Special Activity Airspace
Impact of Weather

March – 481 Flights
8.3 nm Excess Dist.

June – 363 Flights
32.6 nm Excess Dist.
Performance Metrics Reporting

*Is the metric/process useful?*

• Does it lead to improvements in the system?
  – Data mining identifies specific scenarios for mitigation.

• Will decision makers trust what is presented?
  – Weather, Airline Schedules, Airport Capacity
  – What are similar days?

• Capabilities beyond local METAR
  – ASPM like tables for Terminal/EnRoute
  – ASPM like tables for Forecast Weather