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.
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 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

Weather sensors

Weather data

NWS

Weather data

Aeronautical (non-Weather) data

FAA

FIS-B data provider (WSI)

FIS-B server in SBS Control Station (Exelis)

SBS radio station (Exelis)

FIS-B products to be uplinked by specific radios

Aircraft with UAT FIS-B receiver

Weather data

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

...through non-certified/portable units costing only a few hundred dollars.
<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>SBSS-Required Update Interval</th>
<th>SBSS-Required Transmission Interval</th>
<th>WSI’s Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>METAR</td>
<td>Aviation Routine Weather Report</td>
<td>1 minute (where available), As Available</td>
<td>5 minutes</td>
<td>NOAAport, FAA AIDAP</td>
</tr>
<tr>
<td>SPECI (METAR)</td>
<td>Unscheduled Special Weather Report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIREP</td>
<td>Pilot Reports</td>
<td>As Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAF / AMEND</td>
<td>Terminal Aeronautical Forecast</td>
<td>8 Hours</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td>Wind &amp; Temperature Aloft</td>
<td>Computer-prepared forecasts of winds &amp; temperatures aloft</td>
<td>12 Hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td>Description</td>
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<td>SBSS-Required Transmission Interval</td>
<td>WSI’s Data Source</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>AIRMET</td>
<td>Airman’s Meteorological Information: mountain obscuration, icing, or turbulence</td>
<td>As Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convective SIGMET</td>
<td>Convective Significant Meteorological Information: severe, extensive, or prolonged thunderstorm</td>
<td>As Available, then at 15 minute intervals for 1 hour</td>
<td>5 minutes</td>
<td>NOAAport, FAA AIDAP</td>
</tr>
<tr>
<td>SIGMET</td>
<td>Significant Meteorological Information: turbulence, icing, or IMC conditions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTAM-D</td>
<td>Distant Notice To Airmen: Information requires wide dissemination</td>
<td>As Available</td>
<td>10 minutes</td>
<td>Text: FAA AIDAP. Graphic: NAIMES NIWS</td>
</tr>
<tr>
<td>NOTAM-FDC</td>
<td>Flight Data Center Notice To Airmen: Information that is regulatory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUA Status</td>
<td>Special Use Airspace status</td>
<td>As Available</td>
<td>10 minutes</td>
<td>FAA SUA Gateway</td>
</tr>
</tbody>
</table>
## Current FIS-B Products: Graphic Products

<table>
<thead>
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<th>SBSS-Required Transmission Interval</th>
<th>WSI’s Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONUS NEXRAD</td>
<td>Contiguous United States Next Generation Radar</td>
<td>~5 minutes (10 minutes for clear air mode)</td>
<td>15 minutes</td>
<td>NOAAport, NWS Central Weather Service for single-site NEXRAD</td>
</tr>
<tr>
<td>Regional NEXRAD</td>
<td>Regional Next Generation Radar</td>
<td>~5 minutes (10 minutes for clear air mode)</td>
<td>2.5 minutes</td>
<td></td>
</tr>
</tbody>
</table>
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?
paul.freeman@exelisinc.com

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