

# ATM-Weather Integration Plan

## AJP-B, Aviation Weather Office

Presented to: AIXM/MET Info Exchange Conf

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Federal Aviation  
Administration



## Problem Statement

**Most weather support to ATM is manual, with weather displays that must be interpreted by the user**

- Weather products do not have the maturity required for direct insertion without interpretation \*
- Rules for interpretation and use of weather data are generally based on the experience of the user
- ATM decisions based upon today's weather products are inconsistent from user to user

\* This aspect of the problem is addressed in the NextGen Weather Plan rather than in the ATM-Weather Integration Plan



## Working Definition

### **ATM-Weather Integration: The inclusion of weather information**

- into the logic of an ATM decision process or decision aid
- such that weather impacts have already been taken into account when the decision is made or recommended



## Strategy

- **Bring together two communities**
  1. Technologies and methodologies for
    - Translating weather into impacts
    - Dealing with uncertainty
  2. Capabilities under development
    - Solution Sets
    - JPDO Working Groups



## Conceptual Flow

State of the Atmosphere	Translated Impact Parameters	Decision Rules	Decision System
<p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>• Convective wx forecast</li> <li>• Turbulent eddy dissipation rate (EDR)</li> </ul> <p><u>From:</u> weather systems</p> <p><u>Ownership:</u> wx community with requirements from users</p> <p><u>Located:</u> 4D Weather Data Cube</p>	<p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>• CWAM</li> <li>• EDR index to aircraft type</li> </ul> <p><u>From:</u> Appendix B</p> <p><u>Ownership:</u> wx community with user guidance</p> <p><u>Located:</u> multi-use in network service; unique in user systems</p>	<p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>• Acceptable severity level</li> <li>• SFO parallel approach</li> </ul> <p><u>From:</u> user community, with support from Appendix B</p> <p><u>Ownership:</u> Users, with support from weather community</p> <p><u>Located:</u> multi-use service; unique in user systems</p>	<p><u>Examples:</u></p> <ul style="list-style-type: none"> <li>• TFMS (Traffic Flow Management System)</li> <li>• TBFM (Time-Based Flow Management)</li> </ul> <p><u>From:</u> users, and cataloged in Appendix A</p> <p><u>Ownership:</u> users</p> <p><u>Located:</u> user systems</p>



## Analysis of decision capabilities done

- Over the six non-weather solution sets
- By swim lanes and then capabilities
- Initial focus on mid-term
- Have looked for points of weather impact as injection points for weather into decisions
- Details in appendix to be continuously updated



## Analysis of weather integration methodologies done

- Have 30 for translating weather information into impact information
- Have 10 for uncertainty and ATM decisions
- Mostly medium maturity
- In execution, number to be winnowed and some brought to high maturity



## Execution concept

### Step process

1. Analysis and team alignment
2. Determine integration opportunity points
3. Identify methodologies for impacts and uncertainty
4. Support implementation into tools and processes

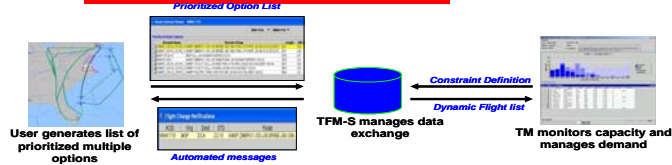
### Foundation: mature weather methodologies

- Development
- Test and evaluation
- TRL



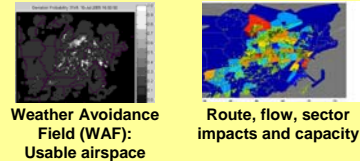
## Crude example

- From **decision capabilities**: SEVEN\*



- From **weather translation methodologies**:  
Weather avoidance models (WAF)

### Capacity Impacts (Terminal and Enroute)



- **Integrated: WAF tells SEVEN how far to dial down**

\* System Enhancements for Versatile Electronic Negotiation



## Summary

- **Plan provides**
  - Ingredients for ATM-Wx integration
  - A recipe for combining them
- **For execution, will still need**
  - Cooks to go into the DSTs' kitchens
  - A couple of chefs directing and coordinating
  - Pots and pans (testbed, training, etc)
- **See the plan at:**  
<http://www.jpdo.gov/newsArticle.asp?id=110>

