Friends/Partners in Aviation Weather

Segment Three

Legacy System Conversion
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Legacy Systems

• Legacy systems often start out as state of the art
• Legacy systems exist for good reasons – to meet identified requirements
• They become obsolete:
  – Requirements change
  – New technology offers advantages
  – Constraints change
  – Legacy technology doesn’t get the job done
Forecasts Roadmap
Why Convert FAA Legacy Systems

• Right-size aviation weather observations suite
• Consolidate processor systems architecture
• Meet NextGen and SWIM requirements
• Implement a Service-Oriented Architecture (SOA) in the NAS
• Lower information costs
• Increase weather information access efficiency
• Increase common situational awareness
• Increase NAS agility
NextGen Recommendation

The JPDO identified these gaps and overlaps:

- Align requirements against a common baseline
- Develop a 4D cube to increase information access
- Develop interoperable weather products, across agencies and air traffic domains
- Integrate and automate weather information into NAS operations
• We cannot adopt the way of living that was satisfactory a hundred years ago. The world in which we live has changed, and we must change with it

• Technology and requirements of NextGen are outstripping our legacy capabilities at Warp speed.
Weather COI

- ARTCC
- ERAM
- PIREDPs
- FTI
- FTI Gateway
- PIREDPs & Altimeter data
- NNCC
- WMSCR
- AOCs
- VOLPE
- ITWS
- WJHTC
- CIWS
- NWS
- ITWS, CIWS, WMSCR
- NWS
- ITWS, CIWS, WMSCR
- NWS

Friends/Partners, FAA Legacy Systems, July 15, 2008
NextGen Architecture circa 2015

Diagram showing the integration of various systems and data sources, including:
- ASR WSP
- ASR-9 WX
- NEXRAD
- ASOS/MWOS
- LLWAS NE TDWR
- LLWAS RS
- LIGHTNING VENDOR
- NOAA Product Generator
- Global Sources
- Vendor
- NextGen Product Generator (FAA)
- Cockpit/ FIS
- AESS Vendor System
- ATCSCC ETNS/TFM-M
- ARTCC ERAM/AOP/TFM-M
- Other Users AOC, DOD, Mia.
C&V Transition

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>2007</td>
<td>NCV Diagnostic Operational</td>
</tr>
<tr>
<td>2008</td>
<td>Ceiling and Visibility Diagnostic and Forecast</td>
</tr>
<tr>
<td>2009</td>
<td>NCV CONUS Forecast</td>
</tr>
<tr>
<td>2010</td>
<td>4D Data Cube at IOC</td>
</tr>
<tr>
<td>2011</td>
<td>2010 Forecast Operational</td>
</tr>
<tr>
<td>2012</td>
<td>4D Data Cube</td>
</tr>
<tr>
<td>2013</td>
<td>Integrate NCV with TAF</td>
</tr>
<tr>
<td></td>
<td>Provide GFA/G-AIRMET to 4D Data Cube</td>
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</table>

**Integration Improvements**
- 2008: G-AIRMET Operational
- 2008 - 2011: GFA Programming and Test
- 2011: GFA Operational
- G-AIRMET and GFA Development
- TAF

**Policy**
- Rules Changes and Training for G-AIRMET
- Rules Changes and Training for GFA
- Rules Changes and Training for 4D Cube
Legacy Architecture

Diagram showing the flow of inputs through Product Generators "A" and "B" to produce products for Users #1, #2, and #3.
NNEW IOC Architecture
NNEW FOC Architecture
Weather Roadmap

- **Dissemination**
  - WARP
  - WINS
  - ADAS
  - WMSCR
  - TWIP

- **Processing & Display**
  - ITWS
  - MIAWS Prototype
  - CIWS Proto
  - WARP
  - WARP TR

- **Ground Segments**
  - SWIM Core Services
  - Ground Segments

- **NextGen**
  - Wake Turbulence (WT) Mitigation for Departures (CSPR)
  - WT Mitigation for Arrivals (CSPR)
  - NextGen Reduced Weather Impact (RWI) Solution Set

**NAP = NextGen Automation Platform**

**Timeline:**
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025

**Legend:**
- CIWS Baseline
- NextGen Wx Processor (WP1)
- NextGen Wx Processor (WP2)
- NextGen Wx Processor (WP3)
- JAWS
### Definition of Program

**Comparison of WSP, ITWS, WARP and CIWS**

<table>
<thead>
<tr>
<th>Product Generation Capability</th>
<th>WSP</th>
<th>ITWS</th>
<th>WARP</th>
<th>CIWS</th>
<th>Dissemination</th>
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<tr>
<td>Current</td>
<td></td>
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<tr>
<td>Hi Res VIL Mosaic/Update Rate</td>
<td>2.5 min</td>
<td>2.5 min</td>
<td>1 min</td>
<td>1.0 min</td>
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<tr>
<td>ASR precip (or Mosaic)/Update Rate</td>
<td>5 min</td>
<td>5 min</td>
<td>1.0 min</td>
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<tr>
<td>Layered/base/point/Comp Refl Mosaics</td>
<td>X</td>
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<td></td>
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<tr>
<td>Mosaic ( # Nexrad/TDWR/Canadian)</td>
<td>3/4</td>
<td>37/0</td>
<td>60/117</td>
<td>31</td>
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<td>ASR precip or Mosaic ( # ASR)</td>
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<td>12</td>
<td>0</td>
<td>31</td>
<td>ARTCCs 17/18</td>
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<tr>
<td>National coverage ( # NEXRAD, ASR/TDWR)¹</td>
<td>134/132/44</td>
<td>134/132/44</td>
<td>134/132/44</td>
<td>134/132/44</td>
<td>ARTCCs 17/18</td>
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<tr>
<td>Mosaic Spatial Resolution</td>
<td>1km</td>
<td>2-4km</td>
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<tr>
<td>Echo Tops</td>
<td>Hi Res</td>
<td>X</td>
<td>Hi res</td>
<td>X</td>
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<tr>
<td>Lightning</td>
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<td>Satellite</td>
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<td>Convective wx Forecast</td>
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<td>Note 2</td>
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<td>Winter Weather</td>
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<td>Winter Precipitation Phase</td>
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<td>Forecast Scoring</td>
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<td>Growth and Decay/Storm Initiation</td>
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<tr>
<td>Echo Tops Forecast</td>
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<tr>
<td>Wind/Wind shear</td>
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<td>Runway Alerts/Warnings</td>
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<td>Terminal Winds</td>
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<td><strong>Input Interfaces</strong></td>
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<td>NEXRAD</td>
<td>TDWR</td>
<td>ASR-9</td>
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<td>X²</td>
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<td>X</td>
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<tr>
<td>WARP</td>
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<td>X</td>
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<tr>
<td>CIWS</td>
<td>X</td>
<td>X³</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

¹ # of facilities-22 sites/34 sites  
² Acquires NCWF  
³ # of radars for proposed National Coverage  
⁴ Includes Canadian long range radars  
⁵ ASOS but no lightning

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