Resolution Improvements for Aviation Weather Destined for the Cockpit

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October 11, 2017
El Reno, Oklahoma EF-5 Tornado, May 13, 2013. Phased array Radar 1 second data on left, 1 minute data from NEXRAD (WSR 88-D) radar on right. Incredible resolution coming, results will have to be parameterized for cockpit use. From Webber, NSSL
High Impact Prediction Needs: Higher Resolution Models

- 40 km RUC (1998)
- 20 km RUC (2002)
- 13 km RUC (2005)
- 3 km HRRR (2014)

Numerical products with ever-increasing resolution, so 3 km scale allows for detailed thunderstorm picture. Except same for regions of flight avoidance and reroute through hazardous weather.

Stephen Weygandt, Assimilation Section Head, NOAA Earth System Research Laboratory /Boulder, CO
3-km HRRR – what it gets you...

13-km 6hr forecast
- NO STORM STRUCTURE
- NO ESTIMATE OF FLIGHT PERMEABILITY

3-km HRRR 6hr forecast
- ACCURATE STORM STRUCTURE
- ACCURATE ESTIMATE OF FLIGHT PERMEABILITY

15-km resolution allows for definition of severe weather avoidance, as shown by thick red line (NOAA, Boulder)
### Cockpit Weather Availability

<table>
<thead>
<tr>
<th>Cockpit Weather Availability</th>
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<tbody>
<tr>
<td>➢ Paper weather briefing</td>
<td>Hours</td>
</tr>
<tr>
<td>➢ X or C band on-board radar</td>
<td>Minutes</td>
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### Cockpit weather graphic products

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>➢ Early</td>
<td>10 Minutes</td>
</tr>
<tr>
<td>➢ Mid</td>
<td>5 Minutes</td>
</tr>
<tr>
<td>➢ Current</td>
<td>Minutes</td>
</tr>
<tr>
<td>➢ Future</td>
<td>0 to Minus 5 Minutes</td>
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### NextGen Weather Processor (NWP)

- **Focuses on weather product generation, translation, and display for aviation weather users**
- **NEXGEN WEATHER PROCESSOR** will allow for the decommissioning of legacy weather processor systems (e.g., WARP, ITWS, CIWS)

<table>
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<tr>
<th>Capabilities</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>➢ Produces advanced aviation specific weather products</td>
<td>➢ Improve accuracy, timeliness and look ahead (0-8 hour) of aviation-specific weather information to air traffic</td>
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<tr>
<td>• 0 to 8 hour aviation weather products</td>
<td>➢ Reduce avoidable air traffic delays and maximize available runway and airspace usage</td>
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<tr>
<td>• Real-time weather radar information (e.g., ERAM)</td>
<td>➢ Enhance weather algorithms</td>
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<tr>
<td>• Convective Weather Avoidance Fields</td>
<td>➢ Establish weather processing platform, reducing operational costs by consolidating legacy processors</td>
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<td>• Wind Shear alerts</td>
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<tr>
<td>➢ Translates weather information into weather avoidance areas for integration into decision support tools (e.g., TFMS, TBFM)</td>
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<tr>
<td>➢ Provides Aviation Weather Display (AWD) of NextGen weather information for ATC users</td>
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<tr>
<td>➢ *NWP in detail in next session.</td>
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*NWP in detail in next session.*
NextGen Weather Stakeholders (e.g.)

Other Aviation Wx Users
- American Airlines
- United
- FedEx
- jetBlue
- UPS
- Southwest
- Delta

Trade Associations
- NATCA
- NBAA
- AOPA
- ICAO
- EUROCONTROL
- RTCA
- CDM
- NOAA
- NOAA National Weather Service
- NASA
- GAO
- OMB
- U.S. Air Force
- United States Congress
- NextGEN

Unions
- AFL-CIO
- UAS
- AVS
- AFN
- OMB
- ANG
- AJT
- AJM
- ASH
- AVS
- AJR
- AJI
- AJT
- AJM
- ANG
- AJV
- AJW
- A4A

Standards Organizations
- U.S. Air Force
- United States Congress
- NextGEN

Other ANSPs
- AIRICS
- AIRICS
- AIRICS

Partner Agencies