NextGen Weather Programs-
CSS-Wx and NWP

Examples of Multi-Agency Collaboration

Presented to: Friends and Partners of Aviation Weather

Presented by: Alfred Moosakhanian, FAA NextGen Weather Systems Program Manager

Date: July 13, 2017
Introduction

• **Collaboration means:**
  – Collective action in producing/creating results which lead to success
  – Working together to reconcile different interests

• **Collaboration is key to achieving NextGen Weather goals:**
  • Providing the best weather support to NAS operations especially information sharing
  • Minimizing adverse weather impacts on NAS operations
## NextGen Wx Collaboration Panel

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<td>Panel</td>
<td>Discussion - Q&amp;A</td>
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NextGen Weather Systems

Common Support Services-Weather (CSS-Wx) and NextGen Weather Processor (NWP)

Presented to:  Friends and Partners of Aviation Weather


Date:  13 July 2017
Overview

- FAA concept to contract
- Stakeholder coordination and agency collaboration
- NextGen Weather Programs, capabilities, products, and Work Packages
• NextGen Weather Systems Program Office coordinated with stakeholders to develop requirements during AMS investment analysis

• NextGen Weather Systems procured and awarded CSS-Wx to Harris and NWP to Raytheon in 2015

• CSS-Wx and NWP are in solution implementation and will be deployed in 2019-2022
  – CSS-Wx to be deployed at 60 operational sites, and NWP to be deployed at 36 operational facilities in addition to 117 designated facilities for weather displays
  – Weather data and displays will also be available to external users
NextGen Weather Stakeholders (e.g.)

Other Aviation Wx Users
- SOUTHWEST
- DELTA
- American Airlines
- UNITED
- jetBlue
- FedEx
- ups

Trade Associations
- NATCA
- NBAA
- AOPA
- ICAO/IAOC/IAOC
- EUROCONTROL
- RTCA
- CDM
- NOAA
- NASA
- GAO

Unions
- OMB
- AFN
- ASH
- AJ I
- AVS

Standards Organizations
- OMB
- AFN
- ASH

Other ANSPs
- AJT
- AJM
- AJM

Partner Agencies
- AJ R
- AGC
- AJ T
- AJ W
- AJ V

Other
- ANSPs

Trade Associations
Collaboration with Other Agencies

- FAA collaborates inside and outside of the agency, in particular with NOAA on implementation of weather requirements
  - Working on getting concept implemented
  - Collaboration efforts between the FAA’s Common Support Services-Weather (CSS-Wx) Program and NOAA’s NextGen IT Web Services (NGITWS)
  - Day to Day Collaboration in support of NAS Operations
  - Federal coordination
  - Future requirements
Collaboration Examples

• NOAA:
  – Memorandums of Understanding
  – Sample weather data
  – Technical documents including PDDs

• NASA:
  – Technology software

• Environment Canada:
  – Doppler radar
### CSS-Wx Program

#### Common Support Services – Weather (CSS-Wx)

- Focuses on weather information management, publishing to users, and providing new interface standards and formats
- Enables decommissioning of legacy weather dissemination systems (e.g., WARP WINS, FBWTG, CDDS)

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Benefits</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single provider of weather data products within the NAS, using standards-based weather dissemination via SWIM</td>
<td>Facilitates consistent weather information by utilizing standard formats</td>
<td>Awarded to Harris in April 2015, executing base contract year 2</td>
</tr>
<tr>
<td>Makes weather products available from NOAA, NWP and other data sources for integration to air traffic systems</td>
<td>Increases NAS access to common weather information</td>
<td>Incremental Agile Software design/development/test in progress</td>
</tr>
<tr>
<td>Provides weather products via a set of common Web Services for weather, using international data access and data format standards</td>
<td>Reduces interface development costs by eliminating custom point-to-point interfaces</td>
<td>Conducted Critical Design Review (CDR) – June 2016</td>
</tr>
<tr>
<td></td>
<td>Reduces infrastructure/bandwidth costs by optimizing weather dissemination</td>
<td>Factory Acceptance Testing (FAT) – 2018</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initial Operational Capability (IOC): 2019</td>
</tr>
</tbody>
</table>
**NWP Program**

**NextGen Weather Processor (NWP)**

- Focuses on weather product generation, translation, and display for aviation weather users
- Enables decommissioning of legacy weather processor systems (e.g., WARP, ITWS, CIWS)

<table>
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<th>Capabilities</th>
<th>Benefits</th>
<th>Timeline</th>
</tr>
</thead>
</table>
| Produces advanced aviation specific weather products  
  - 0 to 8 hour aviation weather products  
  - Real-time weather radar information (e.g., ERAM)  
  - Convective Weather Avoidance Fields  
  - Wind Shear alerts  
| Improve accuracy, timeliness and look ahead (0-8 hour) of aviation-specific weather information to air traffic  
| Reduce avoidable air traffic delays and maximize available runway and airspace usage  
| Enhance weather algorithms  
| Establish weather processing platform, reducing operational costs by consolidating legacy processors  
| Awarded to Raytheon in April 2015, executing base contract year 2  
| Incremental Agile Software design/development/test in progress  
| Conducted Critical Design Review (CDR) – November 2016  
| Factory Acceptance Testing (FAT): 2019  
| Initial Operational Capability (IOC): 2020  

- Translates weather information into weather avoidance areas for integration into decision support tools (e.g., TFMS, TBFM)

- Provides Aviation Weather Display (AWD) of NextGen weather information for ATC users
NWP Consolidation and Modernization

Weather for Traffic Flow Management

Consolidated coverage domains

Integrated Terminal Weather System

CIWS

Guam

Alaska

Hawaii

CoSPA

8-hr Predictions (prototype)

CONUS

Enroute Controllers’ Mosaics

WARP

NextGen Weather Systems
July 2017

Federal Aviation Administration
NWP Aviation Weather Display (AWD)

• AWD dedicated and web displays share the same Angular Material framework

Desktop browser

Phone browser

Tablet browser
NextGen Wx Providers/Consumers

- ASR-9 / ASR-11
- Surface Stations
- TDWR
- LLWAS
- NEXRAD
- GOES Satellite
- Canadian Radar
- NOAA

NWP

AWD

CSS-Wx

Service Adaptors

NAS Enterprise Security Gateway (NESG)

External Aviation Users

Flight Services, Providers, Airlines

User Systems (ERAM, MicroEARTS, ATOP, DOTS+, FDP2K)

Decision Support Tools (TFMS, TBFM, TFDM)

IDS-R

SWIM
NextGen Wx Acquisition Services

- NOAA gridded model products (RAP, HRRR, GFS, NAM, etc.) and Satellite images
- NOAA non-gridded: AIRMETs, SIGMETs, Advisories, Watches, Warnings, Observations (METAR, Mesonet, etc.), Lightning, CIP, SLD, etc.
- 156 WSR-88D (NEXRADs) across the CONUS, Alaska and selected CERAPs
- 45 Terminal Doppler Weather Radar (TDWR) and 31 Canadian Radar (CANRAD) products
- ASR-9/11 radar weather channels
- NWP Gridded, non-gridded analysis and forecast products

CSS-Wx Inputs

- Sensor Data
  - NEXRAD
  - CANRAD
  - TDWR/LLWAS
  - WMSCR
  - GOES
- AIMM ACS
  - Boundaries
  - Routes
  - Features
- NOAA Data
  - Model Products
  - Alphanumeric
  - Gridded & Graphic

NWP Inputs

- ASR
  - TDWR/LLWAS

NWP

- Gridded Analysis and Prediction
- Non-Gridded Analysis and Prediction
- Weather Avoidance products

NextGen Weather Systems
July 2017
NextGen Wx Distribution Services

- **CSS-Wx Web and Distribution Services** provide aviation weather products to NAS and non-NAS consumers
- **Distribution services** support OGC and legacy consumers
  - Web Coverage Service
  - Web Feature Service
  - Web Map Service
  - Web Map Tile Service
- **Consumers subscribe to CSS-Wx products through SWIM**
  - Web Service Description Documents (WSDDs)
  - Product Description Documents (PDDs)
  - Sample data
  - Client Library / Software

![CSS-Wx Outputs Diagram](image-url)
## NextGen Weather Products

<table>
<thead>
<tr>
<th>Gridded Weather Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Precipitation (VIL)</td>
</tr>
<tr>
<td>✓ Precipitation (VIL) with Mask</td>
</tr>
<tr>
<td>✓ Precipitation (VIL) Forecast</td>
</tr>
<tr>
<td>✓ Precipitation (VIL) Forecast with Mask</td>
</tr>
<tr>
<td>✓ Echo Tops</td>
</tr>
<tr>
<td>✓ Echo Tops Forecast</td>
</tr>
<tr>
<td>✓ Precipitation (Base Reflectivity)</td>
</tr>
<tr>
<td>✓ Precipitation (Composite Reflectivity)</td>
</tr>
<tr>
<td>✓ Precipitation (Composite Reflectivity) with Mask</td>
</tr>
<tr>
<td>✓ Surface Precipitation Phase</td>
</tr>
<tr>
<td>✓ Surface Precipitation Phase Forecast</td>
</tr>
<tr>
<td>✓ Precipitation (ASR)</td>
</tr>
<tr>
<td>✓ Precipitation (ASR AP Flagged)</td>
</tr>
<tr>
<td>✓ Icing Tops</td>
</tr>
<tr>
<td>✓ Icing Tops Forecast</td>
</tr>
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</table>
# NextGen Weather Products (Cont’d)

## Non-Gridded Weather Data

<table>
<thead>
<tr>
<th>Precipitation (VIL) Forecast Accuracy</th>
<th>Tornado Detections</th>
<th>Significant Meteorological Information (SIGMET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precipitation (VIL) Forecast Contours</td>
<td>Airport Status Summary</td>
<td>Convective Significant Meteorological Information (Convective SIGMET)</td>
</tr>
<tr>
<td>Echo Tops Forecast Accuracy</td>
<td>Microburst</td>
<td>Airmen's Meteorological Information Advisories (AIRMET)</td>
</tr>
<tr>
<td>Echo Tops Forecast Contours</td>
<td>Gust Front</td>
<td>Winds Aloft Forecast</td>
</tr>
<tr>
<td>Lightning</td>
<td>Gust Front Estimated Time to Impact</td>
<td>Surface Weather Observations</td>
</tr>
<tr>
<td>Storm Information Hazard Text</td>
<td>Tornado Alert</td>
<td>Aviation Watch Notification</td>
</tr>
<tr>
<td>Storm Information Leading Edges</td>
<td>Configured Alerts</td>
<td>Tornado Warnings</td>
</tr>
<tr>
<td>Storm Information Motion Vectors</td>
<td>Wind Shear ATIS Timers – Microburst</td>
<td>Tornado Watches</td>
</tr>
<tr>
<td>Fronts Forecast</td>
<td>Wind Shear ATIS Timers – Wind Shear</td>
<td>Severe Thunderstorm Watches</td>
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<td>Growth Trends</td>
<td>Terminal Weather Graphics</td>
<td>Volcanic Ash Advisory Statement (VAAS)</td>
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<td>Decay Trends</td>
<td>Terminal Weather Text</td>
<td>Terminal Area Forecast (TAF)</td>
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<tr>
<td>Forecast Confidence</td>
<td>Airport Lightning Warning</td>
<td>Center Weather Advisories</td>
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<tr>
<td>Convective Weather Avoidance Polygons</td>
<td>Icing Layer Contours</td>
<td>Meteorological Impact Statements</td>
</tr>
<tr>
<td>Wind Profiles</td>
<td>Composite Icing Contours</td>
<td>Area Forecasts</td>
</tr>
</tbody>
</table>

| Turbulence Layer Contours            | Pilot Report (PIREP) |  |
| Composite Turbulence Contours       | ICAO Aircraft Report |  |
| Pilot Report (PIREP)                | Urgent Pilot Report (PIREP) |  |
NextGen Weather Products (Cont’d)

<table>
<thead>
<tr>
<th>Weather Data Imagery</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Himawari Satellite Images</td>
</tr>
<tr>
<td>✓ G-AIRMET (graphical)</td>
</tr>
<tr>
<td>✓ Volcanic Ash Advisory Graphic</td>
</tr>
<tr>
<td>✓ Canadian Graphical Area Forecasts</td>
</tr>
</tbody>
</table>

- Gridded and Non-gridded products can be rendered into an image layer
- Multiple layers can be combined to provide single image output
NextGen Weather Work Packages

Current Wx Dissemination:
- WARP WINS
- CDDS
- ITWS Web Server
- CREWS

Contract Award: April 2015

Current Wx Processing:
- WARP RAMP
- CIWS
- ITWS

Contract Award: April 2015

Legacy Wx Dissemination:
- WMSCR
- ADAS
- ALDARS
- WIFS

CSS-Wx WP1

NWP WP1

CSS-Wx Work Package 2

NWP Work Package 2

NWP Work Package 3

CY 2015 2020 2030 2040
NOAA
NextGen IT/Web Services
(NGITWS)

Ryan Solomon
NGITWS Project Manager
Aviation Weather Center
NOAA National Weather Service
Topics

• Origins of NGITWS

• NGITWS 101
  – What is NGITWS?
  – Why is NGITWS important?

• NGITWS Architecture
  – Data flow example

• Progress and Timelines
  – What we’ve accomplished and where we’re headed

• Conclusions
Origins of NGITWS

The FAA Next Generation Air Transportation System needs accurate, timely, and reliable weather information

Why does NextGen care about weather?

- ~70% delays in the NAS are due to weather

Through enhanced weather products and services

- ~46% reduction in delays
- ~$19 billion savings annually

That’s where NOAA contributes

NGITWS will “…provide enhanced weather forecast information for integration into an air traffic management system.”

“Capabilities for NextGen will result in a significant increase in weather prediction and dissemination capabilities with wide ranging benefits across NOAA.”

- 2014 NOAA Budget Estimate
Origins of NGITWS (cont)

• NOAA Integrated Dissemination Program (IDP)
  – Enhance NOAA’s dissemination capabilities
    • Reliability
    • Sustainability
    • Integrated, enterprise-level capabilities
  – Core initiatives
    • NWS Ground Readiness – infrastructure improvements, network consolidation, bandwidth upgrades, etc.
    • NWS Telecommunications Gateway Re-architecture – modernizing the heart of NWS dissemination
    • NextGen IT/Web Services (NGITWS)
Origins of NGITWS (cont)

• The culmination of 5+ years of collaboration between NOAA and FAA
  4-D Data Cube  FAA Next Generation SE2020
  Network Enabled Weather prototype (NNEW)

• The fruit of key partnerships
  FAA  National Center for Atmospheric Research (NCAR)
  MIT Lincoln Laboratory

• Leveraging key NOAA resources
  ➢ Aviation Weather Center (AWC)  ➢ Meteorological Development Lab (MDL)
  ➢ Earth System Research Lab Global Systems Division (GSD)  ➢ NCEP Central Operations (NCO)
NGITWS 101

What is NGITWS?

Legacy data silos

Web-based, service-oriented architecture (SOA)

Platform-specific

Platform-agnostic

Closed systems

Open systems

FTP

Web-based, service-oriented architecture (SOA)

Legacy data silos

Platform-specific

Platform-agnostic

Closed systems

Open systems
What is NGITWS?

NetCDF

Standard data formats

OGC compliant services

State of the art data centers
What is NGITWS?

Data
Machine

GRIB2
NetCDF-4

Traditional Alphanumeric Code (TAC)

IWXXM

Collection
Transformation
Dissemination
What is NGITWS?

NGITWS 101 (cont)

Data

FAA CSS-Wx

NOAA NGITWS

GIS

S/W

Models

Forecasts

Warnings

Watches

Observations
Current Data Exchange (in place now)

- **Source:**
  - NextGen IT/Web Services system, NOAA IDP in College Park, MD, and Boulder, CO

- **Destination:**
  - FAA SWIM/NEMS Research and Development, FAA William J. Hughes Technical Center, Atlantic City, NJ

- **Network:**
  - VPN over the Internet

- **Message pattern:**
  - Publish-Subscribe

- **Data:**
  - ~230 unique gridded numerical model products in NetCDF-4
  - ~40 unique XML (IWXXM, IWXXM-US, USWX) products
  - ~40 unique image products
Future Data Exchange (FY18/FY19)

• **Source:**
  – NextGen IT/Web Services system, NOAA IDP in College Park, MD, and Boulder, CO

• **Destination:**
  – FAA Research and Development Enclave, FAA William J. Hughes Technical Center, Atlantic City, NJ
  – FAA CSS-Wx Operational Centers in Salt Lake City, UT, and Atlanta, GA

• **Network:**
  – Private high-speed network

• **Message pattern:**
  – Publish-Subscribe

• **Data:**
  – ~230 unique gridded numerical model products in NetCDF-4
  – ~40 unique XML (IWXXM, IWXXM-US, USWx) products
  – ~40 unique image products
Conclusion

❖ This work is extremely important!

❖ Through healthy partnerships and leadership support we’ve made tremendous progress.

Continue to focus on

✔ Reliability

✔ Performance

✔ Interoperability

NextGen IT/Web Services = the foundational capability for providing the critical aviation weather information necessary for decision making in the National Airspace System.
NWS Support to the FAA Air Traffic Control System Command Center

Brandon Smith
FPAW Summer Workshop
NextGen Weather Program
July 13, 2017
What is “IDSS”? Triad of Concepts Embodies “Impact-based Decision Support Services (IDSS)”

Impact-based Services          Decision Assistance to Core Partners          Decision-relevant Information

NWS IDSS has many faces:

Deployable Meteorologists

- Wildfire support (since the 1920’s)
- High profile incidents (Deepwater Horizon, NYC/DC Fireworks, Super Bowl)
- Center Weather Service Units at ARTCCs (since the 1970’s)
- Spaceflight Meteorology Group at NASA/JSC in Houston (since 1960s)
- NWS Liaison to FEMA National Incident Management Action Teams

- Tailored Forecast Products
- Customer-driven thresholds
Pre 1995:
- NWS Meteorologists in ATCSCC

Post 1995:
- FAA Weather Specialists in ATCSCC

May 2012: NWS returned to ATCSCC with 2 meteorologists

August 2014: Added 1 Meteorologist & a MIC

July 2016: Selected 2 Meteorologists

Current Staffing: 1 MIC, 5 Mets, 1 FAA Wx Specialist
NWS SUPPORT TO ATCSCC

• NWS dedicated weather IDSS to the ATCSCC
• Six NWS meteorologists (National Aviation Meteorologists)
• One FAA weather specialist
• Organizationally: NWS / NCEP Aviation Weather Center (AWC)
• NOT a traditional forecasting role (we do not issue TAFs or standard products, but we collaborate on them)

The Critical 8 C’s:
Coordination
Collaboration
Consistency
Customization
Confidence
Consultation
Clarity
Creativity

Goal: Paint a cohesive, timely national weather picture to the Command Center to improve safety, efficiency, and decision making
“Weather is intertwined with nearly every decision we make.”

- Bryan Beck, FAA / ATCSCC National Operations Manager (NOM)

“We bet our entire house on a weather forecast!”

- Mike Murphy, ATCSCC NTMO and PERTI Supervisor

“Forecasts possess no intrinsic value. They acquire value through their ability to influence the decisions made by users of the forecasts.”

- Allan Murphy, NCAR, 1993
Coordination / Collaboration

NWSChat is the primary tool

NAM ↔ ATCSCC

CWSU
FAA
NWS
WFO
WPC/SPC
NHC/SPWC
A4A/NBAA/IATA
AWC - TCF
NAM Daily Products & Briefings

- Customized TAF Briefings: 09Z through 03Z next day
- TCF Collaboration – 11Z through 03Z next day
- NWS HQ Standup Briefing – 0745 local
- ATCSCC Standup Briefing – 0800 and 1600 Local
- Ad-hoc ATCSCC briefings: 15 to 20 times per day
- NAS Day-1 Convective Outlook - 0830 (started in 2015)
- FAA NAS NSR (Day 2-4+ Outlook) – 1000 Local
- FAA HQ (High Impacts only) – 1030 Local
- NWS WFO/CWSU NY Metro/PHL Coordination – twice per day
- Space Weather (SWPC) & Volcanic Ash -- as needed
- Ad-hoc Telcons/NWS Chat for coordination/collaboration
TCF Collaboration

TFC Convective Forecast

VALID: 2100 UTC MON 10 JUL 2017

(NACE)
TAF Impact Board

NWS Generated TAFs/Customer-Driven Thresholds

- NWS TAFs displayed as hourly forecasts
- Colors represent impact level

- Wind thresholds (for LGA)

- CIG/VIS thresholds
Addressing various observing datasets – ITWS vs. ASOS

- ASOS reports DEG TRUE
- wind is aligned with the TAF
- sighting is consistent

- ITWS reports Deg MAGNETIC
- different from TAF Winds
- sighting is inconsistent
Summary

• National Weather Service NAMs provide key weather decision support to ATCSCC and the National Air Space

• Meteorological expertise is fully integrated with ATFM decision makers
Collaboration with NWS in Support of NAS Operations

SYSTEM OPERATIONS DIRECTORATE

Presented to:
FPAW

Presented by:
Kevin Johnston, Chief Meteorologist

Date:
07/13/17
Collaboration with NWS in Support of NAS Operations

• Contract Officer Representative of Inter-Agency Agreement for Decision Support Services
  – 90 Meteorologists at 22 Air Traffic Facilities
  – Implementing significant change/responsibilities of the Agencies

• NWS now will provide Met workstations (i.e. AWIPS Thin Client) and communications for their operations
Collaboration with NWS in Support of NAS Operations

• Collaborative Decision Making Weather Evaluation Team with FAA and Aviation Industry
  – NWS key to development of the Traffic Flow Management (T) Convective Forecast (TCF)
  – NWS involved with new Plan, Execute, Review, Train and Improve (PERTI) initiative
Collaboration with NWS in Support of NAS Operations

• CONUS Area Forecast (previous session)

• Additional NWS Product Review being planned and led by FAA/ANG-C6
Collaboration with NWS in Support of NAS Operations

• Thoughts for the future
  – Air Traffic Management and the use of data linked forecast and current wind information
    • RTCA guidance—how should NWS be involved?
  – Improvements needed on how NWS tracks performance in support of the NAS
    • Additional motivation is potential for FAA Air Traffic Services to move to private sector
NextGen Weather Systems

FAA Aviation Weather Requirements

Presented to: Friends and Partners of Aviation Weather

Presented by: Danny Sims, NextGen Weather, ANG-C61

Date: 13 July 2017
Overview

- FAA Weather Requirements Process
- Work Package 2 (WP2) Status
  - A set of enhancements and additions to an existing capability
Weather Requirements Process

**PHASE 1: Weather Needs Substantiation**
- 1. Perceived Operational Need / OI Gap
  - ANG-C6 Receipt Letter
  - Statement of Weather Need(s)
- 2. Weather Needs Analysis
  - DP1: Needs Validated?
    - Yes: Continue to Phase 2
    - No: Continue to Phase 2

**PHASE 2: Weather Concepts Validation & Maturity**
- 3. Capability Shortfall Analysis
  - Capability Shortfall Report
- 4. Operational Concept Development
  - Operational Concept Description
- 5. Operational Concept Validation
  - Operational Validation Report(s)
- 6. Concept Validation
  - DP2: Concept Validated?
    - Yes: Continue to Phase 3
    - No: Continue to Phase 2

**PHASE 3: Weather Requirements Development**
- 6. Functional Analysis
  - Functional Requirements
- 7. pPR Analysis
  - Preliminary Performance Requirements
- 8. pPR Validation
  - pPR Validation Report(s)
- 9. pPR Allocation Analysis
  - pPR Allocation Assignment(s)
- 10. pPR Coordination
  - Signed, Gridded Memo
- 11. pPR Transmittal
  - Initial Letter to NWS
- 12. pPR Negotiation
  - Final Letter to NWS
- 13. pPR Documentation
  - Final Letter to NWS
- DP4: Allocation to NWS?
  - Yes: Continue to Phase 4
  - No: Continue to Phase 4

**PHASE 4: Weather Requirements Allocation, Coordination & Transmittal**

**PHASE 5: Post-transmittal Negotiation & Documentation**

Key: Lead Org.
- Sponsor: FAA ANG-C6
- FAA AAV-73
- Deliverable: FAA AMS

NextGen Weather Systems
July 2017
Federal Aviation Administration
Recent Dissemination

Development

Meteorological Research & Development
- Aviation Weather Research Program
- Weather in the Cockpit
- Facilities & Equipment Act 1

Operations

NOAA Analysis and Forecast

National Weather Service Dissemination
- ADDS
- Gateway
- NOAA PORT

External Users
- Dispatchers
- Pilot

Wx Systems
- ITWS
- CIWS
- CoSPA
- WARP

FAA Users
- TFM
- ATS
- AFSS
- CWSU’s
NextGen Dissemination

Development

- Meteorological Research & Development
  - Aviation Weather Research Program
  - Weather in the Cockpit
  - Facilities & Equipment Act 1

Operations

- NOAA Analysis and Forecast
- National Weather Service Dissemination
  - NextGen IT Web Services (NGITW)
  - CSS-Wx
  - NWP

External Users
- Dispatchers
- Pilot

FAA Users
- TFM
- ATS
- AFSS
- CWSU’s
Air Traffic Management Evolution

Trajectory Based Operations is a concept to operate the NAS based on the aircraft’s ability to fly precise paths in time and space and ANSP’s ability to strategically manage and optimize trajectories through the operation.

Trajectory computed by automation (ground and or flight deck) that defines the flight path of an aircraft from one point to another in four dimensions (lat/long/alt/time)

Covers all phases of flight from gate to gate
WP2 Broad Shortfalls

• Lack of objective translations of weather forecast into predictions of air traffic constraints and airspace impacts
• Lack of easily interpreted measures of forecast uncertainty
• Insufficient shared situational awareness for all participants in the strategic planning and collaborative decision making process
• Insufficient training and team development for all participants in strategic Traffic Flow Management
WP2 Status

• In process of looking at candidate capabilities, e.g.
  – Along with pre-planned capabilities
  – Offshore Precipitation Capability (OPC)
  – Support for Trajectory Based Operations
Interagency Coordination for Aviation Weather at OFCM

Judy Stailey
Lead Meteorologist
Office of the Federal Coordinator for Meteorology
Aviation Weather at OFCM

OFCM Mission

Foster the effective use of Federal meteorological resources by encouraging and facilitating the systematic coordination of meteorological services and supporting research across the Federal Weather Enterprise.
Participating Agencies

- DOT (FAA, FHWA)
- DOC (NOAA)
- DoD (USA, USN, USAF)
- NASA
- NTSB
- NSF
- DOS
- DOE
- DOI (USGS, NPS)
- DHS
- USDA (NFS)
- EPA
- NRC
- EOP (OMB, OSTP)
Evolving Coordination

Pre-NextGen

• National Aviation Weather Program Council
  – FAA, NOAA, USAF, NASA, NTSB, USDA
  – Strategic Plan

• Committee for Aviation Services and Research
  – Implementation Initiatives
  – Tracked progress
  – Tracked Weather-Related Accident Trends
Evolving Coordination

NextGen

• Federal Meteorological Handbooks
  – FMH-1: Surface Weather Observations and Reports
  – FMH-11: WSR-88D Meteorological Observations
  – FMH-12: Meteorological Codes and Coding Practices

• Multifunction Phased Array Radar (MPAR)

• Aviation Weather Code Transition (IWXXM)
  – TAC to xml code formats

• Space Weather
Strategic Goals for Weather Coordination

- **Improve** the resolution, frequency, information content, and sustainability of global **observing** capabilities.
- Make Federal **forecasting** processes more resilient for all relevant time and spatial scales.
- Ensure availability of effective and consistent **decision-support** products, information, and services.
- Conduct productive, synergistic interagency **research** efforts.
- Develop, recruit, and sustain a **professional and diverse** Federal weather **workforce**.
- Coordinate **messaging** about FWE priorities and needs.
Inter-Agency Aviation Weather: Opportunities and Challenges

Matt Fronzak
Summer FPAW
July 13, 2017
Inter-Agency Opportunities and Challenges – General

- **Opportunities**
  - Collaboration
  - Information sharing
  - Economies of scale
  - Improved efficiencies
  - Agile acquisition/development
  - High level oversight along with working level coordination

- **Challenges**
  - Budget uncertainties and timeliness
  - Competing priorities
  - Lengthy processes
  - Miscoordination
  - Duplication
  - Restricted sharing
  - Interdisciplinary [ATM and Weather] training
Inter-Agency Aviation Weather Opportunities (O) and Challenges (C)

- **People**
  - (O) Leverage expertise of NWS and industry forecasters in ATM decision-making
  - (C) Train forecasters and ATM decision-makers on the proper use of current (e.g., probabilistic) and future (e.g., translated) weather products

- **Products**
  - (O) Incorporate improved weather observation and forecast products
  - (C) Achieve consistent, appropriate use of weather information from varying sources and among related weather products

- **Infrastructure**
  - (O) Use new weather information sources, e.g., Spectrum Efficient National Surveillance Radar (SENSR), Aircraft-based Observations (ABO) across agencies
  - (C) Introduce procedures and industry aviation weather systems technologies which support sharing consistent information among all users, including cockpit/pilot

- **Processes**
  - (O) Include proactive cockpit input in future TBO decision-making
  - (C) Fix identification, notification and resolution of ASOS system problems
  - (C) Provide a flexible and agile means to upgrade weather inputs to NextGen weather systems and decision support tools
## Panel Discussion / Q&A

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