

# FPAW Segment Four

## Integration of Weather and Air Traffic Decisions

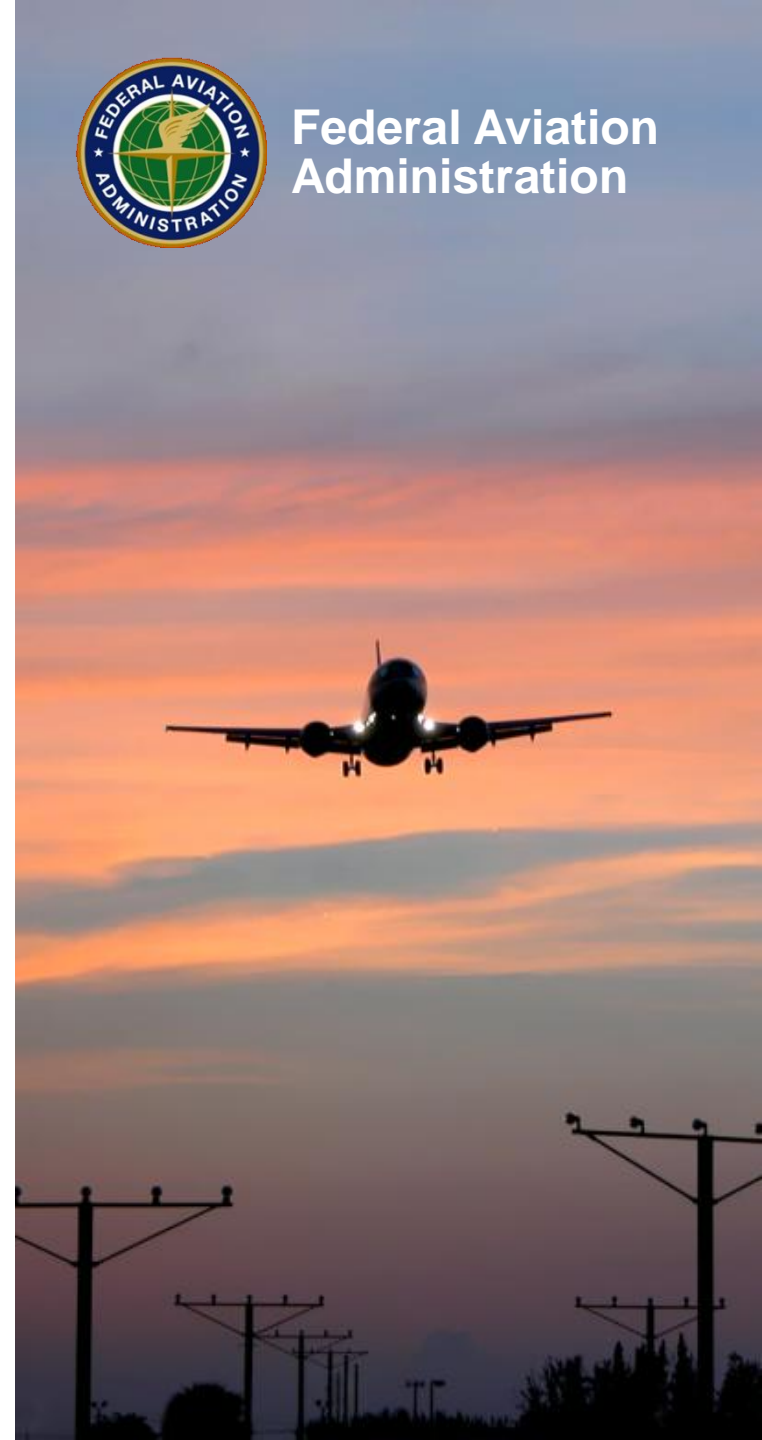
Presented to: FPAW Meeting

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Date: October 12, 2011



Federal Aviation  
Administration



# 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

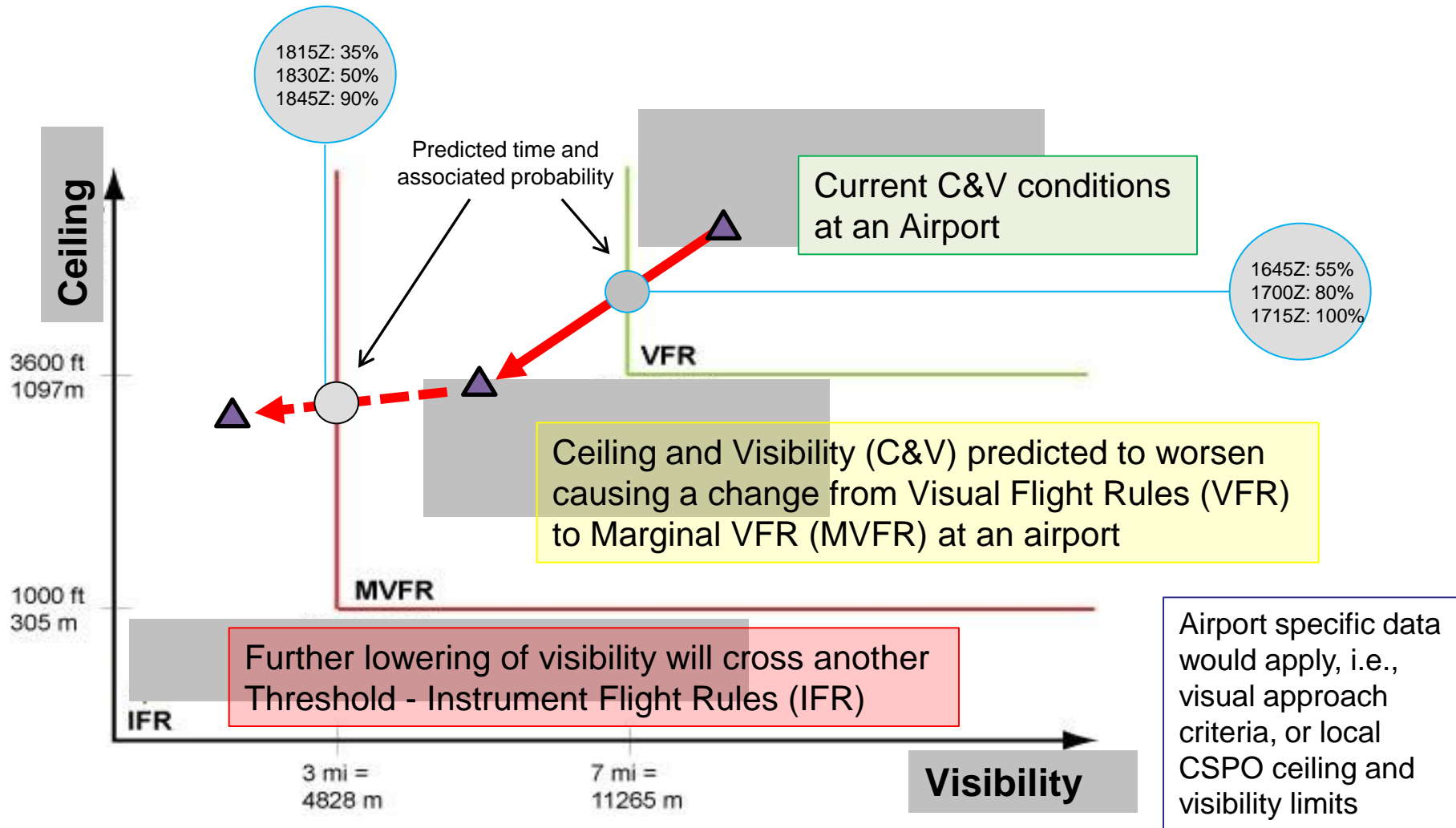
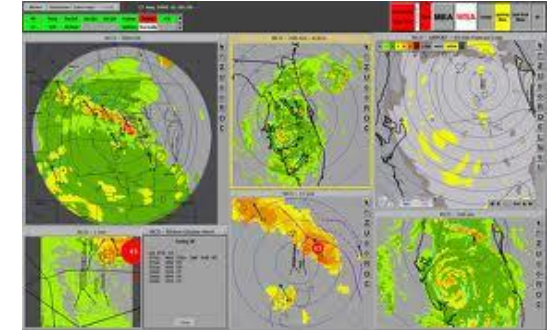


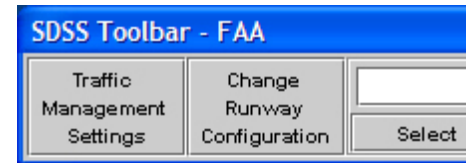
Diagram credit: Metron Aviation

# Runway configuration change (Level 1)

- Monitor weather (**manually**):
  - Winds (speed, gust, direction)
  - Ceiling & Visibility



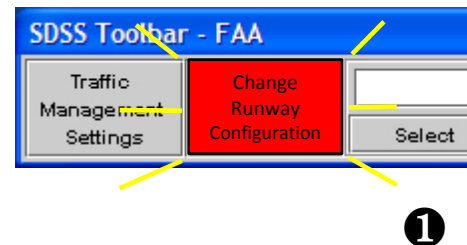
- Open Runway Configuration Dialog Box  
and manually input changes



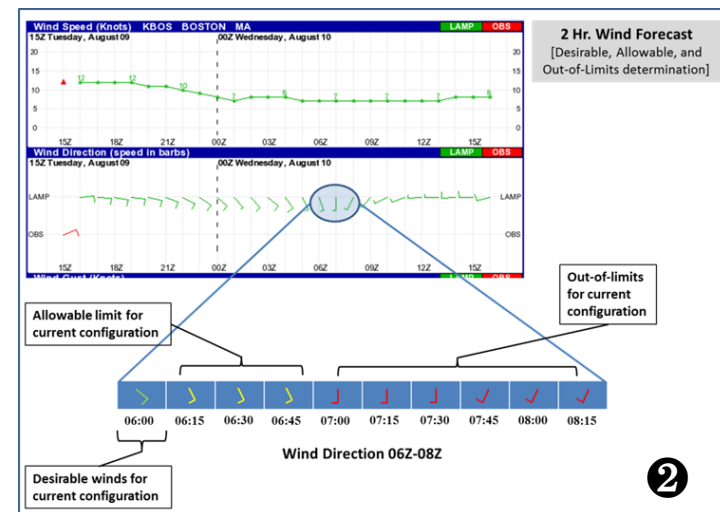
“SDSS predictions depend on knowledge of current or future airport runway configurations. SDSS does not receive this information electronically, thus users must manually enter the current runway configuration and planned future changes as soon as they are known.” **SDSS User’s Manual**

# 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)

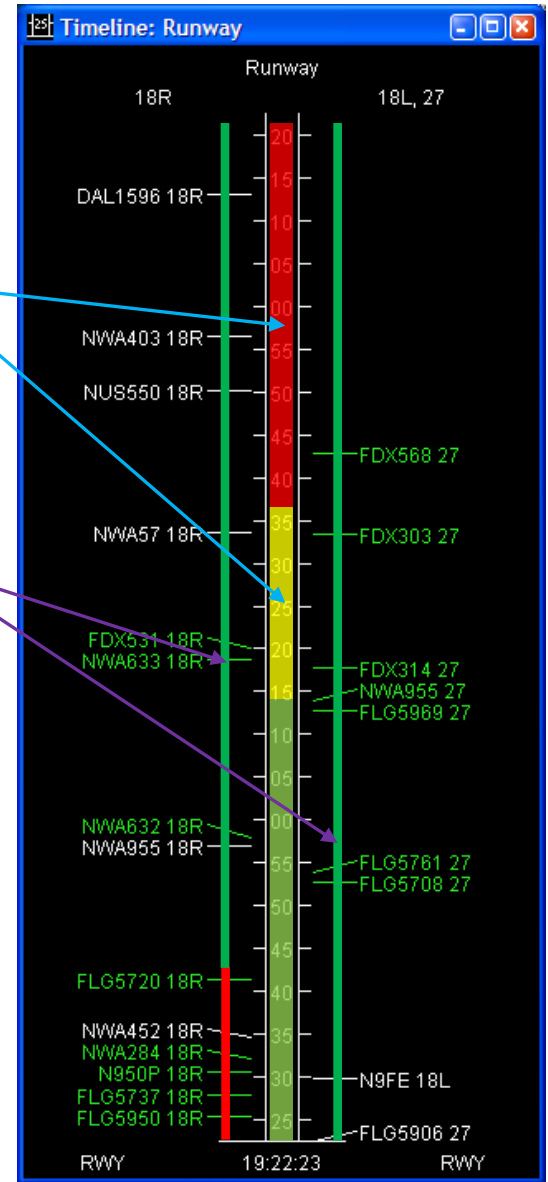
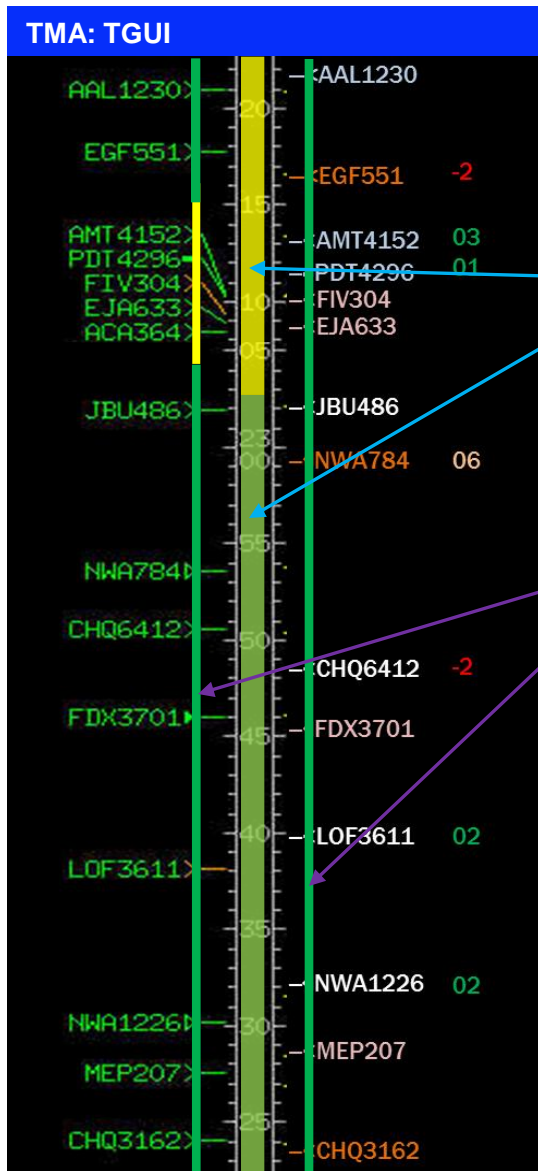


- Threshold is triggered 1
- (Allowing drill down of forecast 2)
- Runway Configuration Dialog Box is manually configured 3



Graphics: SDSS User's Guide and NWS GFS-LAMP station forecast.

# 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**



# 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

**Change Runway Configuration**

Time: 1632Z  
Flt Conds: LOW IFR

Current Config:  
DEP- 36L, 36R, 27  
ARR- 36L, 36C, 27  
ADR: 34 AAR: 40

**CONSENSUS FORECAST**

16z Wind Shift At 17:12 GMT  
Model Run Quality **[Good]**

Probability of Exceeding Limits:  
1645Z 1700Z 1715Z 1730Z  
10% 50% **90%** 65%

Options

<b>(A)</b>	DEP: 18R, 18C, 09 ARR: 18L, 18C	ADR: 60 AAR: 45	Start at: 1700Z
<b>(B)</b>	DEP: 18R, 09 ARR: 18L, 18C, 18R	ADR: 30 AAR: 60	Start at: 1715Z
<b>(C)</b>	DEP: 18C, 09 ARR: 18L, 18R	ADR: 42 AAR: 60	Start at: 1730Z

Comments:  
Option B notes- ARR push. No A380 DEP from 1710Z to 1722Z. TWR-rec new config w/DAL362. TRACON- rec JBU240 last acft to HARDY for N config.

Activation

Activate New Airport Configuration

**Immediately** At  (hhmm)  
Set Configuration Time

Remove Configuration Change

Close

# 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

