



EXELIS

# Exelis FIS-B: Status & Future

Presentation for Friends & Partners in Aviation Weather 2014

Paul Freeman

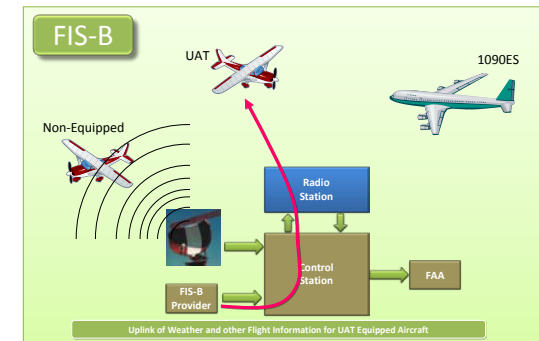
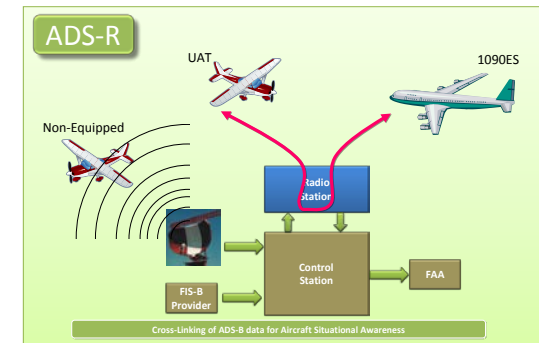
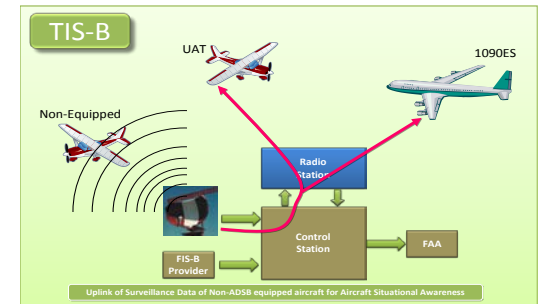
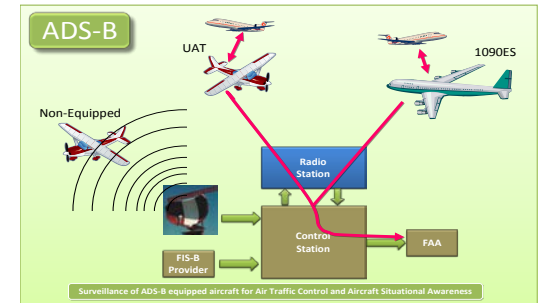
July 22, 2014

**Surveillance and Broadcast Services (SBS) Program**

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# Exelis SBS Overview

- Exelis is under contract with the FAA to design, deploy, and operate the U.S. Surveillance & Broadcast Services (SBS) infrastructure.
- SBS includes several major components:
  - > **Automatic Dependent Surveillance Broadcast (ADS-B):** Receives air-to-ground aircraft traffic data on 2 frequency bands & sends to Air Traffic Control.
  - > **Wide Area Multilateration (WAM):** Performs ground-to-air interrogation of aircraft transponders to determine aircraft position & sends to Air Traffic Control.
  - > **Traffic Information System Broadcast (TIS-B):** Transmits ground-to-air traffic data on 2 frequency bands of aircraft not equipped with ADS-B.
  - > **Automatic Dependent Surveillance Rebroadcast (ADS-R):** Retransmits aircraft traffic data ground-to-air on the opposite frequency band.
  - > **Flight Information System Broadcast (FIS-B):** Transmits ground-to-air data on UAT frequency band of weather & aeronautical information products.



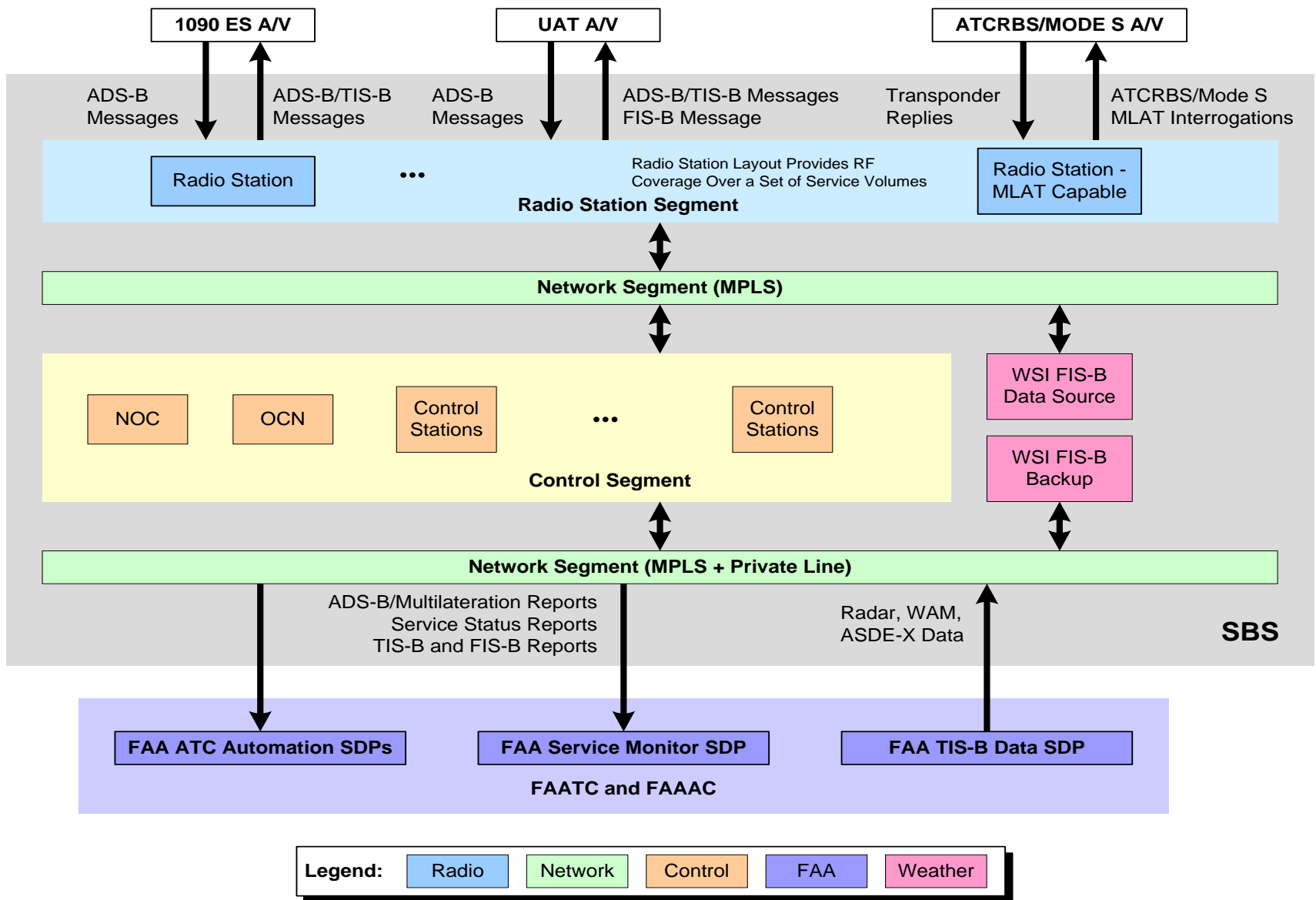
# Exelis SBS System Discriminating Features

- The Exelis SBS System has passed a rigorous FAA Safety Case & is certified & approved for use with 4 different automation systems.
  - > Demonstrated to be safe.
- The Exelis SBS System has passed a rigorous Security Certification & Accreditation inspection.
  - > Demonstrated to be secure.
- The Exelis SBS System is designed to be robust & scalable with built in:
  - > Protections from Spoofing & Denial of Service attacks.
  - > Provisions for flexible distribution of data.
  - > Provisions to determine GPS local health status & usability.
- The Exelis SBS System has a robust overarching monitoring & control solution.

## Exelis SBS Status

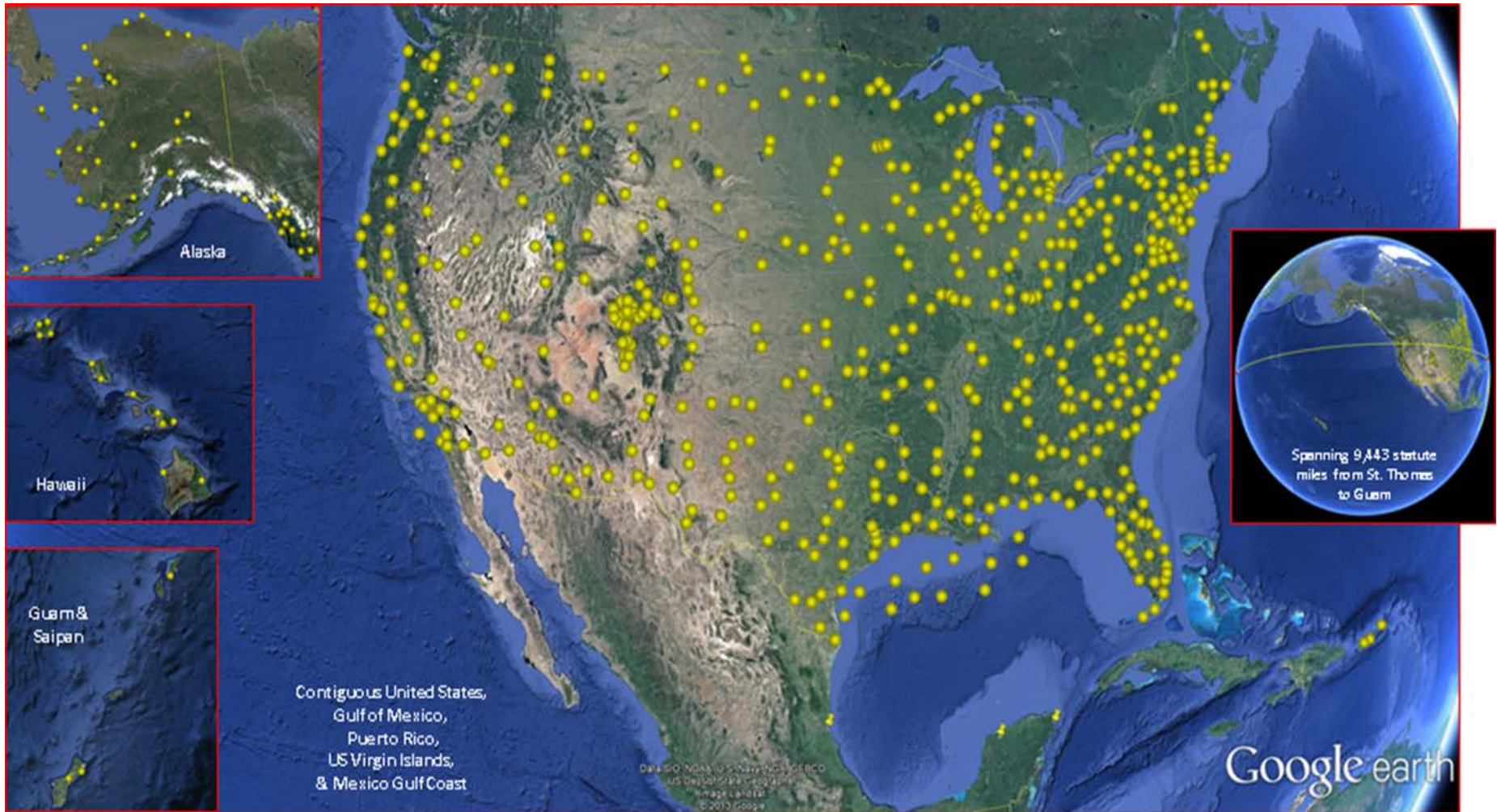
- Exelis SBS has completed the baseline deployment of over 600 SBS ground stations deployed across all 50 states, territories, and the Gulf of Mexico.
  - > Deployment of additional radio stations to expand coverage is ongoing
- Provides operational services to over 200 FAA facilities.
  - > System has passed FAA safety case.
  - > System has achieved security accreditation through independent audit from FAA security office.
- Over 5 years of operational experience.
  - > Hundreds of man-years of data analysis verifying:
    - > Operational suitability of developed infrastructure for each FAA facility,
    - > Data anomalies associated with avionics installations,
    - > Identification of system errors including network routing, RF interference, as well as anomalous delivery of data across the operational network.

# Exelis SBS System High Level Architecture





# 600+ Exelis SBS Ground Stations Deployed across 50 states, territories, and Gulf of Mexico



# A Typical Co-Located SBS radio site





# A Typical Airport SBS Radio Site





# SBS Oil Platform Installation – ATP Innovator



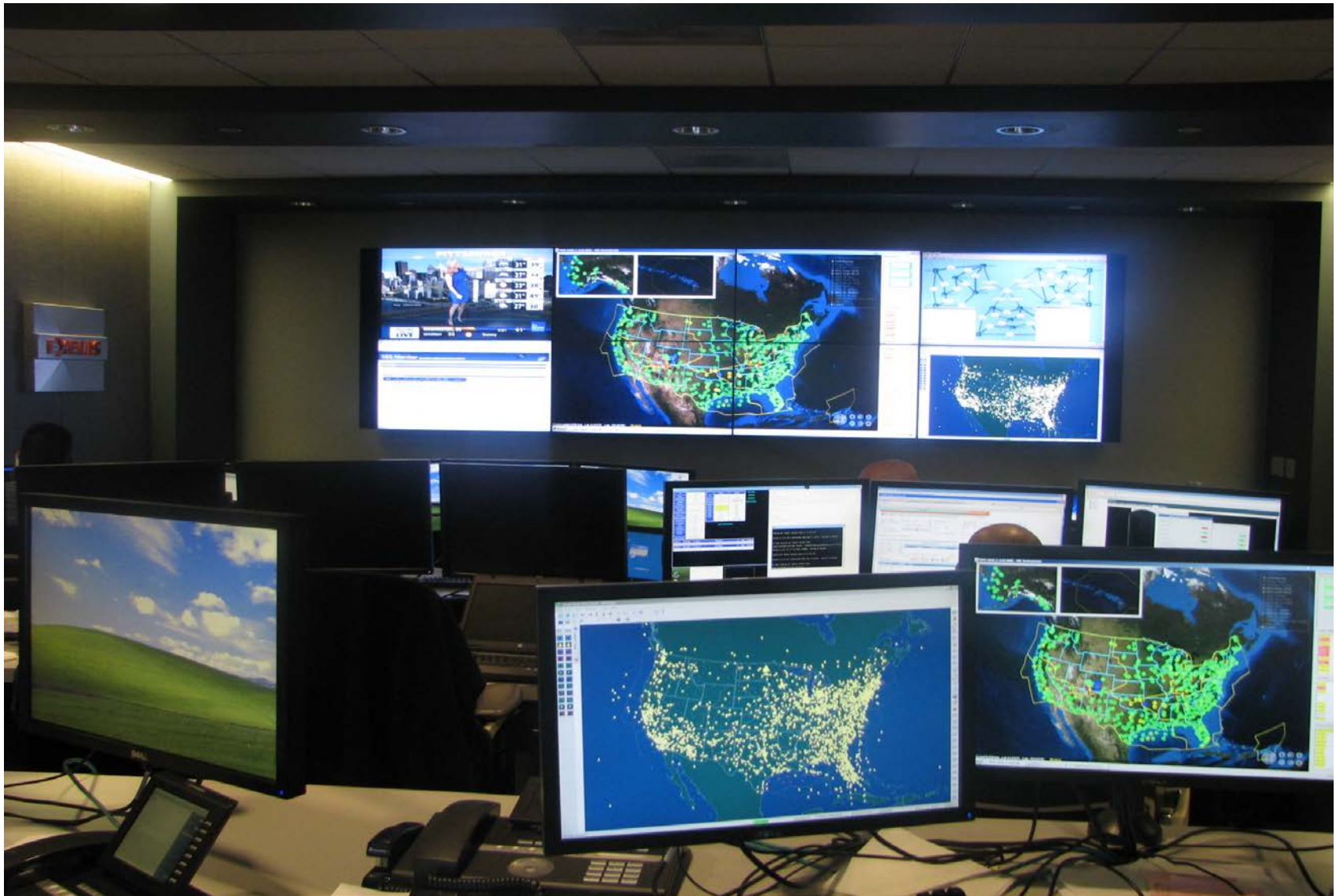
## SBS Radios



# SBS Monitoring Approach

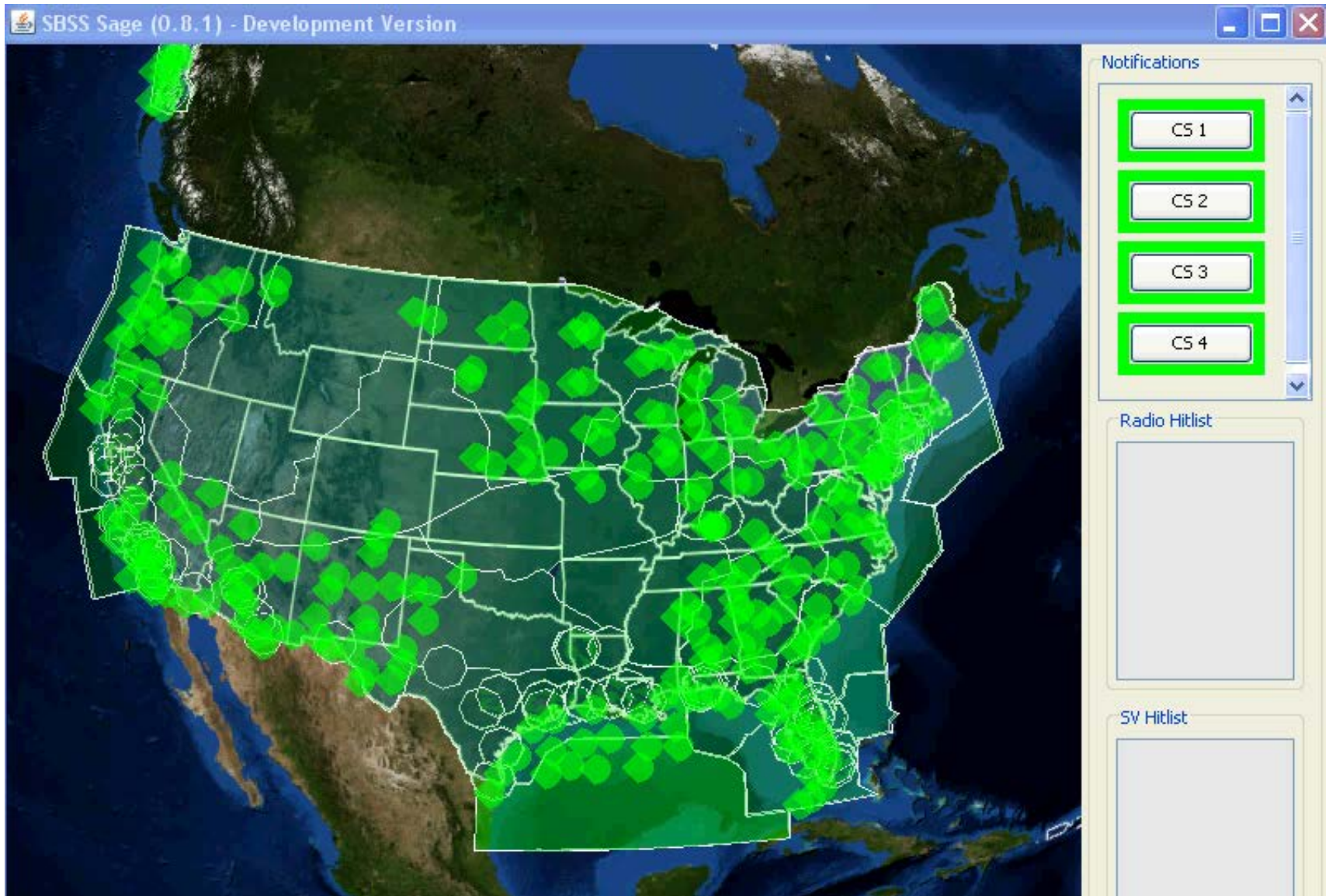
- Hybrid combination of traditional trap collection & service aware monitors
- Focuses on impact to services
- Scales to meet demands of large, nationwide system
- Identifies & assigns tickets to anomaly source asset
- Produces a manageable volume of actionable tickets

# Exelis SBS Network Operations Center, Herndon VA



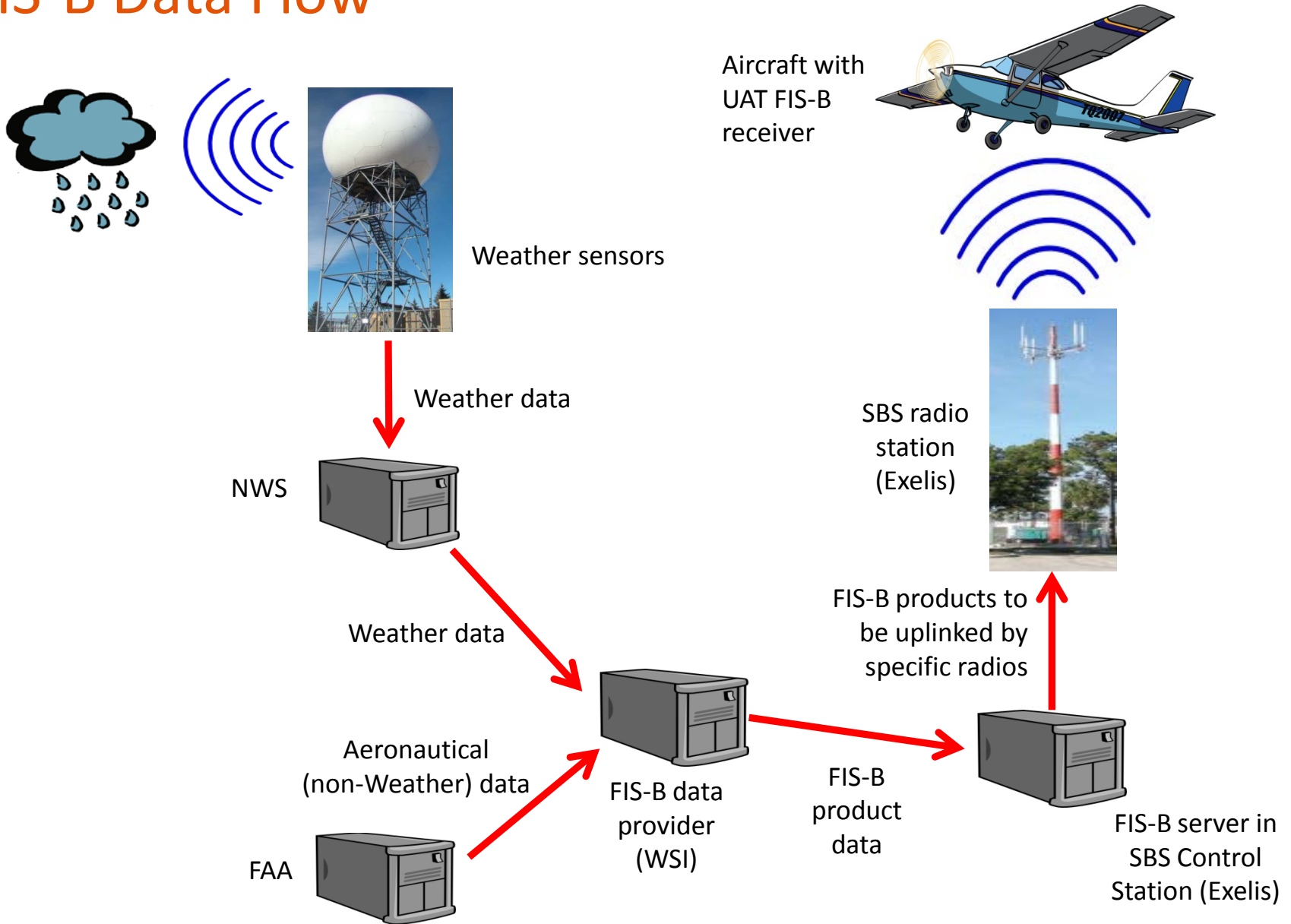


# Situational Awareness Graphical Environment (SAGE)

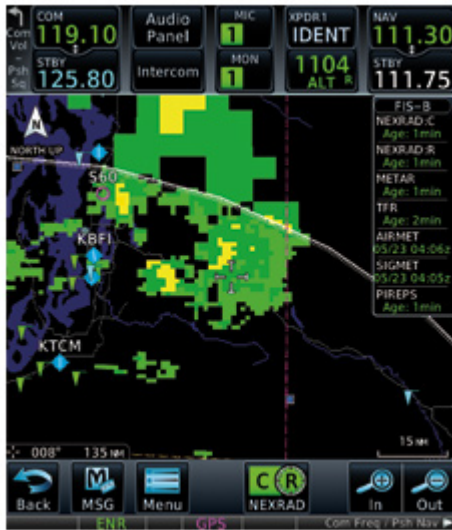




# FIS-B Data Flow



# FIS-B Avionics & Displays



Avionics capable of receiving & displaying FIS-B products range from certified/installed units...



...through non-certified/portable units costing only a few hundred dollars.

## Current FIS-B Products: Text Products

Product	Description	SBSS-Required Update Interval	SBSS-Required Transmission Interval	WSI's Data Source
METAR	Aviation Routine Weather Report	1 minute (where available), As Available otherwise	5 minutes	NOAAport, FAA AIDAP
SPECI (METAR)	Unscheduled Special Weather Report			
PIREP	Pilot Reports	As Available	10 minutes	
TAF / AMEND	Terminal Aeronautical Forecast	8 Hours		
Wind & Temperature Aloft	Computer-prepared forecasts of winds & temperatures aloft	12 Hours		

## Current FIS-B Products: Text/Graphic Products

Product	Description	SBSS-Required Update Interval	SBSS-Required Transmission Interval	WSI's Data Source
AIRMET	Airman's Meteorological Information: mountain obscuration, icing, or turbulence	As Available	5 minutes	NOAAport, FAA AIDAP
Convective SIGMET	Convective Significant Meteorological Information: severe, extensive, or prolonged thunderstorm	As Available, then at 15 minute intervals for 1 hour		
SIGMET	Significant Meteorological Information: turbulence, icing, or IMC conditions.			
NOTAM-D	Distant Notice To Airmen: Information requires wide dissemination	As Available	10 minutes	Text: FAA AIDAP. Graphic: NAIMES NIWS
NOTAM-FDC	Flight Data Center Notice To Airmen: Information that is regulatory			
SUA Status	Special Use Airspace status	As Available	10 minutes	FAA SUA Gateway



## Current FIS-B Products: Graphic Products

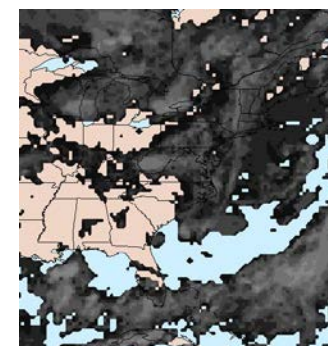
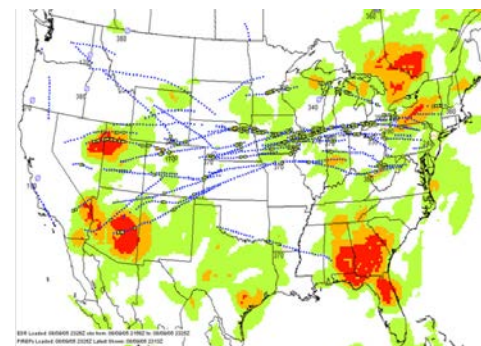
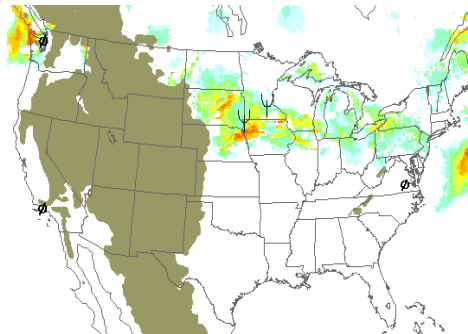
<b>Product</b>	<b>Description</b>	<b>SBSS-Required Update Interval</b>	<b>SBSS-Required Transmission Interval</b>	<b>WSI's Data Source</b>
CONUS NEXRAD	Contiguous United States Next Generation Radar	~5 minutes (10 minutes for clear air mode)	15 minutes	NOAAport, NWS Central Weather Service for single-site NEXRAD
Regional NEXRAD	Regional Next Generation Radar	~5 minutes (10 minutes for clear air mode)	2.5 minutes	

# Path Forward:

## Potential FIS-B Improvements & Additional FIS-B Products

- Potential new products which could be added to FIS-B include:

- > Lightning
- > Turbulence NOWcast
- > Icing NOWcast
- > Cloud Top Heights
- > One-Minute Airport Observations (OMO)
- > D-ATIS
- > NTSB: CWA and MWA products



**Questions?**  
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**Thank you for the opportunity to present  
at Friends & Partners in Aviation Weather 2014!**