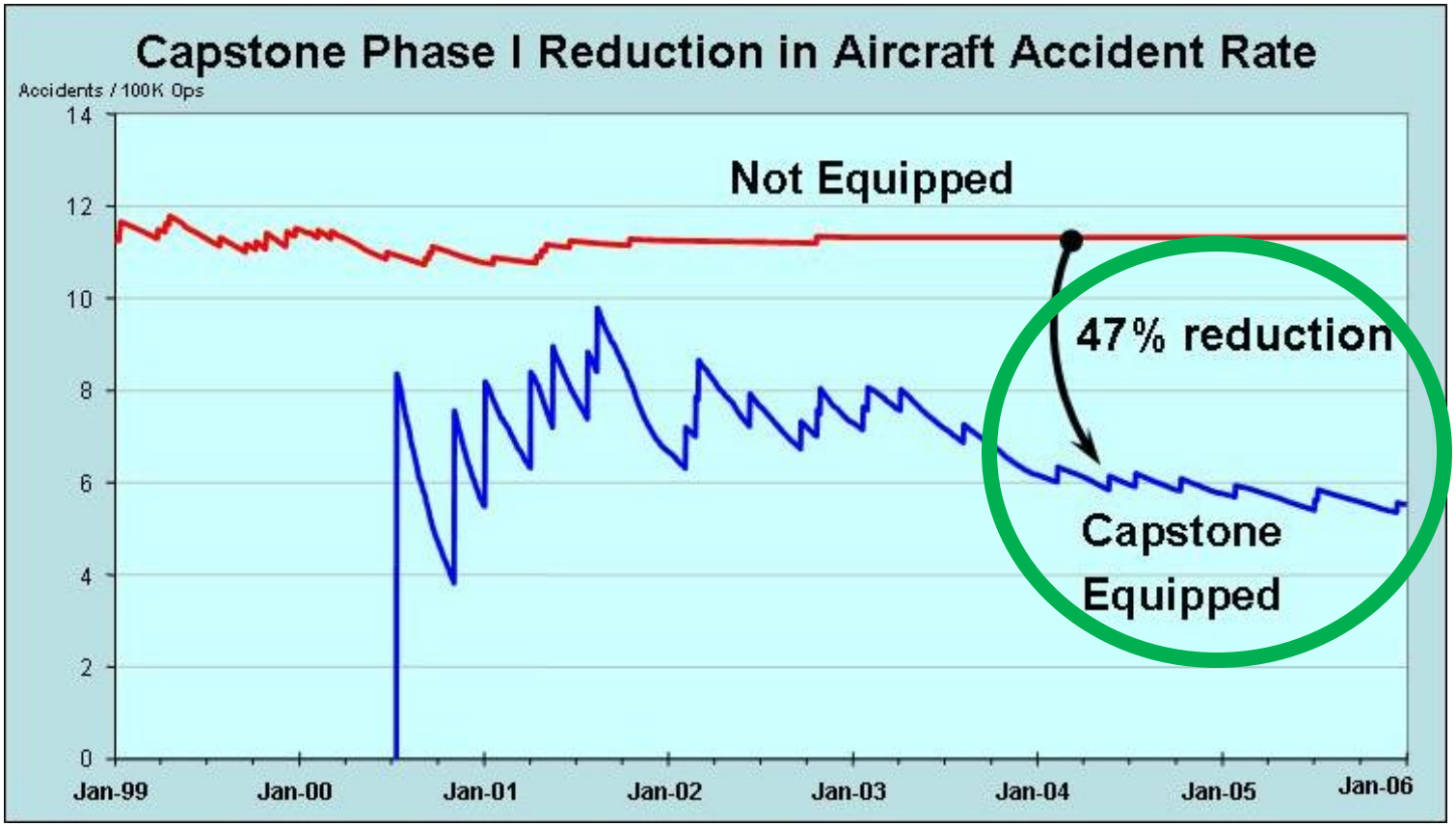
Harris' Experience in the U.S. Surveillance Broadcast Systems (SBS)

Holmes Liao

BD Director
Mission Networks

Safety Improvement in Alaska

A reduction in accidents, and therefore a reduction in SAR, has been proven with the FAA Capstone Program (1999-2006)



***Source: The Impact of Capstone Phase I Program – Final Report*; Sept 2006**

ADS-B Benefits: Operational Improvements and Safety Enhancements

- Air Traffic Control Operational Improvements
  - Expanded Surveillance for IFR Separation Services
  - Improved weather situational awareness for ATC
  - Improved traffic situational awareness for ATC
- Aircraft Operational Benefits
  - Increased pilot awareness of overall traffic flows
  - Common situational awareness between ATC, airlines, and airports
  - Operator Flight Monitoring
  - Improved terrain situational awareness for pilots
- Safety
  - Accident/Incident Reduction
    - Weather-related accident rate
    - Mid-air collision rate
    - Surface accident rate
    - CFIT accident rate
  - Enhanced Search and Rescue

Contract Awarded for SBS Ground Infrastructure Deployment in August 2007

Surveillance Broadcast System (SBS)

- Design, development, integration, key site testing, and significant deployment

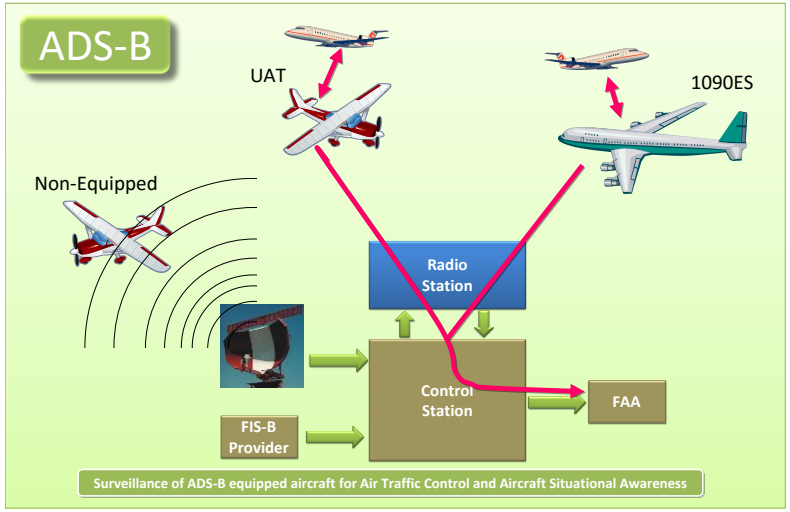
Nation-wide deployment, operations and maintenance of the system through 2025

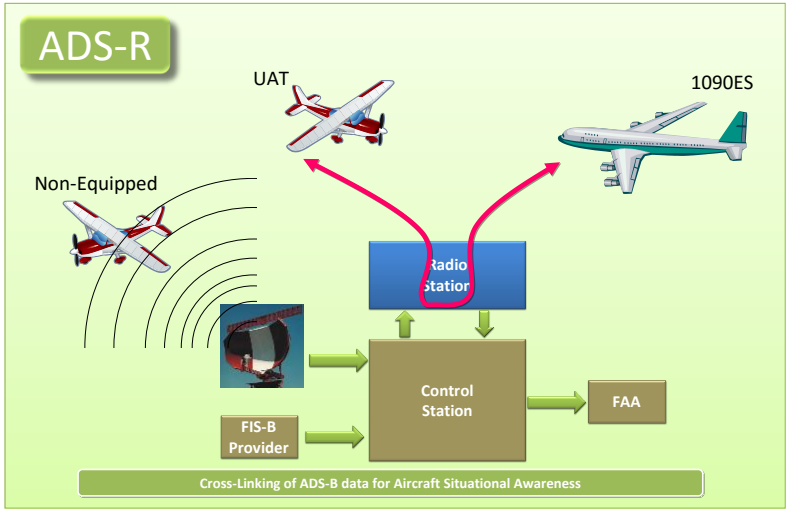
- Service-based contract
- Deployment capital expense funded by ITT (now Harris)
- Operational since 2008
- Nationwide deployment was completed in April 2014

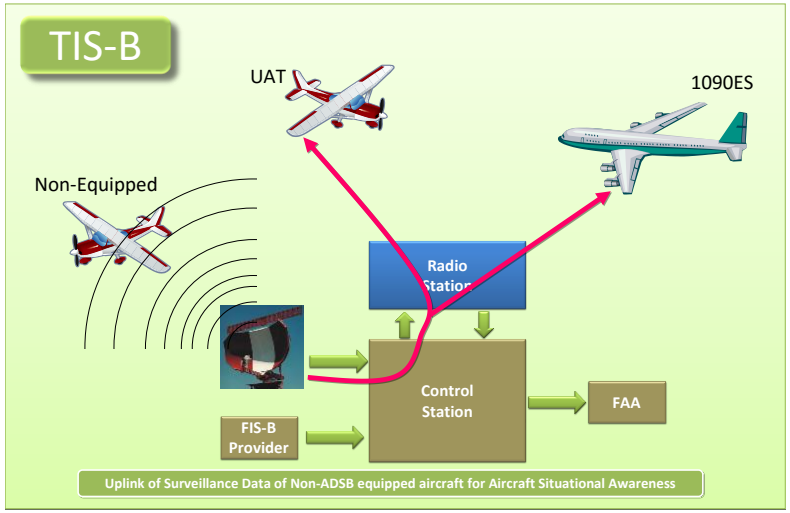
Harris has an exceptional ADS-B ground infrastructure solution used by FAA, airlines, and airports

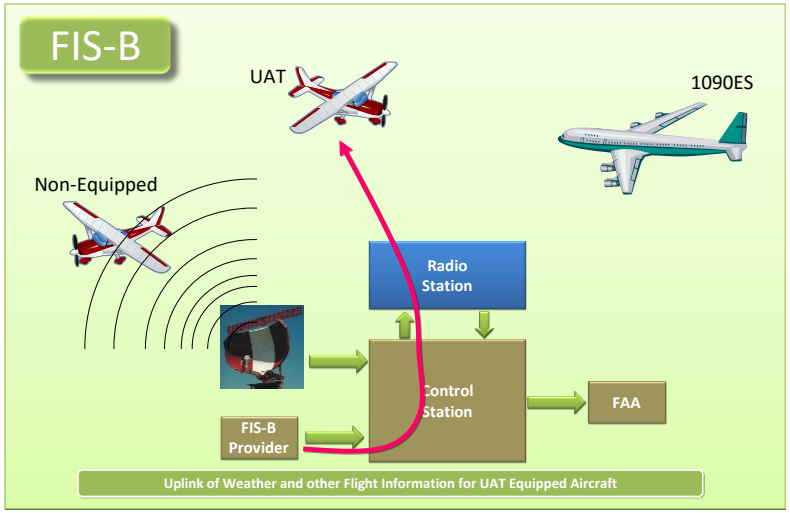
- Flexible, scalable, safe and secure
- Excellent coverage
- Capable of operating in the most stringent 1090 MHz spectrum environment

Dual Link Technologies, Four Services









System Built to FAA Requirements

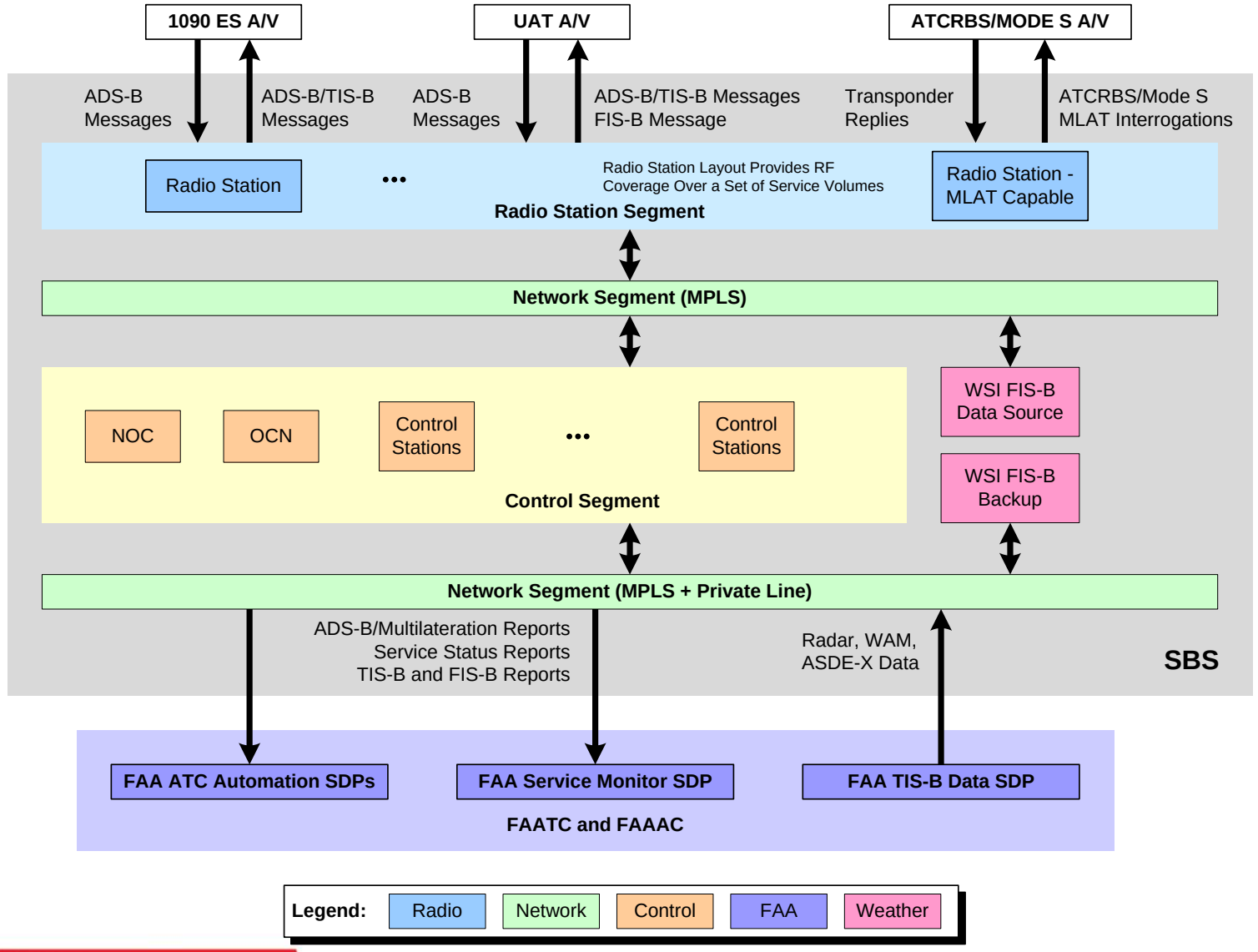
Functional and Performance Requirements

- Essential Services Specification
- Critical Services Specification

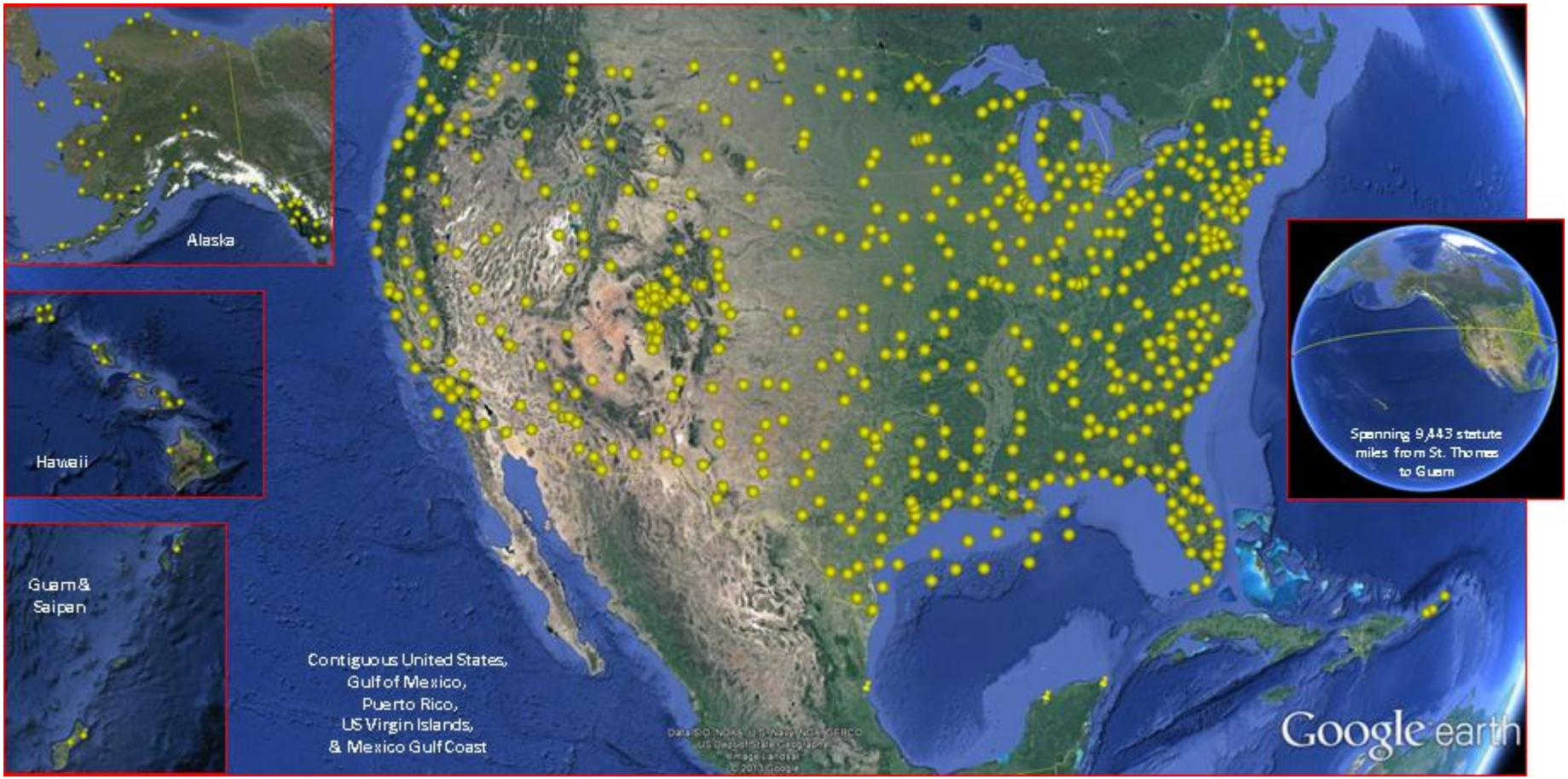
Coverage requirements in Service Volume Description Document

- Defines three service volume types
  - En route service volume – Air Route Traffic Control Center coverage up to FL600 from over the center geographical area
  - Terminal service volume – TRACON coverage up to FL250 in a 60 mile radius around the terminal reference point (typically the terminal area radar location)
  - Surface service volume – Airport surface up to 2000 feet over a 7 mile radius from airport reference point (typically airport center)
- Identifies the radar systems serving each area. Where radar exists, the ADS-B coverage is required to be at least as good as existing radar coverage.

The Ground System Architecture – Demonstrated to be Safe and Secure

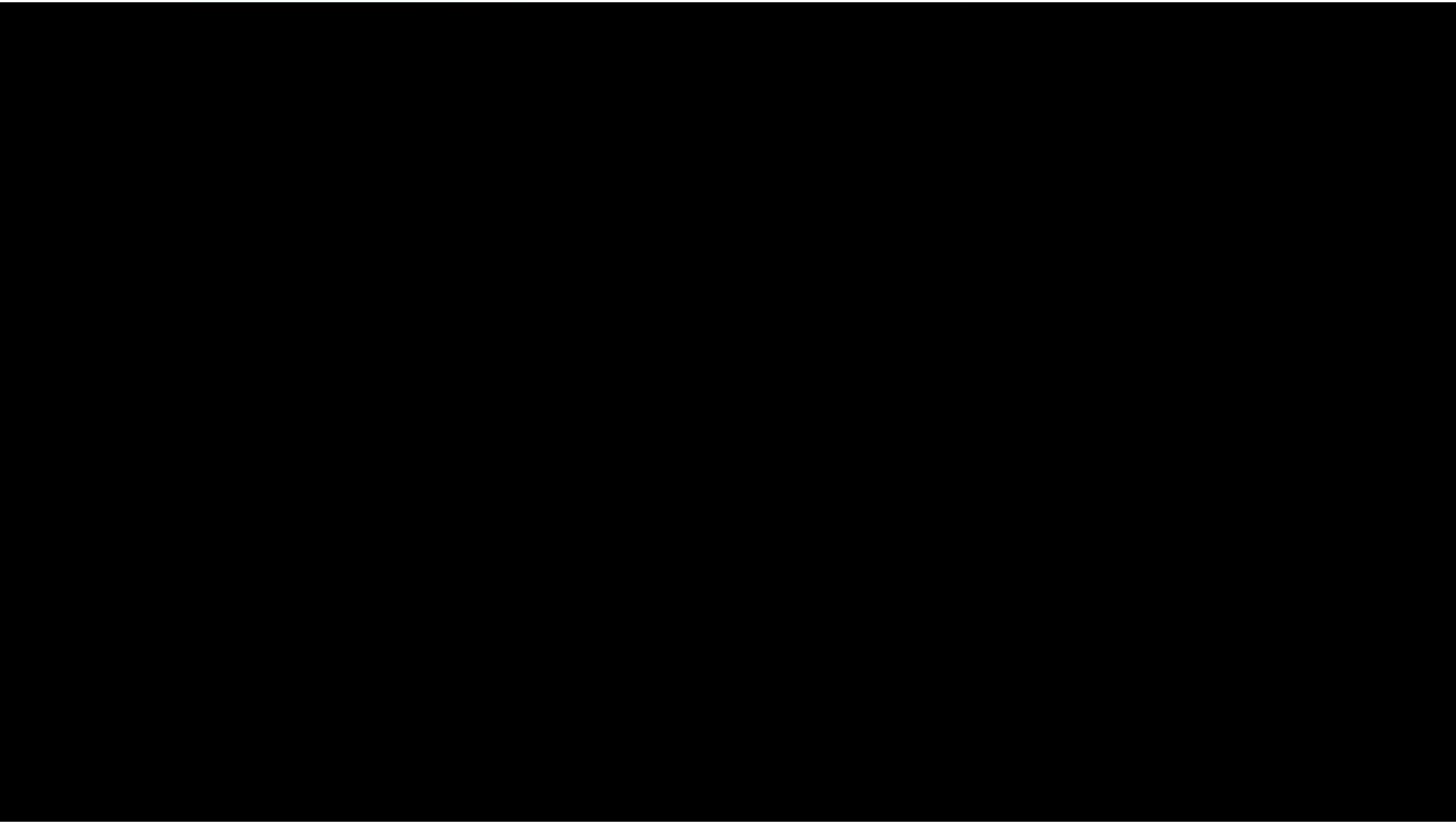


Radio Sites



- 658 total ADS-B radio sites (base + additional) are deployed and on the air

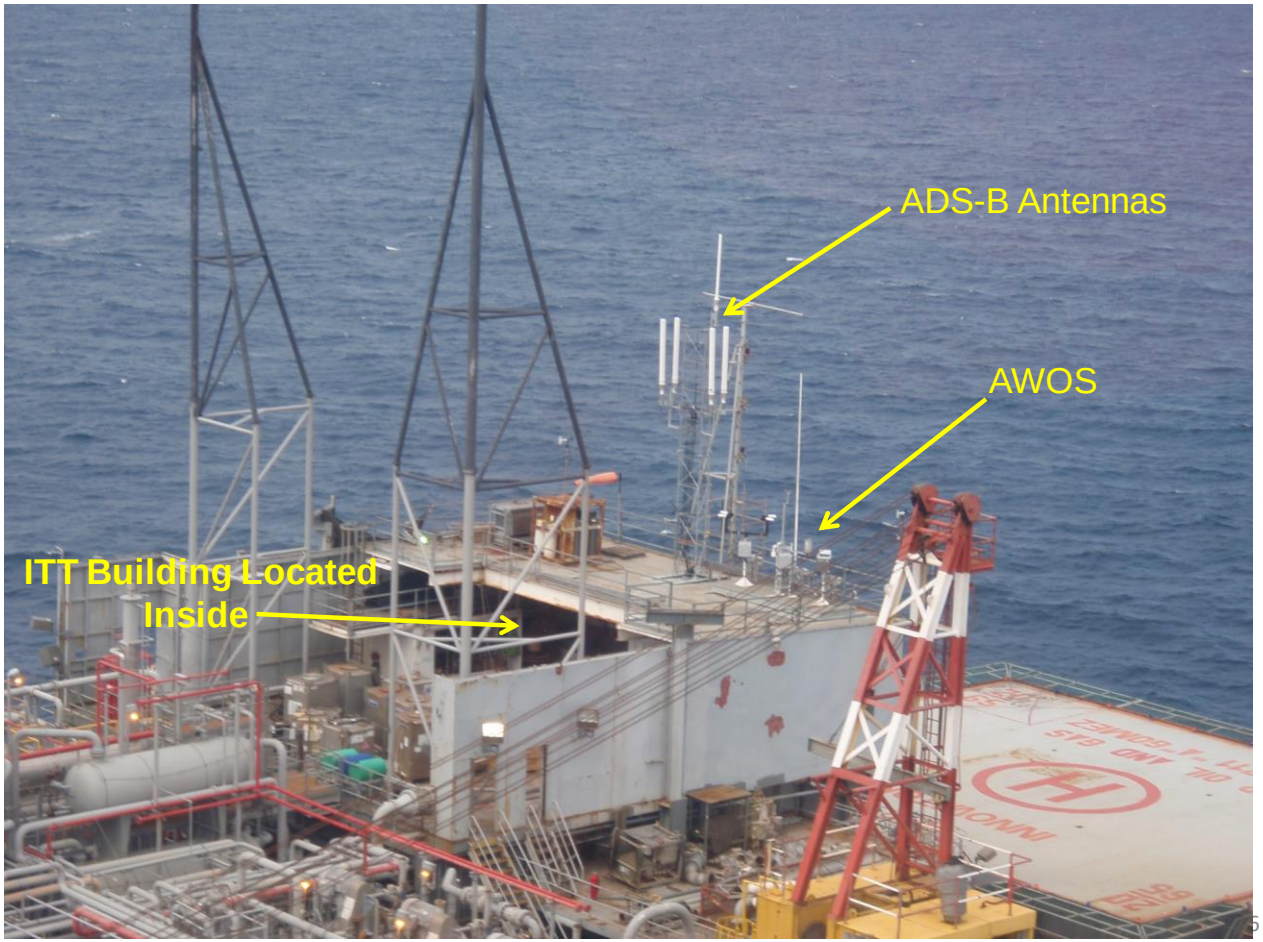
Deployment by Service Volumes (video)



A Typical Co-Location

A Typical Airport Site

Oil Platform Installation in the Gulf of Mexico



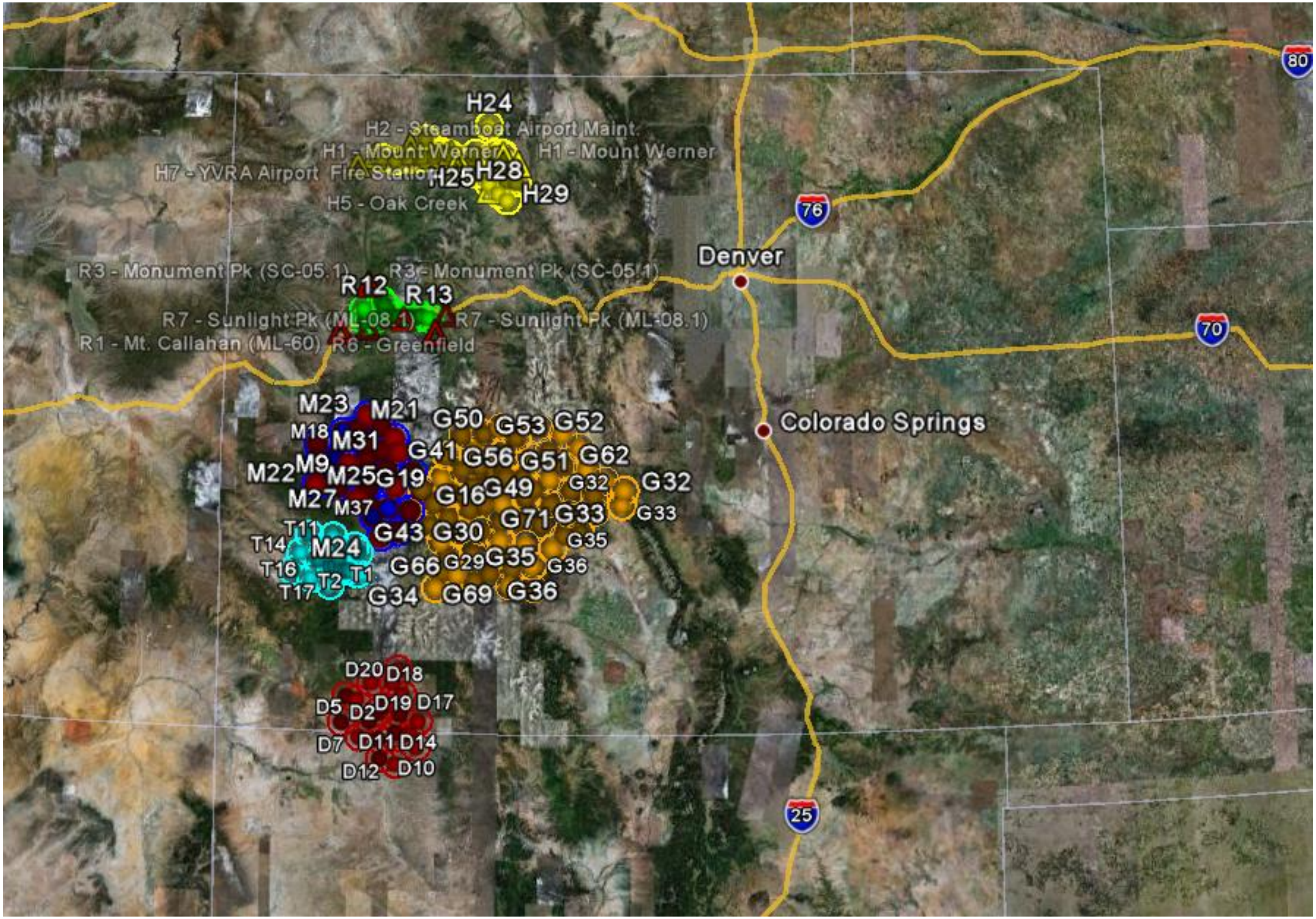
ADS-B Radios

Airport Surface Radio

Radio Enclosure

1090 and UAT Antennas

Colorado Wide Area Multilateration (WAM)



A Networked Architecture (video)

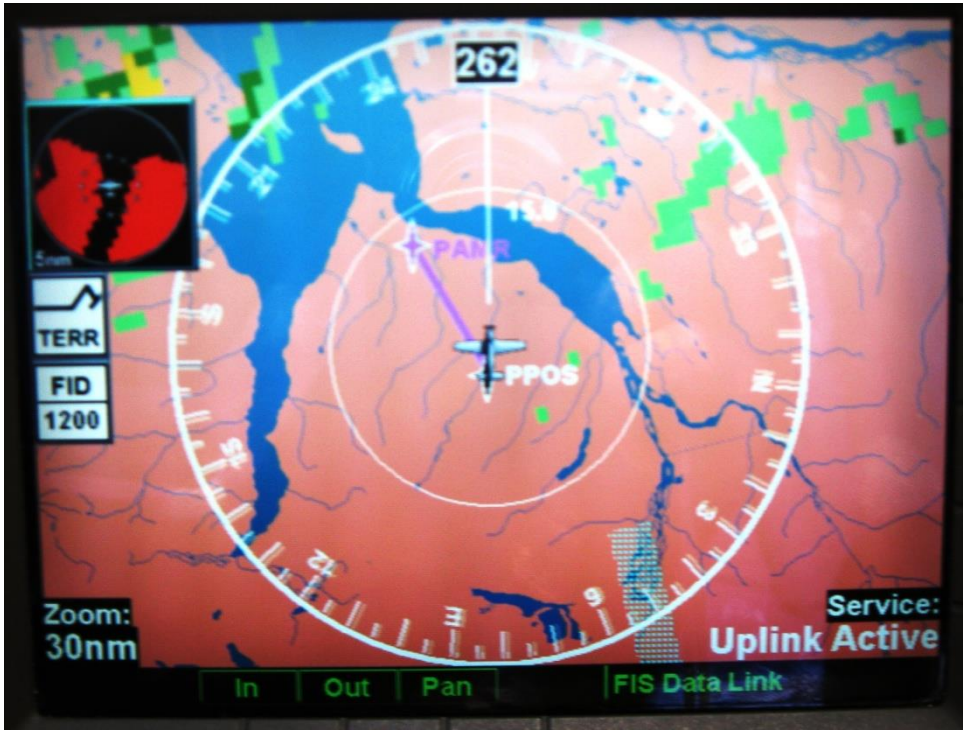
Full Operations and Maintenance Monitoring

TIS-B Display of Traffic Information

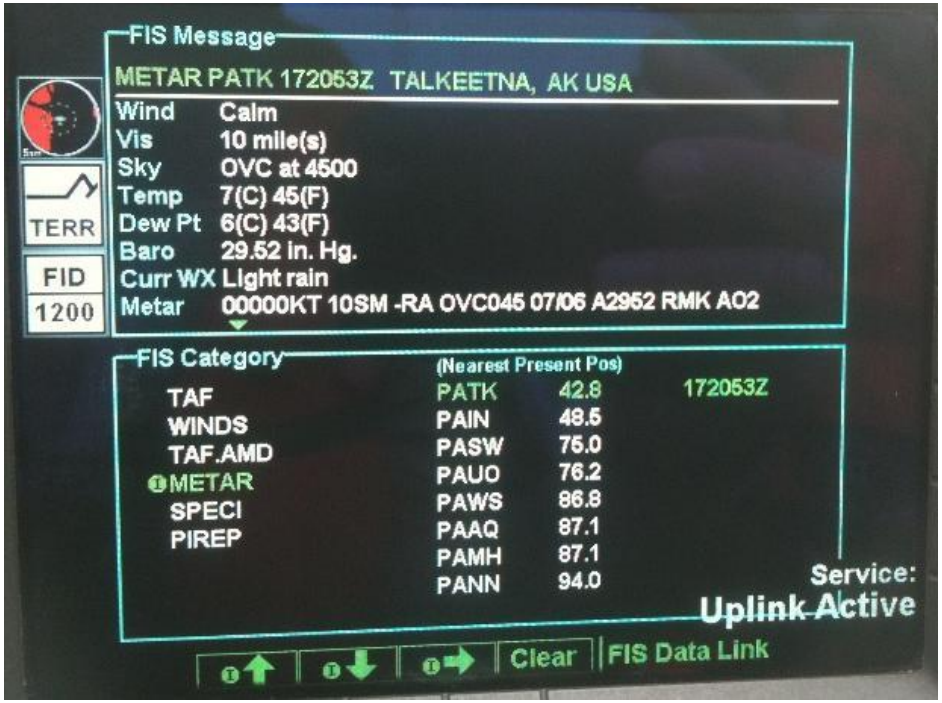
~10 nmi northwest
Anchorage, AK

Courtesy of Alaskan Aviation Safety Foundation
Pilot Jim Cieplak
(Co-Pilot Mike Talotta)
25 May 2011

FIS-B Display of Weather Information

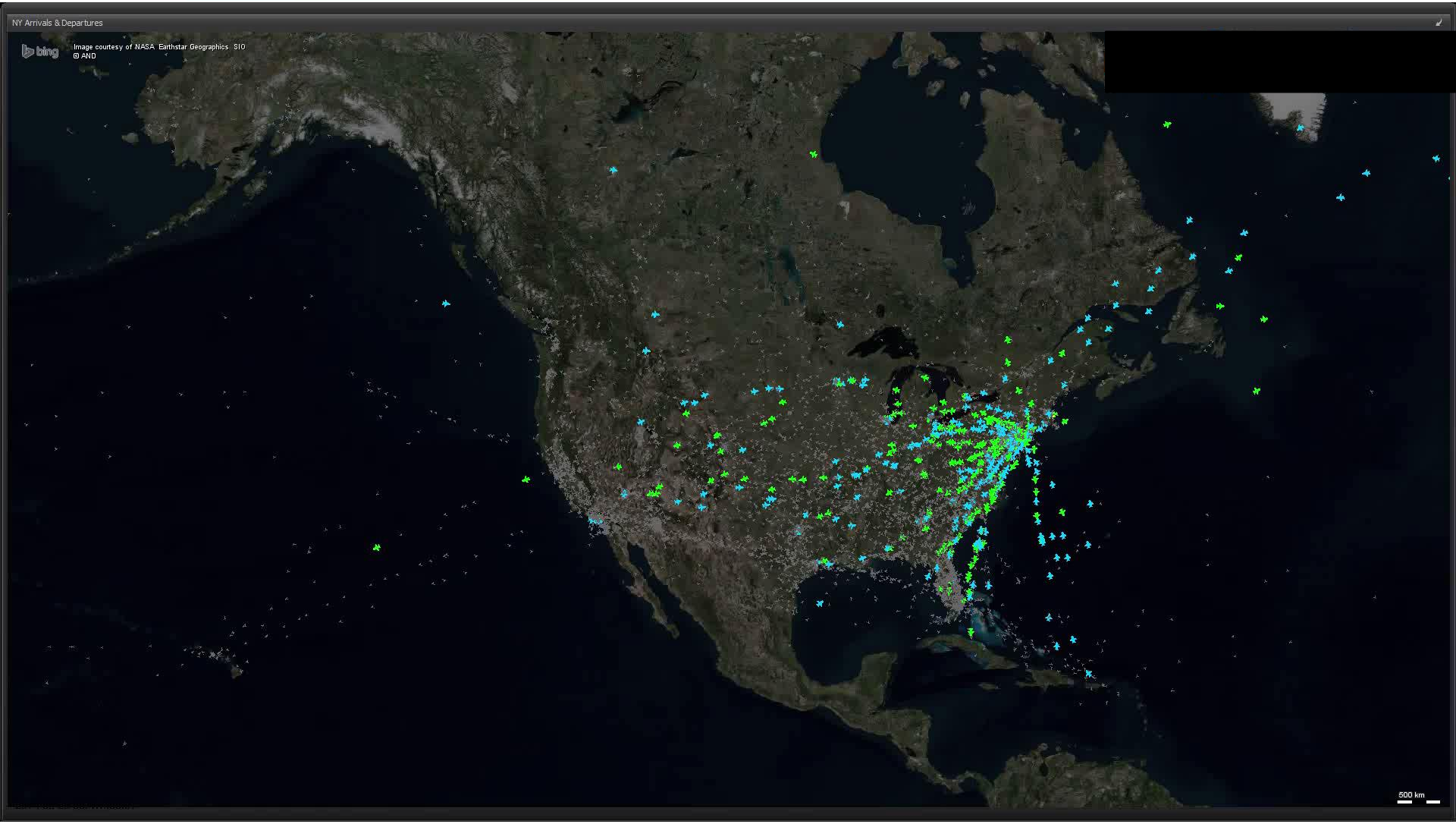


Graphical NEXRAD Scattered Rain Showers (June 2011)



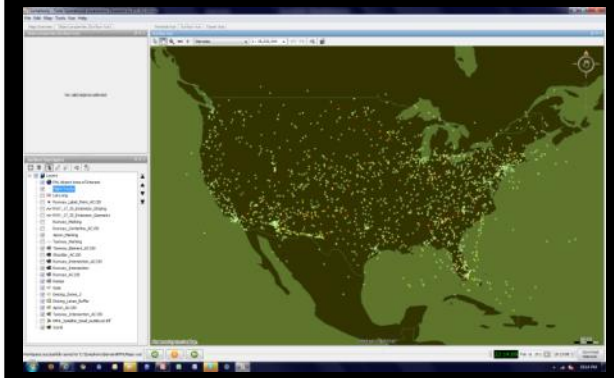
Text METAR PATK (Sept 2011)

Common Situation Awareness Amongst ANSPs, Airports, and Airlines (video)



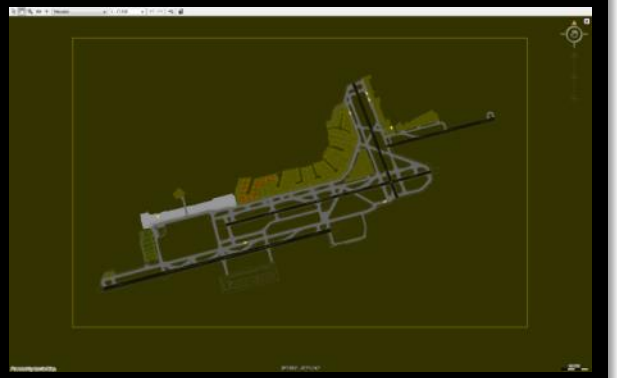
Commercial Services Based on ADS-B

Applications Powered by Harris' Real-Time Aircraft Surveillance Network



Flight Tracking Applications

Virtual Tower Management



Airport Surface Management

One Aircraft Target…One Track…One Point of Contact….Regionwide

Surveillance Data Fused from Multiple ATC Systems

ASDE-X	Terminal Radars	En-Route Radars	ADS-B Network	Multilateration Systems	Flight Plan Data
• Airport surface data • 1 second update	• Terminal area data • 5 second update	• En-route radar data • 12 second update	• ADS-B network data • 1 second update	• MLAT network data • 1 second update	• Flight plan data from FAA Host Computer System

We Have Added Commercial Products to the Data Service

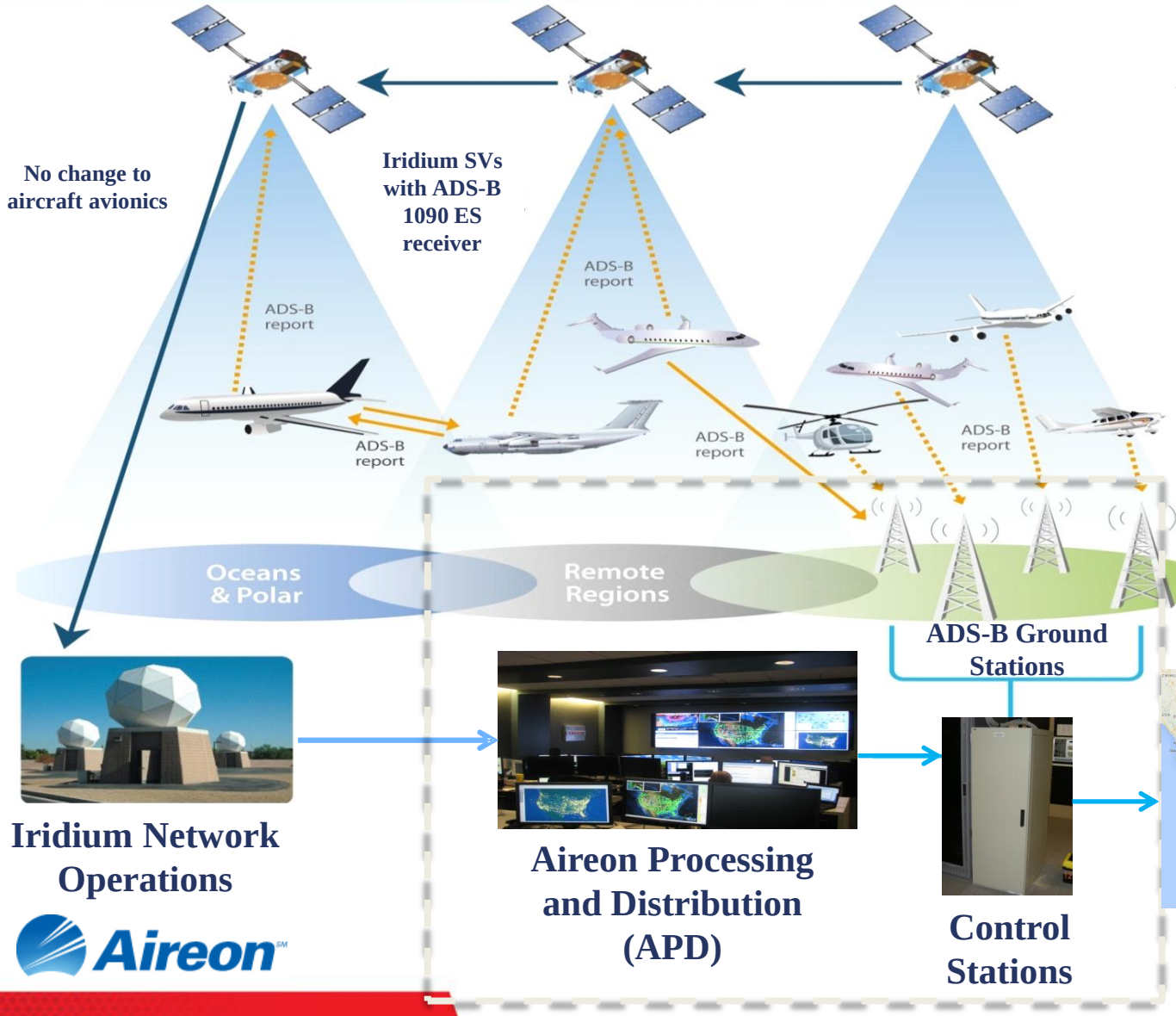
Exelis Web-based Solutions …

Symphony®

Operations Management	Environmental Management	Revenue Management	Information & Data Services
OpsVue / MobileVue	**EnvironmentalVue**	**RevenueVue**	Real-Time and Historical Information and Data Services
 • Real-time situational awareness • Audible and visual warnings and alarms • Historical replay and analysis • Decision support tools • Surface and Terminal Situational Awareness for Tablets & Smartphones	 • Complete noise and track correlation • Management of complaints • Architecture supports access from anywhere • The largest NOMS vendor in North America	 • Airframe ID and tracking of airport use and landings • Allows airports to more easily bill landing fees and other associated airport fees • Produces detailed invoices	

… all run off of a common NextGen nationwide surveillance database

Terrestrial and Space-Based ADS-B Surveillance

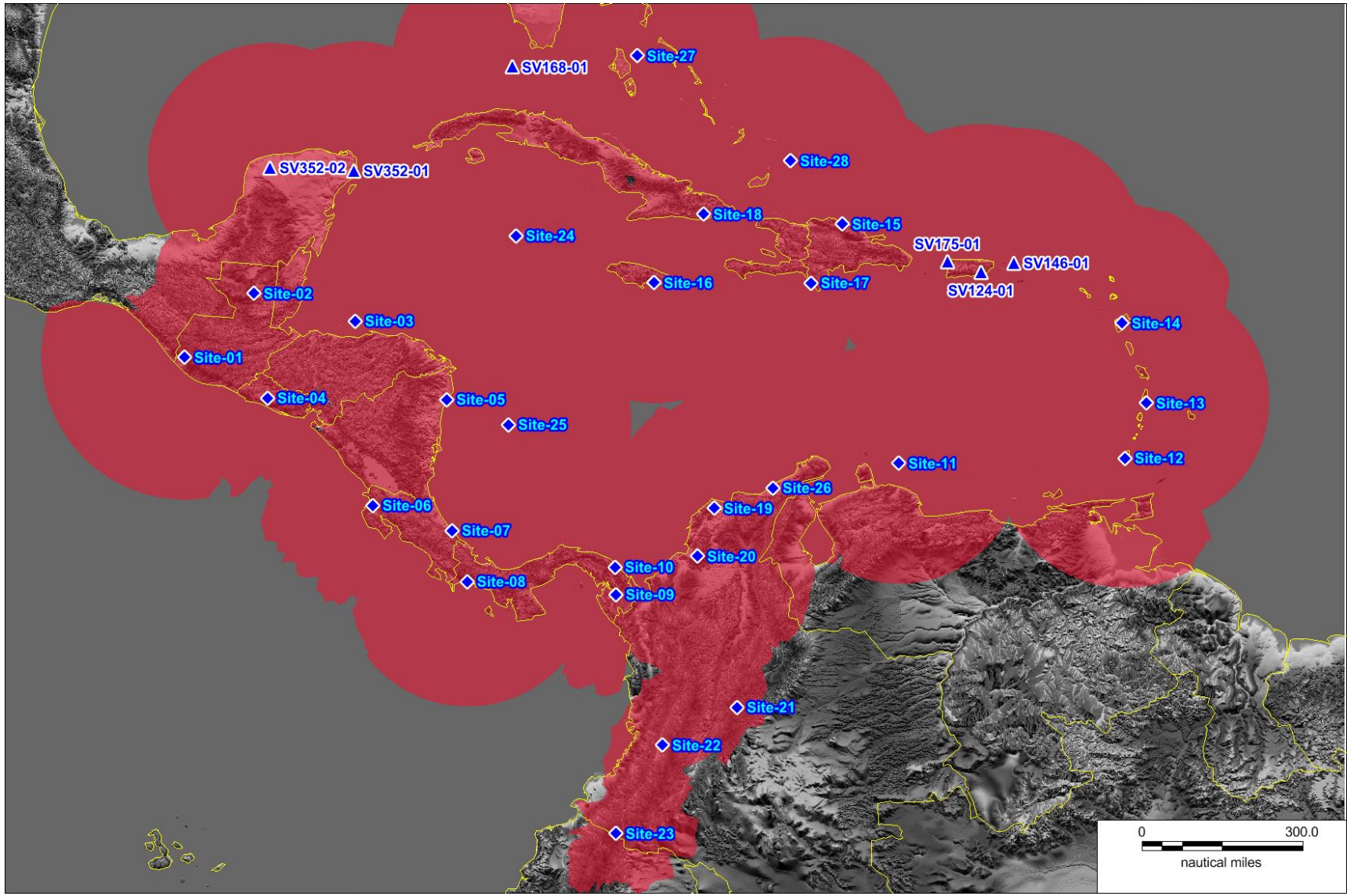


As an Aireon partner, Harris provides ADS-B payload on satellites, data processing/ distribution, systems engineering, and operations control.

Extending the US System: Mexico as a Model

- To provide surveillance in the Gulf of Mexico, FAA signed an MOA with Mexico SENEAM in 2012 for Harris to install 3 ADS-B radio sites and 3 service delivery points in Mexico; 1090ES Out only
  - Harris provides telco to US border, SENEAM to Mexico border
  - SENEAM provided space, power, and site prep for RSs and SDPs
  - SENEAM paid for import-export taxes, VAT, duties, etc.
  - Harris monitors, operates, and maintains; has spares in each site
  - No need for Harris to apply for permit, zoning, or purchase insurance
- ADS-B data is routed back to Houston for processing and dissemination
- Surveillance info is disseminated to ATC centers in the US and Mexico
- Leveraging Harris service-based contract with FAA
  - Harris provides capital investment, owns and operates the equipment
  - FAA pays for surveillance service for aircraft separation

Potential ADS-B Coverage at FL300 with ~30 Radio Stations



Summary

Harris has designed, developed and deployed the world's largest ADS-B infrastructure that is scalable, safe, and secure.

Harris' solution can be cost-effectively operated and maintained in any regions around the world.

We're prepared to share our experience with and provide a regional ADS-B solution that is complimentary to ICAO's vision and plans.

INVITACIÓN

Introducción a una solución regional de ADS-B, basada en una experiencia de Estados Unidos

[Proveedores de Servicios de Navegación Aérea Solamente]

Fecha: 23 de Septiembre, del 2015
Lugar: Hotel Sheraton, Salon Contadora, Piso M1
Hora: 4:00pm

Backup Slides

ADS-B Benefits: Operational Improvements and Safety Enhancements

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Safety

- Accident/Incident Reduction
  - Weather-related accident rate
  - Mid-air collision rate
  - Surface accident rate
  - CFIT accident rate
- Enhanced Search and Rescue

ADS-B Safety Case

- *FAA has approval for 3-mile separation for Terminal and 5-mile separation for Enroute airspace when also in radar coverage.*
- *A comprehensive safety case has been completed for ADS-B only airspace (i.e. without radar coverage) in the U.S. for 3-mile and 5-mile separation across the US National Airspace System (NAS).*
- *For Alaska and Gulf of Mexico, the FAA has 5-mile approved ADS-B separation in non-radar airspace*
  - *Used to be procedural separation of as much as 10 minutes*
- *Wide spread operational use of ADS-B separation across the NAS awaits the ADS-B equipage mandate after 2020, with a best-equipped, best-served policy. Technologically, ADS-B can support 3-mile separation in the congested Terminal airspace.*
- *ICAO circular 326 Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation contains the safety assessment carried out to conclude that ADS-B and MLAT may be used to provide a three (3) nautical mile separation minimum*