# FAA NextGen Weather Systems

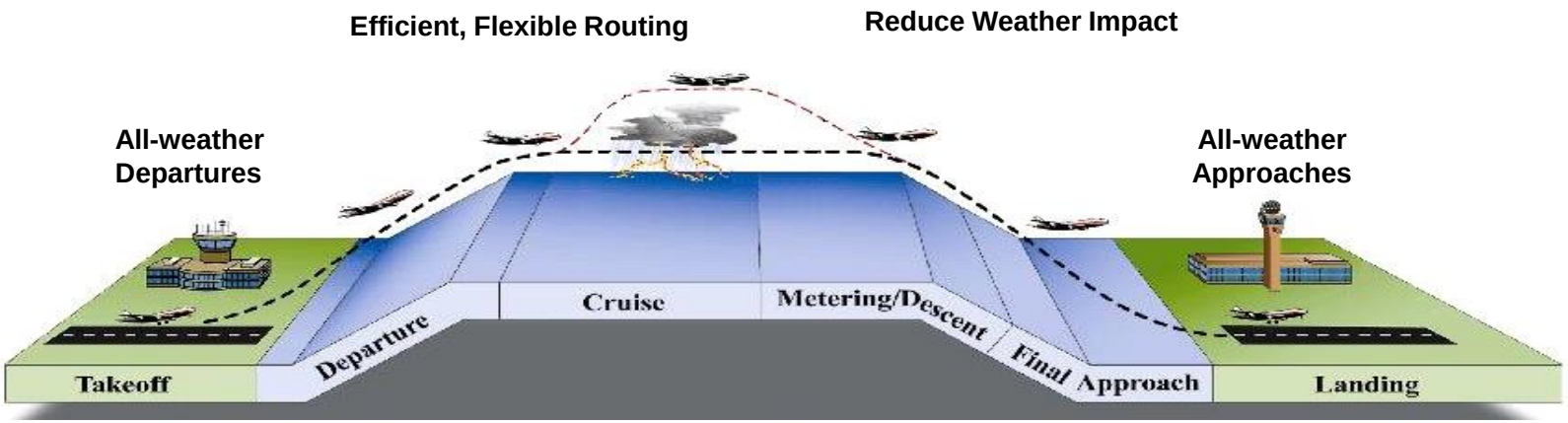
## Common Support Services – Weather (CSS-Wx) and NextGen Weather Processor (NWP)

Presented to: FPAW

Presented by: William N. Brown, FAA

Date: August 2015

# NextGen Weather Systems

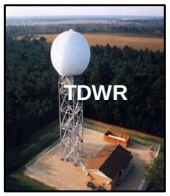



| | | | | | |
|---|---|---|---|---|---|
| Current Wx Dissemination | • ITWS NFU, ITWS VOLPE | • ITWS NFU, ITWS VOLPE<br>• WARP WINS, FBWTG | • CIWS CDDS<br>• WARP WINS, FBWTG | • ITWS NFU, ITWS VOLPE<br>• WARP WINS, FBWTG | • ITWS NFU, ITWS VOLPE |
| Future | ← | | CSS-Wx | | → |

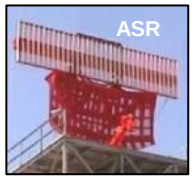
| | | | | | |
|---|---|---|---|---|---|
| Current Wx Processing | • ITWS | • ITWS<br>• WARP | • CIWS<br>• WARP | • ITWS<br>• WARP | • ITWS |
| Future | ← | | NWP | | → |

# Current Wx in Air Traffic Operations

## Wx Sources

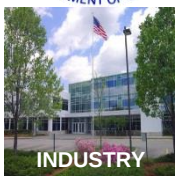








NOAA – National Oceanic and Atmospheric Administration – U.S. Department of Commerce

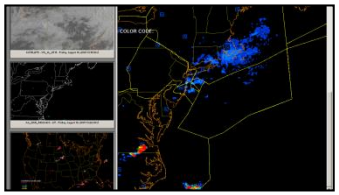



## ATC/TMU/ATCSCC Users

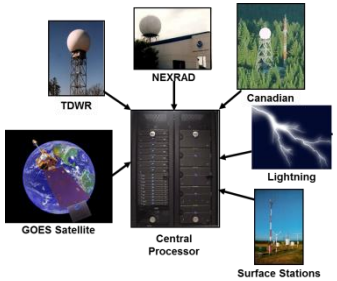
USER SYSTEMS
(ERAM, MICRO-EARTS, ATOP, DOTS+, FDP2K)

DECISION SUPPORT TOOLS
(TFMS, TBFM, TFDM)

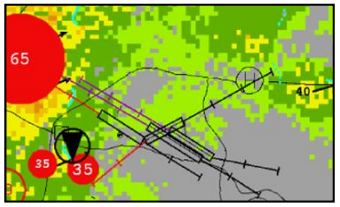

INTEGRATED DISPLAY SYSTEM (IDS)



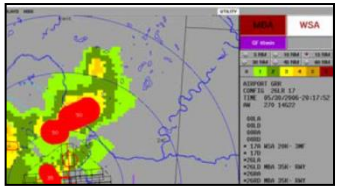
WEATHER AND RADAR PROCESSOR (WARP) BRIEFING TERMINAL (WARP BT)



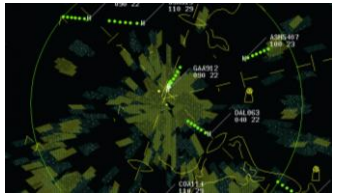

CORRIDOR INTEGRATED WEATHER SYSTEM (CIWS)



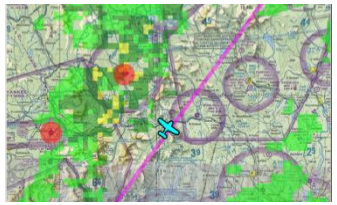

INTEGRATED TERMINAL WEATHER SYSTEM (ITWS)




AIR SURVEILLANCE RADAR - WEATHER SYSTEMS PROCESSOR (ASR-WSP)



STANDARD TERMINAL AUTOMATION REPLACEMENT SYSTEM (STARS)



FLIGHT INFORMATION SYSTEM – BROADCAST (FIS-B)

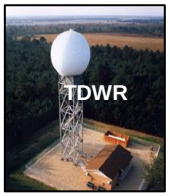
FLIGHT SERVICES (e.g.. OASIS)

## External Users, e.g. NOAA, Airlines

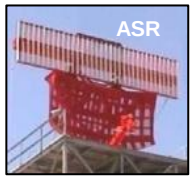
NOAA – National Oceanic and Atmospheric Administration – U.S. Department of Commerce

# NextGen Wx in Air Traffic Operations

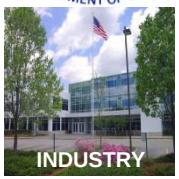
**Wx Sources**












## ATC/TMU/ATCSCC Users

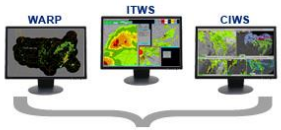
USER SYSTEMS
(ERAM, MICROEARTS,
ATOP, DOTS+, FDP2K)

DECISION SUPPORT TOOLS
(TFMS, TBFM, TFDM)

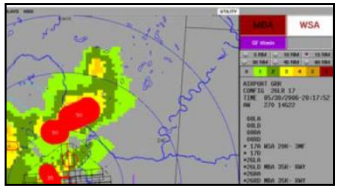

INTEGRATED DISPLAY
SYSTEM (IDS)

NextGen Weather Processor (NWP)

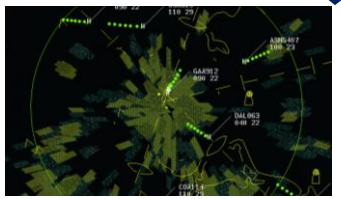
Common Support Services-Weather (CSS-Wx)



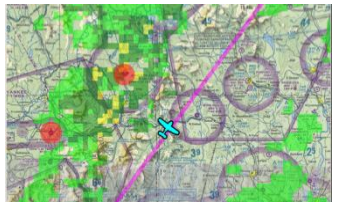





AIR SURVEILLANCE RADAR -
WEATHER SYSTEMS
PROCESSOR (ASR-WSP)



STANDARD TERMINAL
AUTOMATION REPLACEMENT
SYSTEM (STARS)

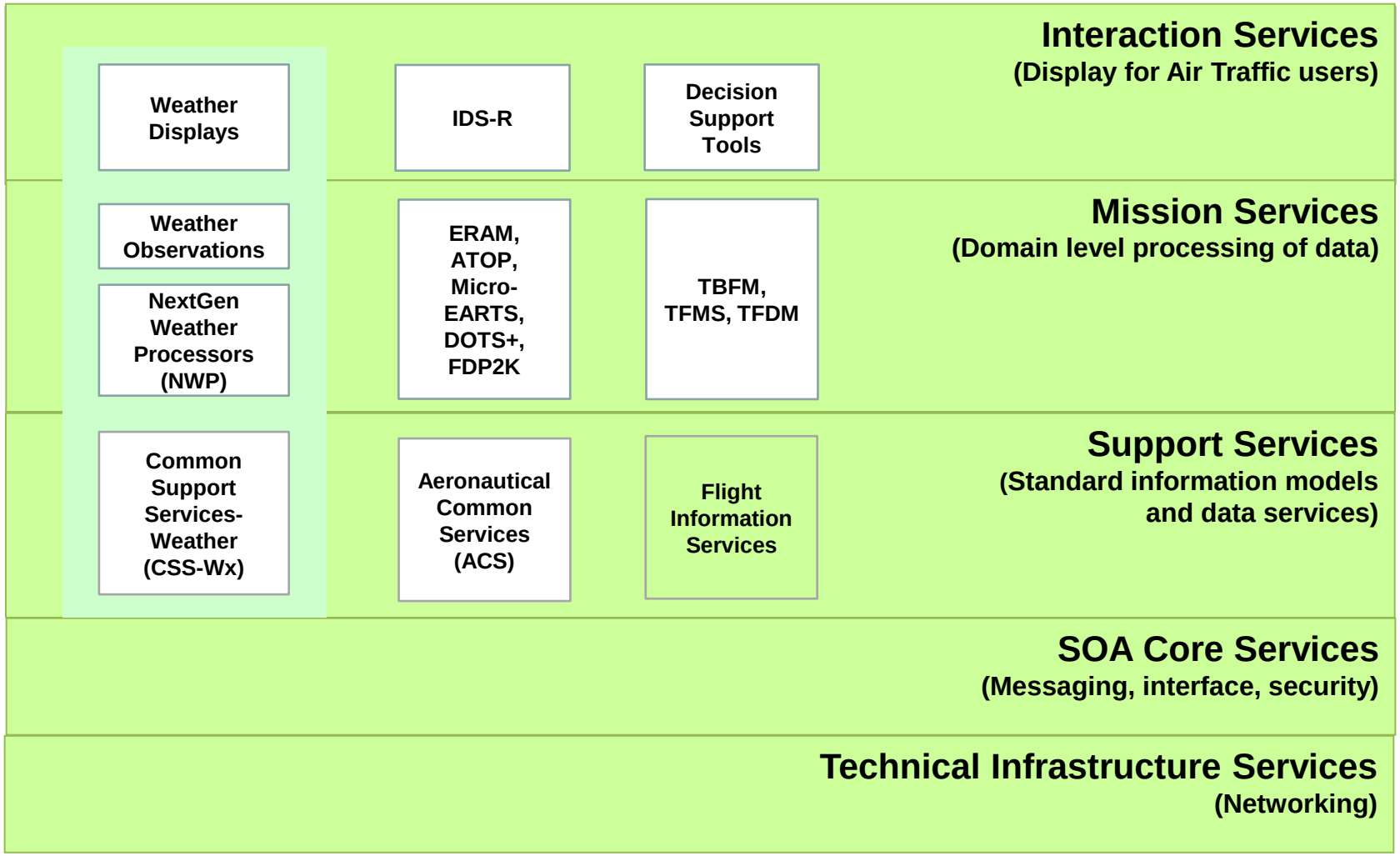


FLIGHT INFORMATION
SYSTEM – BROADCAST
(FIS-B)

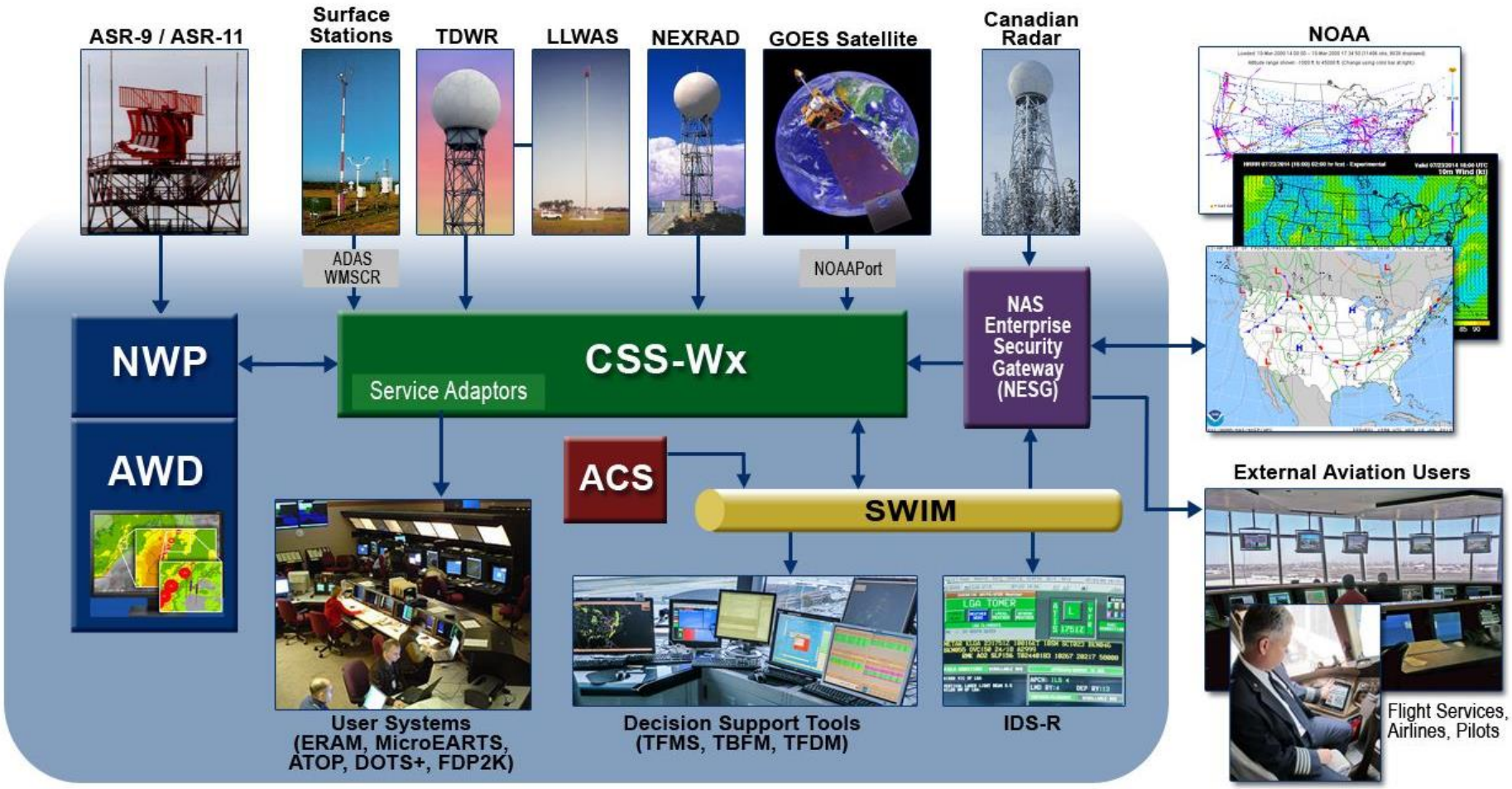
FLIGHT SERVICES

**External Users, e.g. NOAA, Airlines**

# Weather in NAS Enterprise Architecture



# NextGen Weather Architecture



# 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*

# Interdependencies

| | |
|---|---|
| **Data / Service Providers** | • **Weather Radar and Sensors**<br>• **FAA Telecommunications Infrastructure (FTI)**<br>• **System Wide Information Management (SWIM)**<br>• **National Oceanic and Atmospheric Administration (NOAA)** |
| **FAA Data / Service Consumers** | • **NAS consumer systems, including:**<br>– En Route Automation Modernization (ERAM)<br>– Advanced Technologies and Oceanic Procedures (ATOP)<br>– Time Based Flow Management (TBFM)<br>– Traffic Flow Management System (TFMS)<br>– Micro En Route Automated Radar Tracking System (Micro-EARTS)<br>– Information Display System Replacement (IDS-R)<br>• **NAS Users, e.g. Collaborative Decision Makers, Traffic Management Unit (TMU)** |
| **External to FAA Data / Service Consumers** | • **NOAA**<br>• **Department of Defense (DoD)**<br>• **Department of Homeland Security (DHS)**<br>• **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)

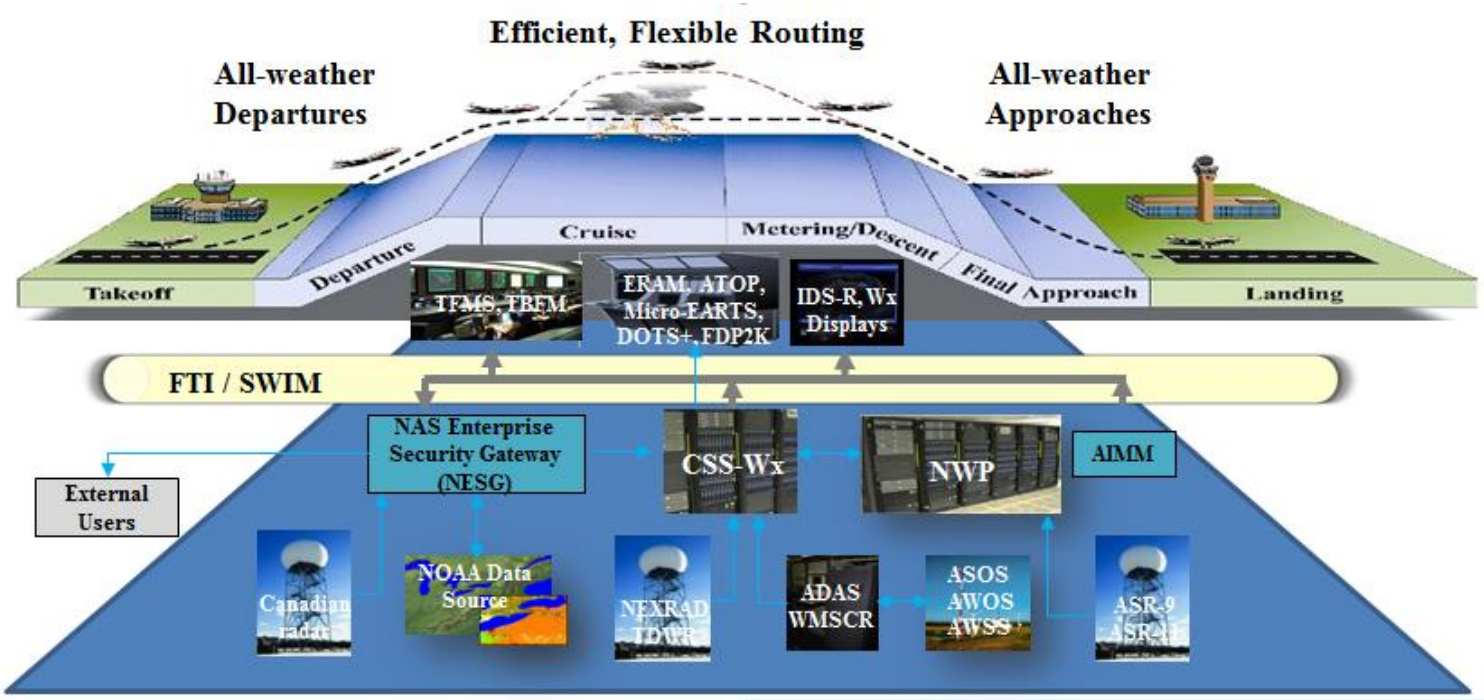
# NextGen Weather Summary

**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




**CSS-Wx / NWP**

Initial Investment Decisions (IIDs) 2013

Screening Info. Requests (SIRs) Release January 2014

Final Investment Decisions (FIDs) 2015

Contract Award 2015

Key Site IOCs 2019 / 2020

# Backup

# Contact Information

Alfred Moosakhanian, FAA
NextGen Weather Systems Manager
alfred.moosakhanian@faa.gov

# Resources

- **NextGen Weather:**
  - https://www.faa.gov/nextgen/programs/

# CSS-Wx and NWP Brochures

# 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