Cross-cutting Issues Impacting Operational ATM and Cockpit Usability of Aviation Weather Technology

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Introduction

- Air Traffic Management Coordinators are supposed to provide input into the development of Tactical Decision Aids that address hazardous weather.
- However, how accurate, reliable, formalized, and **USABLE** is weather?
- Is flight crew part of the DST process? Pilots certainly have a stake in the outcome!
Operational Involvement

• From this observer, involvement of AT Managers, Supervisors, and Coordinators is “too informal and anecdotal”, rather than in-depth participation to set operational user requirements.

• “If it doesn’t meet my needs as a user, forget it.”

• This short session must raise awareness of major deficits in NextGen DST’s for ATM and pilot.

• Have the users had the opportunity to train providers regarding their needs?

• Additionally, is terminology obscuring the broad reach of the development process?
Aviation Weather Training Issues

ATC and Meteorologists
Background

--- Currently Detailed to FAA HQ, AJP- 6 Research and Technology Development

--- Permanent Position is Supervisor, Traffic Management Coordinator at Jacksonville En Route Air Traffic Control Center

--- Staff of 4-6 Traffic Management Coordinators.
Area of Responsibility

• To ensure a safe, orderly and expeditious flow of traffic through ZJX and underlying facilities by managing volume with Traffic Management Initiatives.

• Analyze, develop, coordinate, communicate, monitor and adjust a plan to manage constraints within ZJX.
ZJX – Jacksonville ARTCC
ARTCC Boundaries - Convection
How do we meet NextGen Goal?

- Reducing delays caused by weather by 14% in the midterm.
- Why is ZJX effective at managing weather constraints?
FACTS

• Air Traffic controllers, Traffic Managers, Supervisors are **NOT** meteorologists yet make strategic and tactical decisions for the movement of aircraft through the NAS based on the display of various weather products.

• Meteorologists are **NOT** Air Traffic Controllers yet provide guidance on movement of aircraft around weather in the NAS.
Issues

• Current weather training is generic

• Weather display training focuses on “buttonology”

• No specialized training for ATC decision makers focused on interpreting the weather information available.
Delays due to Weather
ATC Weather Tools & Training

• Tools should present data in ATC terms
  – Decode terms and symbols
• Tailor training to geographic area
• Face-to-Face by Meteorologist vs. CBT
• Translations of “colors” to flight conditions
• Include ATC and pilots the development
  – Spend time in our environment
• Consider impact on airframe; small, large, heavy
ATC Training

• How to find the “soft spot” in a line
• Where the weather permeable
• Extent of deviations on the routes
• Importance of pilot reports to validate decisions
Issues

• CWSU need specialized “aviation” training for better integration into our Traffic Management Units.
Example of scale in DBZ
Looks like a bad weather day

### NATIONAL PROGRAMS

<table>
<thead>
<tr>
<th>CONTROL ELEMENT</th>
<th>START</th>
<th>END</th>
<th>SCOPE</th>
<th>REASON</th>
<th>AVG</th>
<th>AAR</th>
<th>PR</th>
<th>ADVZY</th>
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<td>0259</td>
<td>(Distance) - 1400 miles. + CYHZ+CYOW+CYUL+CYYZ+CYTZ+CYQB</td>
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<td>36</td>
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### GROUND STOPS

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<td>ZTL ZID ZIX ZBW ZOB ZDC ZNY</td>
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### DELAY INFO

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<th>REASON</th>
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### VACAPES REQUESTS

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<td>A - B - C</td>
<td>ON REQ</td>
<td>AQA FL240</td>
<td>1900-0400</td>
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CoSPA will be deactivated on November 1, 2011. Click here for more information.
Controller’s view
Pilot approaches weather
Flying through “RED”
Florida to the NE Playbook
What can we do better

- With additional/specialized training we can reduce the delays and miles flown
- With a better understanding of the flight conditions in the atmosphere and impact to the different classes of aircraft, ATC can better plan for the reduction in volume to accommodate deviation.
- New products be geared toward aviation terms/vocabulary. Ex. FL300 vs. dbz
Backup Slides
Control Room
CCFP

Noaa's National Weather Service
Aviation Weather Center

CCFP
Issued 2100 UTC
Click image for detailed view

JAVA Loop Display
Scroll Window
2hr Verification
Previous Forecasts

2hr forecast Valid at 23Z
4hr forecast Valid at 01Z
6hr forecast Valid at 03Z
Controller Display

Table 1
NEXRAD Color Scheme for Controllers Display

<table>
<thead>
<tr>
<th>Reflectivity</th>
<th>Color</th>
<th>Phraseology</th>
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<tbody>
<tr>
<td>&lt; 30 dBZ</td>
<td>Blank</td>
<td>N/A</td>
</tr>
<tr>
<td>30-40 dBZ</td>
<td>Royal Blue</td>
<td>Moderate precipitation</td>
</tr>
<tr>
<td>40-50 dBZ</td>
<td>Checkered Cyan</td>
<td>Heavy precipitation</td>
</tr>
<tr>
<td>&gt;50 dBZ</td>
<td>Cyan</td>
<td>Extreme precipitation</td>
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</table>

Table 2
NEXRAD Layers Available on Controller Displays

<table>
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<th>Mosaic Name</th>
<th>Layer (ft)</th>
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<tbody>
<tr>
<td>Composite Reflectivity</td>
<td>0-60,000</td>
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<tr>
<td>CR Low</td>
<td>0-24,000</td>
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<tr>
<td>CR High</td>
<td>24,000-33,000</td>
</tr>
<tr>
<td>CR Super High</td>
<td>33,000-60,000</td>
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</table>
OVERCOMING METSPEAK

• Acronym Hell: CoSPA, FAR, PAD, MCS, CACR, RUC, HRRR, WAF

• Met Terms: boundary layer, eddy dissipation rate, mesoscale

• 19th Century solution Beaufort Wind Force Scale, but evolving with technology
Antidotes

• Learn and use air air traffic terms, concepts, problems
• Express weather tools as means to anticipate and overcome problems
• Get inside the head of a traffic management coordinator
• Understand the different roles of airline dispatchers, pilots, controllers (tower, arrival departure, en route) and traffic management coordinators
Discussion Examples

• Integrated Departure Route Planning (IDRP) tool
• Forecasted weather is invisible, implied, and accounted for
• Time Based Flow Metering (TBFM) tool
• Evolving from Traffic Management Advisor
• Will run on ERAM some day
• At heart of NextGen
QUIZ ANSWERS

CTOP – Collaborative Trajectory Options Program
FCA – Flow Constrained Area
CACR – Collaborative Airspace Constraint Resolution
CI – Convective Initiation
FAR – False Alarm Ratio
POD – Probability of Detection
MCS – Mesoscale Convection System
Rapid Refresh (RR) Model – will replace RUC in 2011. Will be parent of HRRR