Segment 4: Progress in Strategic Convective Weather Info for ATM in Complex Airspace

Friends/Partners Aviation Weather
Orlando, FL  11 November 2005

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Comments  
on  
2 Topics  

• CDM Steering Group (CSG) Directives  
• Wind Shear Info
Collaborative Convective Forecast Product

• Progress
  - Intuitive Format introduced March 2005

Additional Opportunities

• CDM Steering Group (CSG) Directives
  – Define New Terminal Area Convection Fcst Product
  – Focus on CCFP Granularity & Verification
# CCFP Definitions

**Source:** Statement of User Needs - CCFP 2005

## CCFP Purpose (Section 1.1):

“...to be used for strategic planning of air traffic flow management during the **en route** phase of flight. It is **not intended to be used** for traffic flow control in the airport terminal environment, …”

## CCFP Minimum Threshold (Section 2.1):

- Polygon of at Least 3000 sq. miles that contains:
  
  **Coverage**
  
  - Composite reflectivity of at least 40dbZ is expected to cover at least 25% of the forecast area, and
  
  - Echo top of 25,000 feet Mean Sea Level (MSL), or greater, are expected to cover at least 25% of the forecast area, and

  **Confidence**
  
  - A confidence of at least 25% that above 2 minimum criteria will be met.


**CSG Recommendation - Psbl Implementation**

- New Terminal Area Product
- CCFP Granularity
  - Is 3000 sq. miles the correct threshold?
    - In the Airport Terminal Environment?
    - In the En Route Environment?
  - 3000 sq miles of what?
    - Level 3 or higher Reflectivity? - 4km squares or
    - Traffic Impacted Areas? - 40nm diameter circles

- Specific Opportunities
  - Develop a Terminal Environment Product
  - Further Define En Route Threshold
Convection 22Jun05 @17Z

Green =

4km squares of Level 3 & Higher Wx Radar Reflectivity

Is this More
or
Less than
3000 sq miles?

Answer: LESS- Approx 2000 sq miles
Same Convection 22Jun05 @ 17Z

3 shades of Green =
40nm diameter circles w/ Solid, Bkn or Sct coverage

Is this More or Less than 3000 sq miles?

Answer: MORE - Approx 19,000 sq miles
CSG Recommendation - Psbl Implementation

• Verification
  – Measurements of Both VALUE & ACCURACY

Value
Measurements of CCFP Value for Decisions by Airspace Users

Accuracy
Measurements of CCFP Accuracy for Producers (Meteorologists)

• Specific Opportunities
  • Continue Efforts on Accuracy Measures
  • Initiate Maximum Tops Verification
  • Initiate Measurements of CCFP Value
Wind Shear

• Progress
  - Observation/Detection Capabilities

Additional Opportunities
• Observation/Detection Capability
  – Dry regime (Wind Shear w/ Weak or No Convection)
• Distribution
  – Access to Graphics
  – Access to Text Advisories
Wind Shear

Current Observation Capability

• Current: Human-in-the-Loop
  – Pilot Reports to ATC after Encountered (PIREP)

• Current: Automated
  – 117 U. S. Airports w/ Ground Based Detection
    • 43 Airports: Terminal Doppler Weather Radar (TDWR)
      – 11 of 43 Upgraded to Integrated Terminal Weather System (ITWS)
    • 40 Airports: Low Level Windshear Advisory System (LLWAS)
    • 34 Airports: Weather System Processor (WSP)
ITWS Display with Wind Shear Identified
Wind Shear Hazard Info - Distribution

At 43 Airports w/ TDWR
Avail. to Pilots & AOC’s
Via TWIP

At 117 Airports
Runway Specific Info
Relayed By ATC to A/C

KMSP 2013
ITWS TERMINAL WX
*WIND SHEAR ALERTS
20 KT LOSS
BEGAN 2006
-STORM(S)

2--04-22-30R-30L
AW CALM
04 A WSA 15K−2MF
04 D
22 A
22 D WSA 15K−1MD
30RA

Automated Distribution
Text - No Graphics

Human-In-Loop Distribution
Conclusions

Future Opportunities

Weather Info for ATM in Complex Airspace

• CCFP Verification & Value
• Additional Definition CCFP Minimum Threshold
• Definition of a Terminal Environment Product
• Wind Shear Information Distribution
• Wind Shear Detection Capability
Supporting Slides
Use only if requested
&
Time available
Convection 22Jun05 @19Z

Green =
4km squares of Level 3 & Higher Wx Radar Reflectivity

Is this More
or
Less than
3000 sq miles?

Answer: MORE - Approx 6000 sq miles
Same Convection 22Jun05 @19Z

3 shades of Green =
40nm diameter circles w/ Solid, Bkn or Sct coverage

Is this More
or
Less than
3000 sq miles?

Answer: MORE - Approx 40,000 sq miles
### 2 Convection Related Topics

<table>
<thead>
<tr>
<th>Details</th>
<th>CCFP</th>
<th>Wind Shear</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Type</strong></td>
<td>Forecast: 2, 4 &amp; 6 Hrs</td>
<td>Observation</td>
</tr>
<tr>
<td><strong>Update Period</strong></td>
<td>Every 2 Hours</td>
<td>Every 1 Minute</td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td>Human-In-Loop</td>
<td>Automated</td>
</tr>
<tr>
<td><strong>Avoiding</strong></td>
<td>Congested Air Traffic</td>
<td>Ground Proximity</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Graphics via Web</td>
<td>via TWIP</td>
</tr>
<tr>
<td></td>
<td>Posting by AWC</td>
<td>Verbally by Tower</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Efficiency</td>
<td>Safety</td>
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- Human-In-Loop
- Automated
- Graphics via Web
- Posting by AWC
- via TWIP
- Verbally by Tower
In Situ Turbc Sensing & Reporting Concept of Use

• Progress
  – FAA 18 Month Project & Document Drafted

Additional Clarification

• Air Traffic & Operator Roles in Turbc Avoidance
• Add Human-in-Loop Forecasting Systems (e.g. EWINS)
• Add Turbc Reporting Methods
  – Operator Automated as well as Manual Reporting to WMSCR
  – Operator initiated uplinks to A/C