FAA NextGen Weather Systems

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

Presented to: FPAW

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NextGen Weather Systems

Efficient, Flexible Routing

Reduce Weather Impact

All-weather Departures

All-weather Approaches

Current Wx Dissemination
- ITWS NFU, ITWS VOLPE
- ITWS NFU, ITWS VOLPE, WARP WINS, FBWTG
- CIWS CDDS, WARP WINS, FBWTG
- ITWS NFU, ITWS VOLPE, WARP WINS, FBWTG
- ITWS NFU, ITWS VOLPE

Future
- ITWS NFU, ITWS VOLPE

Future
- ITWS

Current Wx Processing
- ITWS
- WARP
- CIWS
- WARP
- ITWS

Future
- ITWS

CSS-Wx

NWP

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NextGen Wx in Air Traffic Operations

Wx Sources
- TDWR
- NEXRAD
- ASR
- ASOS
- AWOS
- AWSS
- LLWAS
- NOAA
- INDUSTRY

ATC/TMU/ATCSCC Users
- USER SYSTEMS (ERAM, MICROEARTS, ATOP, DOTS+, FDP2K)
- DECISION SUPPORT TOOLS (TFMS, TBFM, TFDM)
- INTEGRATED DISPLAY SYSTEM (IDS)

Common Support Services-Weather (CSS-Wx)
- NextGen Weather Processor (NWP)
- AIR SURVEILLANCE RADAR - WEATHER SYSTEMS PROCESSOR (ASR-WSP)
- STANDARD TERMINAL AUTOMATION REPLACEMENT SYSTEM (STARS)
- FLIGHT INFORMATION SYSTEM – BROADCAST (FIS-B)
- FLIGHT SERVICES

External Users, e.g. NOAA, Airlines
# Weather in NAS Enterprise Architecture

## Interaction Services
(Display for Air Traffic users)
- Traffic Flow Management (TBFM)
- Traffic Flow Display System (TFMS)
- Traffic Flow Database Management (TFDM)

## Mission Services
(Domain level processing of data)
- Next Generation Weather Processors (NWP)
- ERAM, ATOP, Micro-EARTS, DOTS+, FDP2K
- TBFM, TFMS, TFDM

## Support Services
(Standard information models and data services)
- Aeronautical Common Services (ACS)
- Flight Information Services
- Common Support Services - Weather (CSS-Wx)

## SOA Core Services
(Messaging, interface, security)
- Decision Support Tools

## Technical Infrastructure Services
(Networking)
- Interoperability Data Services (IDS-R)
- Weather Displays

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NextGen Weather Architecture

- ASR-9 / ASR-11
- Surface Stations
- TDWR
- LLWAS
- NEXRAD
- GOES Satellite
- Canadian Radar
- NOAA
- NAS Enterprise Security Gateway (NESG)
- External Aviation Users
- Flight Services, Airlines, Pilots

NWP

AWD

Service Adaptors

CSS-Wx

ACS

SWIM

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

Decision Support Tools (TFMS, TBFM, TFDM)

IDS-R
CSS-Wx Program Scope

• Provides a single source for FAA weather information and establishes enterprise level common support services using SWIM
• Provides users with the right information at the right time
• Consistent with global standards (e.g., WXXM)
• Provides geospatial data access services (WFS, WCS, WMS, WMTS)
• Enables decommissioning of legacy weather dissemination systems (e.g., WARP WINS, FBWTG, CDDS)
NWP Program Scope

• Produces advanced aviation specific weather products
• Translates weather information into weather avoidance areas for integration into decision support tools
• Enables decommissioning of legacy weather processor systems (e.g., WARP, ITWS, CIWS)
Key Benefits of CSS-Wx and NWP

Reduce FAA Operations Costs

- $2.0B Cost Avoidance Over 25 Year Lifecycle Including $350M Ops Cost Savings
- Eliminates Need for Legacy System Tech Refreshes
- Payback After 7 Years

Modernize National Airspace System

- Decommission Outdated Systems
- Leveraging SWIM and FTI
- Cloud Compatibility
- Global Data Standardization

Improve Efficiency

- Over $2.8B of User Benefits
- Reduce Flight Delays
- Enable Collaborative Decision-making

Improve Safety

- Enhanced Weather Information
- Greater Access
- Common Situational Awareness

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# Interdependencies

| Data / Service Providers | • Weather Radar and Sensors  
|                          | • FAA Telecommunications Infrastructure (FTI)  
|                          | • System Wide Information Management (SWIM)  
|                          | • National Oceanic and Atmospheric Administration (NOAA) |
| FAA Data / Service Consumers | • NAS consumer systems, including:  
| | – En Route Automation Modernization (ERAM)  
| | – Advanced Technologies and Oceanic Procedures (ATOP)  
| | – Time Based Flow Management (TBFM)  
| | – Traffic Flow Management System (TFMS)  
| | – Micro En Route Automated Radar Tracking System (Micro-EARTS)  
| | – Information Display System Replacement (IDS-R)  
| | • NAS Users, e.g. Collaborative Decision Makers, Traffic Management Unit (TMU) |
| External to FAA Data / Service Consumers | • NOAA  
| | • Department of Defense (DoD)  
| | • Department of Homeland Security (DHS)  
| | • Airline Operations Centers (AOCs) |
| International | • Global harmonization with EUROCONTROL and ICAO through the use of standards |
Contract Awards

• Both CSS-Wx and NWP contracts were awarded in April 2015
  – Periods of Performance: April 2015 – March 2023 (including 4 year options)
  – CSS-Wx Program Prime contractor: Harris
  – NWP Program Prime contractor: Raytheon

• Begin solution implementation of CSS-Wx and NWP systems
  – Key Site Initial Operational Capability (IOC): 2019 (CSS-Wx) / 2020 (NWP)
NextGen Weather Summary

As-Is Weather
- Aviation Weather information limitations: inconsistencies across domains, unique data types, fixed time, space resolution, range, and latencies
- User must mentally process multiple information sources to assess the potential impact to their operations

To Be Weather
- Consistent weather information across domains and externally by the implementation of a common weather exchange model (i.e., WXXM)
- Improved aviation weather information
- Reduce avoidable air traffic delays and maximize available runway and airspace usage

Efficient, Flexible Routing
- All-weather Departures
- All-weather Approaches

Initial Investment Decisions (IID) 2013
Screening Info. Requests (SIR) Release January 2014
Final Investment Decisions (FID) 2015
Contract Award 2015

Key Site IOCs 2019 / 2020

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Backup
Contact Information

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Resources

- **NextGen Weather:**
  - [https://www.faa.gov/nextgen/programs/](https://www.faa.gov/nextgen/programs/)
CSS-Wx and NWP Brochures

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Federal Aviation Administration
Key Acronyms

- ADAS: Automated Weather Observing System (AWOS) Data Acquisition System
- ARTCC: Air Route Traffic Control Center
- ASOS: Automated Surface Observing System
- ASR: Airport Surveillance Radar
- ATOP: Advanced Technologies and Oceanic Procedures
- AWD: Aviation Weather Display
- AWOS: Automated Weather Observing System
- AWSS: Automated Weather Sensor System
- CDDS: CIWS Data Distribution Service
- CIWS: Corridor Integrated Weather System
- CREWS: CTAS Remote Weather System
- CSS-Wx: Common Support Services for Weather
- DHS: Department of Homeland Security
- DoD: Department of Defense
- DOTS+: Dynamic Oceanic Tracking System Plus
- DST: Decision Support Tools
- ERAM: En Route Automation Modernization
- EWD: Enhanced WINS Dissemination (WARP)
- FBWTG: FAA Bulk Weather Telecommunications Gateway
- FDP2K: Flight Data Processing 2000 System
- FTI: FAA Telecommunications Infrastructure
- IDS-R: Information Display System Replacement
- IOC: Initial Operational Capability
- ITWS: Integrated Terminal Weather System
- LLWAS: Low-Level Windshear Alert System
- MEARTS: Microprocessor En Route Automated Radar Tracking System
- NAS: National Airspace System
- NESG: NAS Enterprise Security Gateway
- NEXRAD: Next Generation Weather Radar (WSR-88D)
- NFU: NWS Filtering Unit
- NOAA: National Oceanic and Atmospheric Administration
- NEMC: National Enterprise Management Center
- NWP: NextGen Weather Processor
- OGC: Open Geospatial Consortium
- RAMP: Radar Acquisition and Mosaic Processor
- SWIM: System Wide Information Management
- TBFM: Time Based Flow Metering
- TDWR: Terminal Doppler Weather Radar
- TFDM: Terminal Flight Data Manager
- TFMS: Traffic Flow Management System
- TMU: Traffic Management Unit
- TRACON: Terminal Radar Approach Control
- VOLPE: National Transportation Systems Center (ITWS Web Services Provider)
- WARP: Weather and Radar Processor
- WCS: Web Coverage Service
- WFS: Web Feature Service
- WMS: Web Mapping Service
- WMTS: Web Mapping Tile Service
- WINS: Weather Information Network Server
- WMSCR: Weather Message Switching Center Replacement
- WXXM: Weather Information Exchange Model