Overview

- Status of ATM-Wx integration effort
- Excerpt from sample analysis
  - Problem statement
  - Integration levels
  - A decision scenario
- Present decision targets
Status of ATM-Wx integration effort

• Limited present focus to just two Decision Support Tools (DSTs)
  – Surface Trajectory Based Operations (STBO)
  – Time-Based Flow Management (TBFM)

• For each of the DSTs, produced an initial “Concept for Weather Integration into Operations”
  – Weather integration concept
  – Operational scenarios
ATM-Weather and Data Integration

- Levels of wx integration:
  - Level 0: some weather information is available, somewhere
  - Level 1: weather overlaid on ATM display (“on the glass”)
  - Level 2: Translation: weather + data = **Threshold Events** or NAS Constraints
  - Level 3: Conversion: TE/Constraints + traffic = **State Changes** or Impacts
  - Level 4: Decision Support: State Changes/Impacts + amplifying data = **Solutions and Recommended Actions**

- Seek to make repeatable automation-assisted decisions based on objective authoritative information
Anatomy of a threshold event

Current C&V conditions at an Airport

Ceiling and Visibility (C&V) predicted to worsen causing a change from Visual Flight Rules (VFR) to Marginal VFR (MVFR) at an airport

Further lowering of visibility will cross another Threshold - Instrument Flight Rules (IFR)

Diagram credit: Metron Aviation

Airport specific data would apply, i.e., visual approach criteria, or local CSPO ceiling and visibility limits
Runway configuration change (Level 1)

- Monitor weather (manually):
  - Winds (speed, gust, direction)
  - Ceiling & Visibility
- Open Runway Configuration Dialog Box and manually input changes

“SDSS predictions depend on knowledge of current or future airport runway configurations. SDSS does not receive this information electronically, thus users must manually enter the current runway configuration and planned future changes as soon as they are known.” SDSS User’s Manual

(Graphics: SDSS User’s Guide, Federal Aviation Administration (FAA), MIT Lincoln Labs.)
Runway configuration change (Level 2)

- Forecast winds, ceiling, and visibility are automatically monitored along with other basic data elements (e.g., FAA regulations, general limitations, and local policy)
- Threshold is triggered ❶
- (Allowing drill down of forecast ❷)
- Runway Configuration Dialog Box is manually configured ❸

Runway configuration change (Level 3)

Weather Conditions
As depicted on the TMA TGUI (l) and the SDSS timeline (r)

Traffic Conditions
Manual judgment on if/when to change configuration

Graphics: SDSS User’s Guide
Runway configuration change (Level 4)

- Decision support provides optimized solutions and alternatives
- Additional data is considered by automation logic (e.g., time of impact vs. ARR/DEP demand, business rules)
- Human-in-the-loop options are still available to traffic managers
Present decision targets

• **STBO/TFDM target decisions**
  - Runway configuration change
  - Departure fix closure
  - Runway closure due to weather
  - Change to AAR/ADR
  - Other possible decision targets
    • Surface winds: wake mitigation
    • Terminal winds aloft: compression
    • Low level WS: temporary runway closure
    • Ceiling: airport configuration, CSPO
    • Visibility: airport configuration, CSPO, taxi spacing
    • Lightning: ramp operations
    • Convection: closed/disrupted ARR/DEP fixes/routes
    • Freezing Precip: rwy surface conditions, de-icing ops

• **Time-Based Flow Management (TBFM) decisions** (yesterday at CDM meeting)
Thank you