

Surveillance and Broadcast Services

Industry Day #2

By: Surveillance and Broadcast Services
Program Office

Date: August 28, 2006



Federal Aviation
Administration



Agenda

- **Opening Remarks**
- **Program Status**
- **Backup Analysis Overview**
- **Contract Status**
- **Aviation Safety (AVS) Overview**
- **Equipage Assumptions**
- **Avionics Certification**
- **Separation Standards**
- **Avionics Manufacturers**
- **User Groups**



Opening Remarks & Program Status Review

**Vincent Capezzuto
Surveillance and Broadcast Services
Program Office**



Opening Remarks

"Never tell people how to do things. Tell them what to do and they will surprise you with their ingenuity."

– *General George S. Patton*



Segment 1 Dual Track Approach

- **Ground Infrastructure**

- Industry Day #1 – June 2006
- Industry Day #2 – August 2006
- Performance Specification Request for Information (RFI) – September 2006
- Industry Day #3 – October 2006
- Screening Information Request (SIR) – November 2006
- Request for Offer (RFO) – March 2007
- Contract Award – July 2007
- Gulf of Mexico Comm. / Weather Initial Operating Capability (IOC) – September 2009
- Louisville IOC – October 2009
- Gulf of Mexico Surveillance IOC – December 2009
- Philadelphia IOC – February 2010
- Juneau IOC – April 2010
- In-Service Decision (ISD) – September 2010

- **Avionics Equipage**

- Rulemaking Project Team Established – May 2006
- Rulemaking Project Record (RPR) Phase 1 and Phase 2 – August 2006
- Economic Assessment of Notice of Proposed Rulemaking (NPRM) – October 2006 - December 2006
- Internal FAA Coordination – December 2006 - January 2007
- Submittal of NPRM to OST / OMB – February 2007
- Issuance of NPRM – September 2007
- Final Rule Preliminary Concurrence – April 2008
- Final Rule Economic Assessment – June 2008
- Final Rule AGC-1 Approval – December 2008
- Final Rule OST Approval – February 2009
- Final Rule Published – November 2009



Program Status: Risks (as of 8/18/06)

8 Total Risks: 3 High, 5 Medium

Next Risk Board: August 31

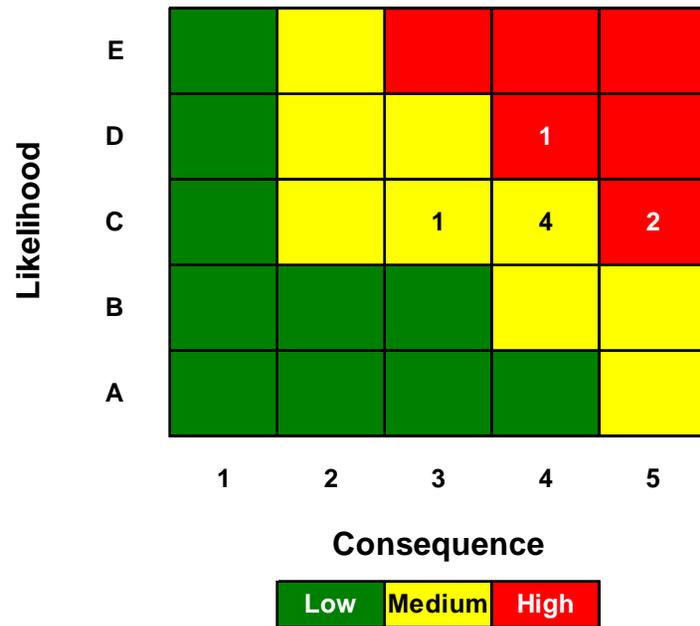
High Risks:

- Risk #1:** If NAS users demonstrate active opposition to avionics related airspace mandates, there may be delays in required rulemaking activities and/or the program may experience a reduction in benefits. (C5)

- Risk #19:** The satellite position system signal could be a single point of failure. If the satellite source is used as the sole means for providing ADS-B, then there could be a NAS performance failure (i.e., a drop in level of service required for a specific domain, such as en route) if the satellite system were compromised, for example due to geographical and/or atmospheric conditions. (C5)

- Risk #23:** If AOV, ATO, AFS, and AIR are unable to reach agreement on aircraft separation with ADS-B surveillance, then the performance benefits of ADS-B may not be realized. (D4)

Risk Summary



Source: ADS-B Risk Database

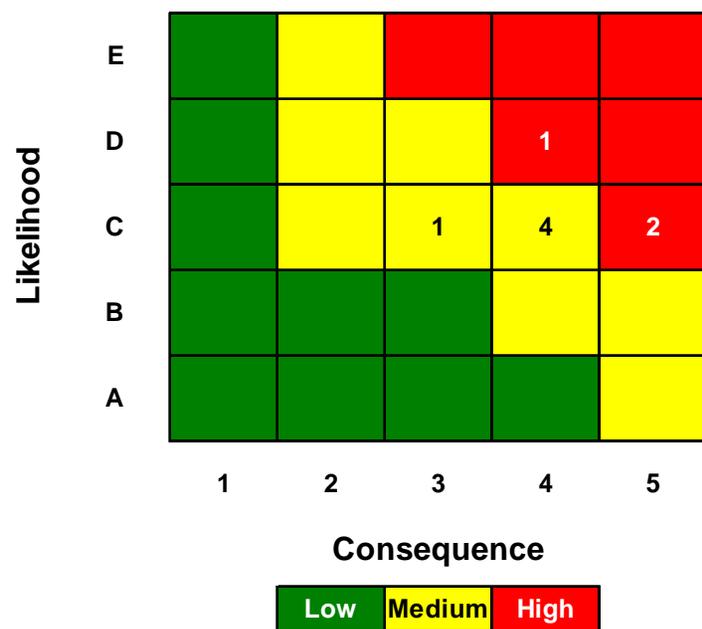


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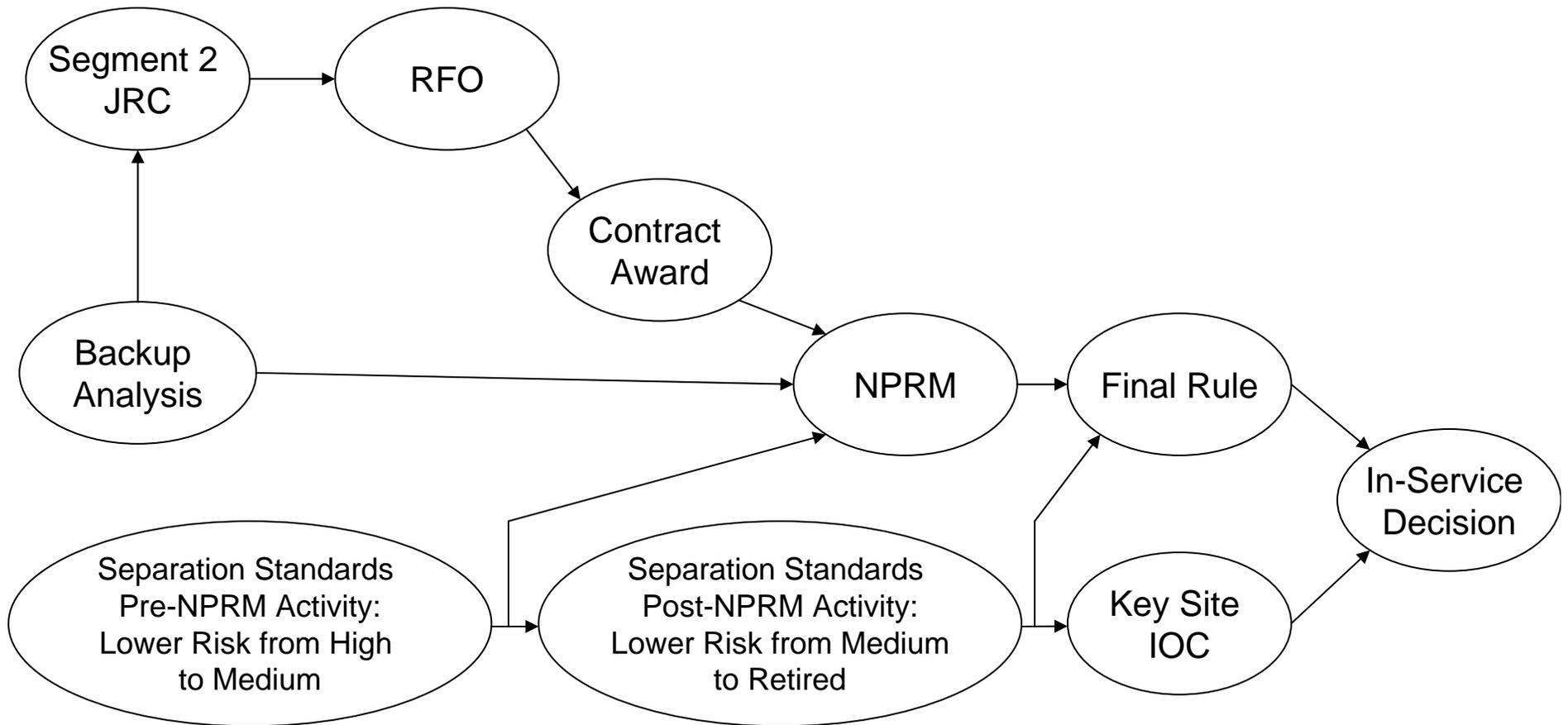
Medium Risks

- **Risk #2:** If avionics suppliers are unwilling to accept investment risks, and/or are unable to ramp up ADS-B equipment production, certification and installation, then the avionics “industrial base” will lag user demand for ADS-B capabilities and make it difficult to meet the requirements of airspace mandates, and there will be a delay in benefits accrued to the Program. (C4)
- **Risk #3:** SBS has no practical experience with RTCA DO-260A/TSO-C166A nor other similar standards, and limited experience with DO-282A/TSO-C154A equipment. If avionics meeting the applicable standards are unable to support SBS segment 1 applications, then the program goals will not be met and benefits of these ADS-B applications cannot be realized. (C4)
- **Risk #4:** Standards for air-to-air applications approved in Segment 1 are not complete. If there is a delay in standards completion which delays the equipage guidance, then accrual of benefits will be delayed. (C3)
- **Risk #7:** There is a limitation on spectrum occupancy. If the spectrum requirements for implementing 1090ES exceed spectrum limitations, then there may be interference to the TCAS or SSR systems. (C4)
- **Risk #21:** The Euro counterparts of RTCA are doing their own independent safety assessments. If the results of these Euro safety assessments differ from the conclusions used by the FAA, then there may be different standards for avionics which could affect how the system is used and the associated benefits. (C4)

Source: ADS-B
Risk Database



Interrelationship of Key Milestones



Segment 1 Schedule

Milestone	Projected Completion Date
Segment 1 JRC	June 2006
Screening Information Request (SIR) Issued	November 2006
Segment 2 JRC	February 2007
Request for Offer Released	March 2007
Contract Award	July 2007
NPRM Issued	September 2007
Preliminary Design Review (PDR)	October 2007
Critical Design Review (CDR)	January 2008
Key Site Initial Operating Capability (IOC) of Broadcast Services	July 2008
In-Service Decision (ISD) of Broadcast Services	November 2008
Gulf of Mexico Comm. and Weather IOC	September 2009
Louisville IOC of Surveillance and Broadcast Services	October 2009
Final Rule Published	November 2009
Gulf of Mexico IOC of Surveillance and Broadcast Services	December 2009
Philadelphia IOC of Surveillance and Broadcast Services	February 2010
Juneau IOC of Surveillance and Broadcast Services	April 2010
Surveillance and Broadcast Services ISD for ADS-B	September 2010



Proposed Schedule - Segments 2 - 4

Milestone	Projected Dates
Segment 2 (2009 – 2014)	
ADS-B “Out” Final Rule Published	FY 2010
Continue Initial Aircraft to Aircraft Application Deployment	FY 2010 – FY 2014
Additional Aircraft to Aircraft Application Deployment	FY 2010 – FY 2014
Additional Aircraft to Aircraft Requirements Definition	FY 2010 – FY 2014
Continue / Complete TIS-B / FIS-B Deployment	FY 2009 – FY 2012
Continue / Complete ADS-B NAS Wide Infrastructure Deployment	FY 2010 – FY 2013
Complete 40% Avionics	FY 2014
Segment 3 (2015 – 2020)	
Additional Aircraft to Aircraft Requirements Definition	FY 2015 – FY 2020
Additional Aircraft to Aircraft Application Deployment	FY 2015 – FY 2020
Targeted Removal of Legacy Surveillance	FY 2018 – FY 2020
Complete 100% Avionics	FY 2020
Complete Initial Aircraft to Aircraft Application Deployment	FY 2020
Segment 4 (2021 – 2025)	
Complete Removal of Targeted Legacy Surveillance	FY 2023
Complete Targeted Removal of TIS-B	FY 2025
Complete Additional Aircraft to Aircraft Application Deployment	FY 2025



Backup Analysis Overview

Robert Pomrink

**Surveillance and Broadcast Services
Program Office, Systems Engineering**



Backup Analysis

- **Objective: Determine optimal backup strategy to GPS based ADS-B**
- **Backup Analysis Team Composition**
 - Team Facilitation and Administration: Coordinate and execute the Backup Analysis
 - Subject Matter Experts: Provide descriptions of potential alternatives to evaluate
 - Evaluators: NAS users and stakeholders
- **Steering Committee**
 - Consists of key stakeholders
 - Defines assumptions and constraints for Backup Analysis Team



Backup Analysis: Team Composition

Category	Area	Name	Organization
Support Analysts	Team Lead	Jim Baird	FAA/ATO
	Team Facilitator	George Ligler	PMEI
	Sec./Risk Analysis	Jonathan Hammer	MITRE/CAASD
	Benefits	Gary Paull	MCR
	Costs	Shahan Stepanian	MCR
SMEs	ADS-B	Chris Moody	MITRE/CAASD
	Navigation	Sally Frodge Leo Eldredge	FAA/ATO
	eLoran	Jim Carroll	Volpe
	Radar, Multilat.	Ray McDonald Bob Pomrink	FAA/ATO
	Avionics (AT)	Bob Saffell	Rockwell/Collins
	Avionics (GA)	Tom Mosher	Garmin
Evaluators	Air Traffic	Gus Waters	FAA/ATO
	Certification/Surv Certification/Nav	Steve George Bruce DeCleene	FAA/AIR
	General Aviation	Bill Flathers	AOPA
	Air Transport	George Wilson	Delta
	DoD (Nav)	Milton Clary	USAF/Pentagon
	DoD (Surv)	Robert Manning	

Backup Analysis: Process

- **Identify assumptions and constraints for a backup solution**
- **Determine appropriate metrics for backup solutions**
- **Determine available technologies that support a backup for ADS-B in alignment with assumptions / constraints**
- **Select potential alternative strategies for backup based on technologies**
- **Develop technical descriptions for each alternative**
- **Evaluate strategies that comply with metrics**
- **Identify cost and benefits for each alternative**
- **Conduct sensitivity analysis on initial set of alternatives**
- **Refine metrics and alternatives based on sensitivity analysis**
- **Conduct Final Alternative Assessment**
- **Provide recommendation based on analysis results and B/C ratio**



Backup Analysis: Metrics Summary

- **Operational capability** - ability to support ATC and defined advisory air-air applications, including transition workload, by airspace and user class (access)
- **Operational duration** - length of time alternative meets operational requirements after loss of GPS
- **Technical maturity** - probability of alternative being operational and deployed by 2018
- **Independence** – likelihood that alternative does not have common vulnerability with primary means
- **Coverage** - extent of coverage provided by alternative, by airspace class
- **Flexibility/agility** - degree to which an alternative can accommodate changes in user requirements (short and long-term), dependent plans, and operating environments
- **Global interoperability** – degree to which an alternative will be compatible with international standards and adopted by other states



Backup Analysis: Assumptions and Constraints

- **General**

- GPS outages (or degradations) due to interference, RAIM holes, or single-aircraft avionics failures must be considered
- Worst case assumed outage: 40-60nm radius, 3-4 days

- **Navigation**

- GPS L5 will be available
- 21 “healthy” GPS satellites with 0.98 probability
- Dual frequency Wide Area Augmentation System (WAAS) will be available
- 27 operational Galileo satellites + 3 spares in orbit by 2015, with 3 frequencies for aviation (E5a, E5b, & L1)
- eLoran ground infrastructure will be in place and operational
- DME/DME navigation capability (RNP of 1; 1.2nm input for NIC of 2nm, 0.6nm input for NAC of 1nm, SIL of 2) will be supported at least in en route airspace (24K+ Rockies, 18K+ elsewhere) without reverting to inertial



Backup Analysis: Assumptions and Constraints

- **Surveillance**

- Performance requirements must be consistent with ADS-B Final Program Requirements (FPR)
- Transponder carriage rules will not change in the projected timeframe
 - Due to TCAS interoperability requirements, at least in Mode C Veil airspace
- Primary radar (PSR) can be used to validate ADS-B reports and mitigate single-aircraft outages
- Use of primary radar will be acceptable as a backup in all required airspace
 - For surveillance and navigation (radar vectoring)
 - Capacity will be limited in some areas
- Primary radar coverage will not be reduced
- The correlation of flight plan data with backup surveillance data must be addressed for each alternative



Potential Backup Technologies and Methods

- **Surveillance Systems**
 - Secondary radar
 - Primary radar
 - Passive multilateration (listen only)
 - Active multilateration (interrogate/reply)
- **Navigation Sources**
 - DME/DME/IRU
 - DME/DME
 - eLoran
 - IRU only
 - Satellite Navigation Only (SBAS, L5, Galileo)
 - VOR/DME, LOC/DME, MLS/RNAV
- **Procedural Separation**



Backup Analysis: Summary of Initial Filtering

- **Technologies/methods fall into one of the following categories:**
 - **Meets all minimum criteria for at least one airspace type**
 - Secondary Radar, Primary Radar, Passive and Active Multilateration
 - **Meets most criteria, with uncertainty regarding certain metrics**
 - DME/DME/IRU, DME/DME, eLoran, Satellite Navigation Only
 - **Does not or will not meet minimum criteria**
 - IRU Only, VOR/DME, LOC/DME, MLS/RNAV, Procedural Separation
- **Alternatives to be assessed in detail will be based on technologies that fall into the first category**
- **Second category alternative technologies may be included in the final evaluation after an alternatives sensitivity analyses**
- **Technologies falling into the third category will not be assessed further**



Backup Analysis: Resulting Candidate Strategies (for Initial Evaluation)

1. **Strategy 1:** Retain (reduced) secondary radar network to cover required airspace, and use primary radar to mitigate single-aircraft avionics failures
2. **Strategy 2:** Use passive multilateration to cover required airspace, and use primary radar to mitigate single-aircraft avionics failures
3. **Strategy 3:** Use passive multilateration to cover high density terminals and en route, use active multilateration to cover medium density terminals and en route, and use primary radar to mitigate single-aircraft avionics failures

Backup Analysis: Next Steps

- **Interim Report of Initial Alternatives Downselect: August 2006**
- **Cost/Benefits of Alternatives Complete: September 2006**
- **Initial Evaluation of Alternatives Complete: September 2006**
- **Final Evaluation of Alternatives Complete: October 2006**
- **Conduct Safety and Security Assessments: October 2006**
- **Provide Report on Recommended Backup Strategy: November 2006**



Acquisition Status Review

Steve Manley

Surveillance and Broadcast Services

Contracting Officer



“What do I need, when do I need it, and how do I know it is good when I get it?”

– *Seven Steps to Performance-Based Services Acquisition*



Performance Based Specifications

- **Avoids over and under specifying the government's contractual requirements**
 - Government may be obligated to accept whatever service it receives, or to make changes in the work requirements (with increased contractor compensation) in order to acquire the services it actually needs
- **Limits the involvement of government employees and provides contractors maximum flexibility in meeting the government's actual needs**
- **As long as the government's need for an item is defined well enough to be capable of fulfillment, how to fulfill that need is entrusted to the contractor**
 - *Source: Robert J. Wehrle-Einhorn, National Contract Management Journal*

Acquisition Timeline

- **June 19 - 23, 2006: Industry Week**
 - Presented overview of program
 - Stimulus for industry to arrange partnerships / teaming arrangements in preparation for November Screening Information Request (SIR)
- **June 19, 2006 – Present**
 - Conducted one-on-one discussions with industry
 - Exchange of information
 - Validation of industry assumptions
- **August 28, 2006: Industry Day**
 - ADS-B avionics manufacturers / user presentations
 - MITRE Broadcast Services Capstone Communications and Control System (CCCS) software briefings
 - Synopsis of future acquisition efforts



Acquisition Timeline

- **September 2006: ADS-B Specification Request for Information (RFI)**
 - Issue RFI for draft specification and draft Statement of Objectives (SOO) comments
 - Comments due October 2006
 - Allow offerors to suggest proposed discriminators
- **October 2006: Industry Day #3 (Pre-SIR response conference)**
 - Discuss specification comments
 - Discuss SOO comments
 - Discuss proposed SIR evaluation criteria

Acquisition Timeline

- **November 2006: Issue Screening Information Request (SIR)**
 - Purpose is to determine which offeror(s) are most likely to receive an award
 - Partnerships / teaming arrangements should be identified
 - FAA Acquisition Management System (AMS) goal is to preclude offerors who are unlikely to receive an award having to expend significant resources preparing detailed proposals
 - Traditional acquisition requests full blown technical and cost proposals
 - SIR will contain high level key discriminators
 - Technical criteria
 - Business plan criteria
 - Proposed methods to encourage avionics implementation (increase value to the customer)
 - Contractor will submit metrics to show avionics implementation
 - FAA considering incentive awards for accelerated implementation
 - Suggested performance incentives and penalties
 - Representative service volume to be priced out



Acquisition Timeline

- **January 2007: Receive SIR responses**
- **February 2007: Downselect Decision**
 - Notify offerors who are selected for further discussions
- **February 2007: Begin Discussions with Selected Offerors**
 - Conduct discussions up to contract award
 - Purpose is to ensure that there are mutual understandings about all aspect of the acquisition
 - Facilitates streamlining of award by reducing post offer discussions

Acquisition Timeline

- **February – March 2007: Discussions with Selected Offerors (Continued)**
 - Issue Official Statement of Objectives (SOO) to offerors which includes:
 - Purpose: Provide the infrastructure to collect ADS-B data and disseminate to designed service delivery points and aircraft. Provide TIS-B and FIS-B data to aircraft.
 - Period of Performance: 15 years, including options, planned
 - Identify possible constraints which may include:
 - Specification criteria
 - Security requirements
 - Spectrum limitations
 - Schedule constraints
 - Statutory constraints
 - Interface requirements to automation
 - CLIN structure
 - Funding
 - Small Business Goals
 - Provide offerors with proposed contract provisions and general provisions



Acquisition Timeline

- **February – March 2007: Discussions with Selected Offerors (Continued)**
 - Tailor / Discuss Proposed Offeror Response
 - Conduct pre-RFO submittal meetings
 - Offeror will prepare “Statement of Work (SOW).” Format may be different than FAA format.
 - Offeror will describe how objectives will be met
 - Possible tailoring to accommodate COTS product capability
 - Possible tailoring regarding quantitative portions of coverage volume, i.e. more cost-effective to provide ceiling of 3,100 feet vs. 3,000 feet
 - Discussions based on offeror proposals. FAA will not suggest approaches.



Acquisition Timeline

- **March 2007: Issue Request for Offer (RFO) (SIR RFO)**
 - Offeror formally commits to provide the service required under stated terms and conditions
 - Beneficial, though not required, to propose SOW as developed during discussions
 - RFO will contain specific technical and business-related discriminators and cost requirements
 - Response will consist of written and oral submissions
 - Evaluation will be based on best value to the government
 - Decision has been made to award ADS-B, TIS-B, and FIS-B as one contract based on industry feedback

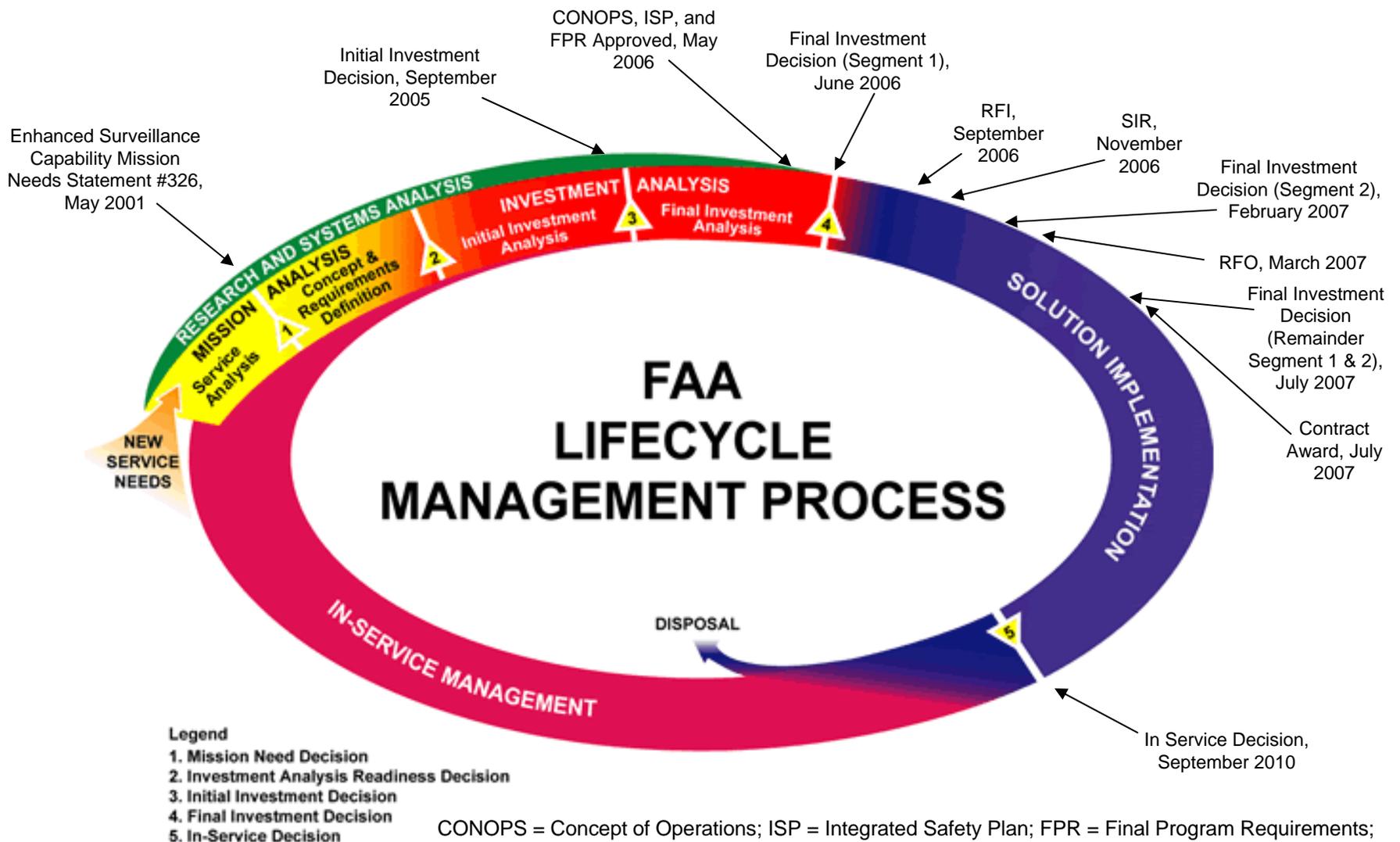


Acquisition Timeline

- **April 2007 (45 Days from RFO Issuance): Receive RFO Responses**
- **July 2007: Complete RFO Response Evaluation Documentation**
- **July 2007: Award Contract**
- **FAA may independently conduct a “contest” where vendors compete to reduce the cost of avionics**



Acquisition: FAA Life Cycle Management Process



Sample Statement of Objectives: Purpose

- **This contract establishes a long-term, performance-based business arrangement with the contractor(s) for the purpose of implementing the ADS-B system into the NAS**
- **The use of ADS-B technology will improve surveillance in order to increase safety, capacity, and efficiency, in a cost effective manner, both in the air and on airport surfaces**
- **Applications associated with the ADS-B program will provide traffic, weather and other broadcast information to equipped aircraft to enhance safety**
- **The ADS-B service will provide a foundation for the Next Generation Air Transportation System (NGATS) to enhance safety, support projected growth, and reduce variance in the system**



Sample Statement of Objectives: Acquisition Objectives

- **The service provider delivers high quality technology and services**
- **It must provide mitigation of risks in the areas of program management, security, safety management**
- **The technology should be scaleable to accommodate future capacity increases (approximately two to three times greater than today)**
- **The service must ensure continuous availability through effective monitoring and maintenance**



Sample Statement of Objectives: Scope

- **ADS-B Services**
 - Link-Specific Processing (LSP) Function:
 - Provides the ADS-B System transmit/receive functionality on the ground
 - Receives ADS-B Messages from equipped aircraft and surface vehicles, formats the associated ADS-B reports, and distributes them to ATC Automation, the Broadcast Services (BCS) Function, and other authorized users
 - Broadcast Services (BCS) Function:
 - Processes surveillance reports, including tracking, filtering, and applying quality indicators, from external sources and ADS-B messages from the LSP Function
 - Maintenance Function:
 - Provides for the control and monitoring of the ADS-B ground infrastructure operational functions, Link-Specific Processing and Broadcast Services
 - Control includes the setting of configuration items, the download of new software, the request for read back of monitored parameter values, and any other actions necessary to control the operation and support the maintenance of the system



Sample Statement of Objectives: Scope

- **ADS-B Services (continued)**
 - The LSP, BCS, and Maintenance functions are to be provided by the vendor, and will interface with externally provided aircraft / vehicle functions and the ATC automation function
 - Optionally, the vendor may propose approaches to accelerate the implementation of the aircraft / vehicle and ATC automation functions, but these implementation of these functions will not be within scope of the acquisition



Sample Statement of Objectives: Scope

- **Implementation Strategy**

- The ADS-B System deployment approach is to implement the system via “pockets of opportunity” at select locations and expand the system NAS-wide as user and service provider interest and experience progress
- ADS-B may also necessitate deployment of additional voice communications and weather infrastructure in selected locations to support ATC Services



Sample Statement of Objectives: Scope

- **Implementation Strategy Continued:**
 - Segment 1:
 - ADS-B, TIS-B, and FIS-B services are provided in limited areas that can obtain benefits from early avionics equipage
 - Segment 2:
 - The ground ADS-B service infrastructure is deployed on a NAS-wide scale and avionics equipage continues
 - Segment 3:
 - All aircraft are equipped and the seven initial applications are available NAS-wide
 - Requirements definition has been completed for some of the future for aircraft / vehicle based applications that provide benefits to users
 - Some of these future applications are partially deployed within the NAS
 - Requirements definition continues on other aircraft / vehicle based applications that are considered beneficial to stakeholders
 - Existing legacy surveillance infrastructure removal commences to eliminate unnecessary redundant ADS-B / radar coverage
 - Segment 4:
 - Envisions the implementation of more complex aircraft/vehicle based applications, the removal of TIS-B services as full avionics equipage has been realized, and the decommissioning of unneeded legacy surveillance assets displaced by ADS-B coverage to eliminate unnecessary redundant ADS-B / radar coverage



Sample Statement of Objectives: Scope

- **The ADS-B contract will be awarded to cover Segments 1 and 2**
- **Segment 1 will be awarded at contract award**
- **Segment 2 will be exercised as an option upon substantial completion of Segment 1**



Sample Business Objectives

- **The Surveillance and Broadcast Services Program will place significant focus on the service provider's business model. In addition to providing direct contract services, this program will emphasize the following:**
 - Accelerating benefits and/or reducing costs leading to earlier than projected payback. Activities that fall within this category may include:
 - Accelerating avionics implementation
 - Increasing usage of services for those already equipped
 - Accelerating availability of baselined applications
 - Reducing government O&M costs for surveillance, communications, and other related services (e.g., service provider provides weather)
 - Identifying additional revenue streams that benefit the service provider and / or reduce government and user costs, such as:
 - Innovative ways of reselling data
 - Apply surveillance and broadcast services' technologies to emerging and innovative applications
 - Ensuring the business model is responsive, adaptable, scalable, and customer oriented to accommodate anticipated increased use of the NAS
- **In pursuit of achieving earlier payback and benefits it is expected that the service provider will have an effective communication and marketing strategy**



AVS Safety Overview

John McGraw

Division Manager

Flight Technologies and Procedures, AFS-400

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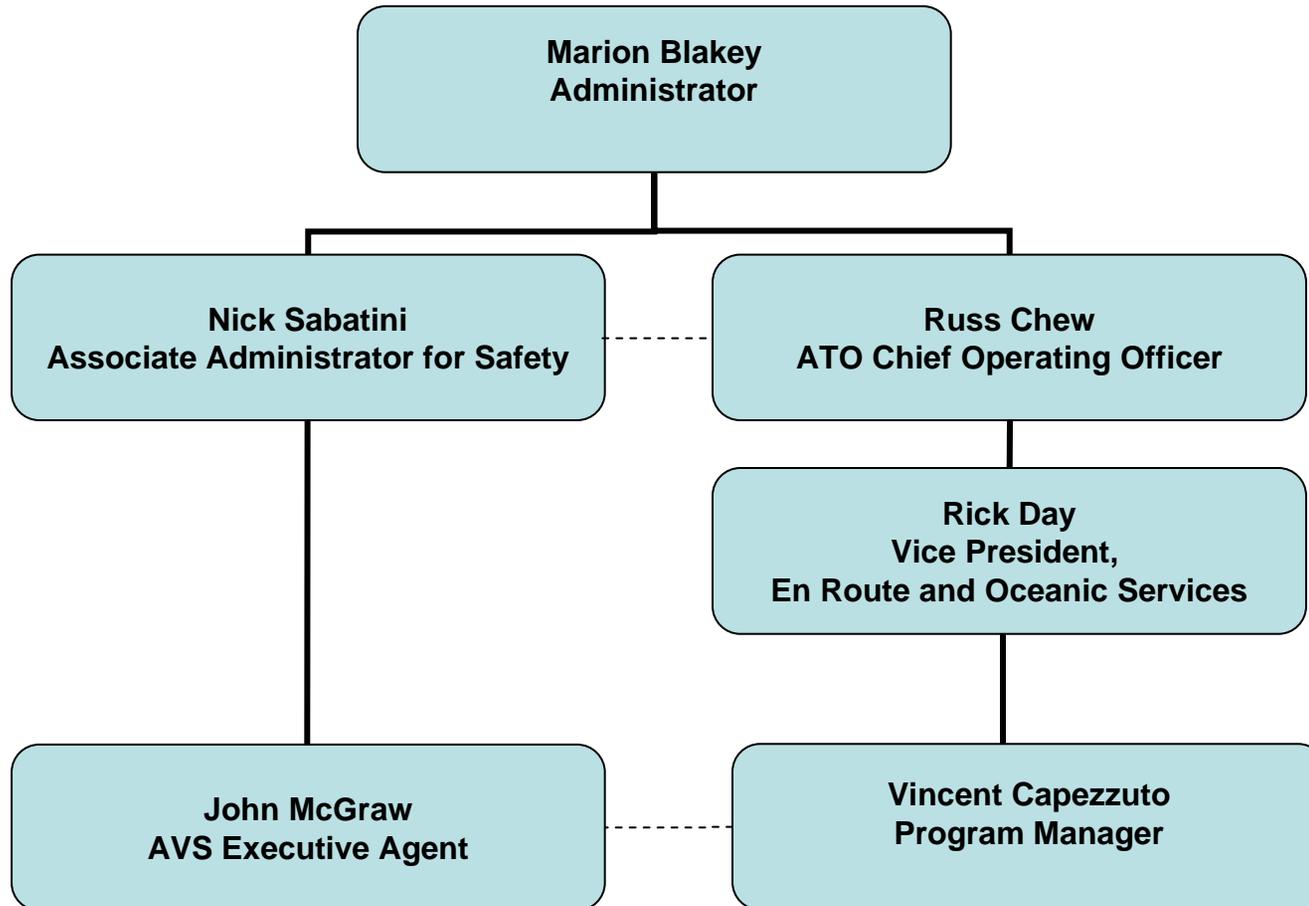
Pat Zelechowski

AVS ADS-B Project Lead,

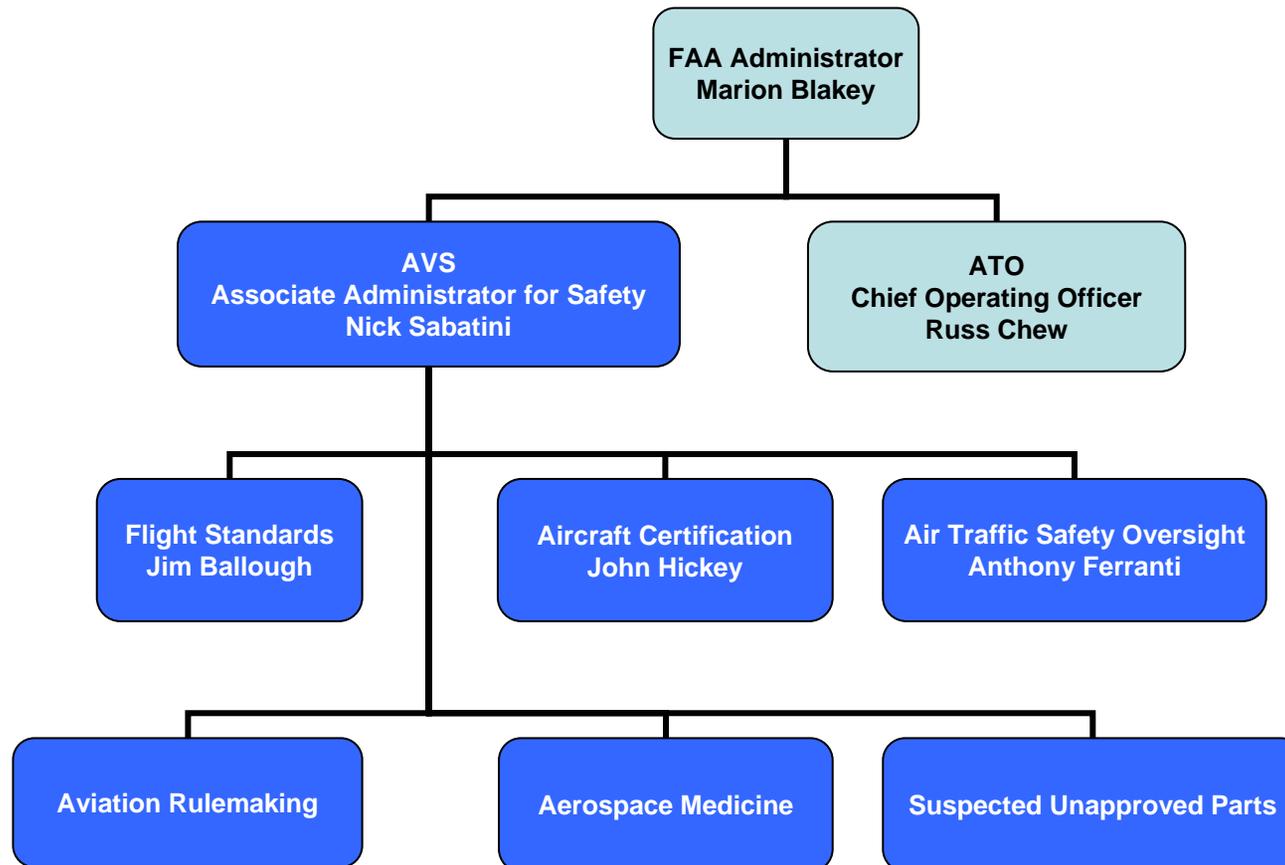
Flight Procedures Branch, AFS-410



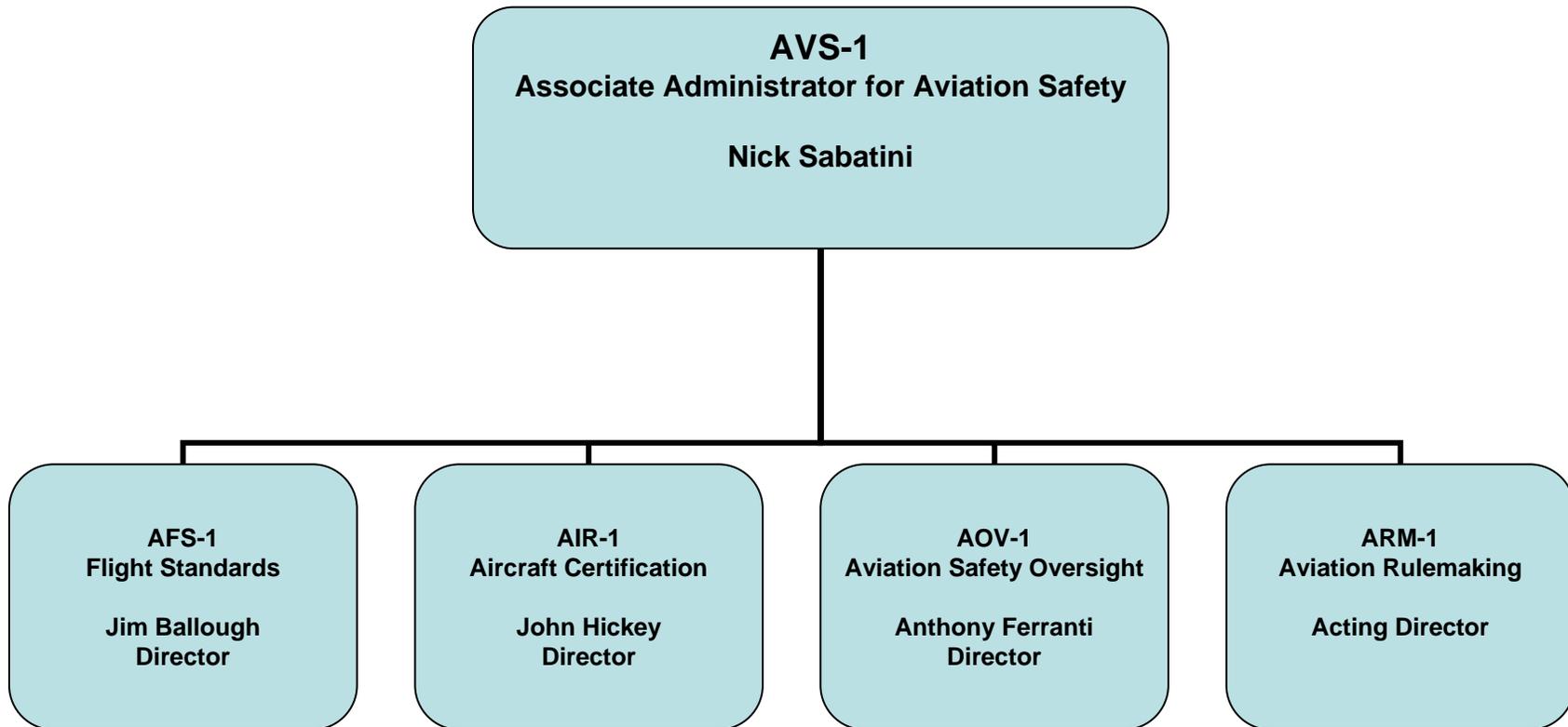
FAA SBS Leadership



AVS Organization



AVS Organization



Equipage Curve Assumptions

Gary Paull

Surveillance and Broadcast Services



Equipage Assumptions

- **Aircraft equipage assumptions dependent on classifications:**
 - Air Transport
 - Large Air Transport
 - Classic: Analog aircraft without Flight Management Systems (FMS)
 - Neo-Classic: Semi-integrated systems with FMS
 - Modern: Digital aircraft with integrated displays
 - Regional Jets and Turboprops
 - General Aviation
 - Turbine Fixed Wing (Jets)
 - Turboprop Fixed Wing
 - All Other

Note: DoD and Vehicle equipage estimated separately

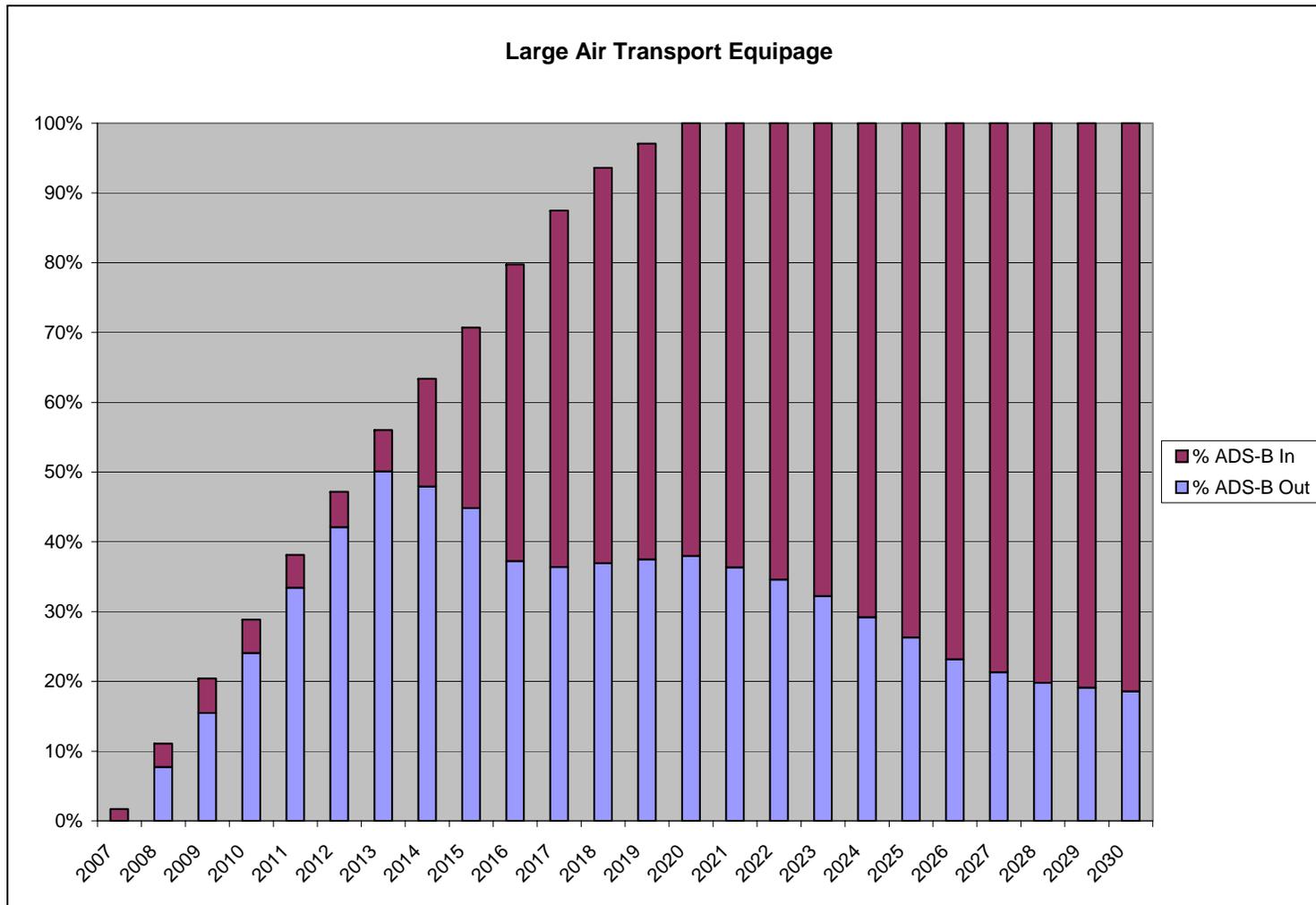


Equipage Assumptions

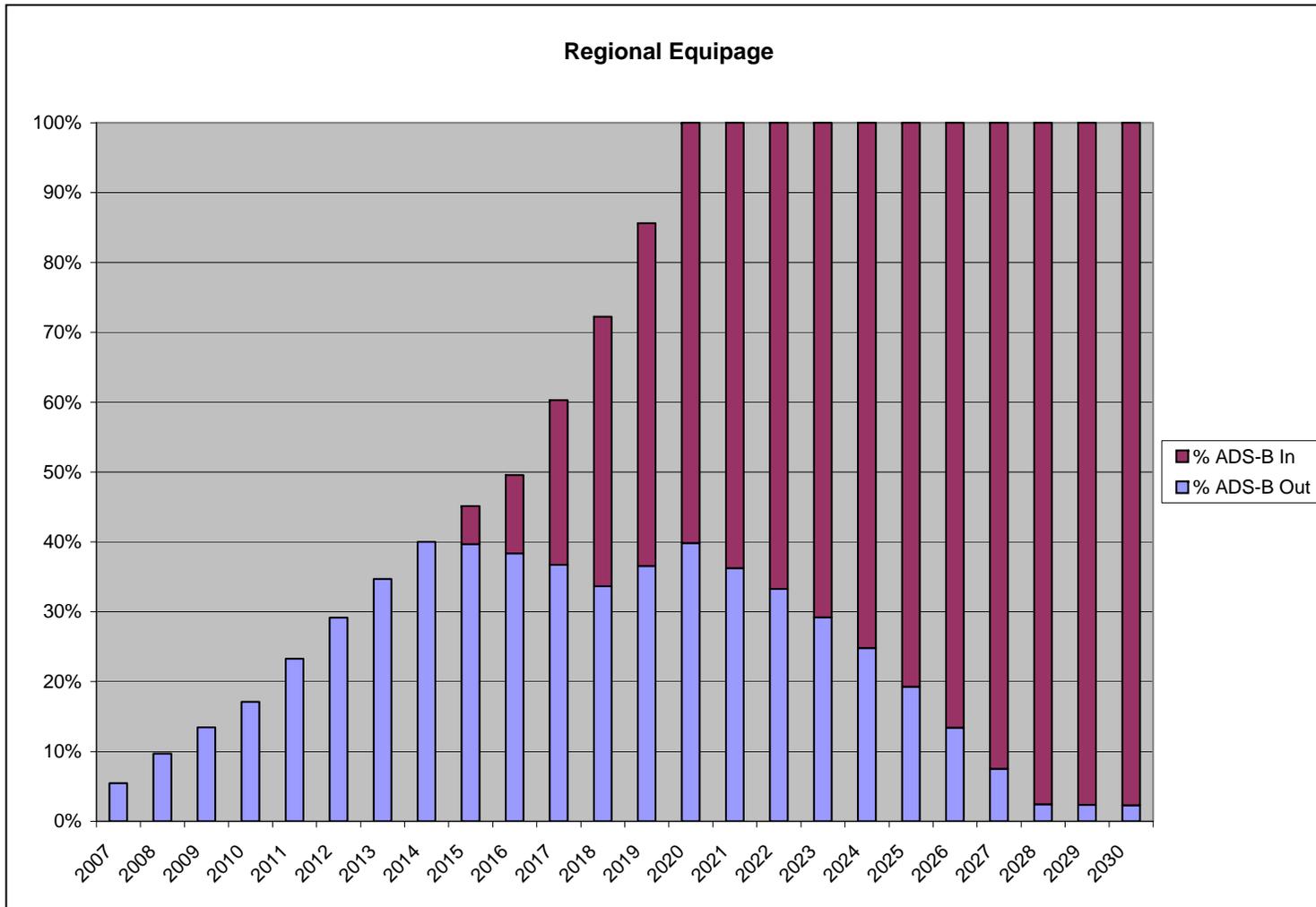
- **Air Transport**
 - Retrofit to ADS-B Out capability from 2011 to 2020 in compliance with rulemaking – Limited initial retrofits begin in 2009 for Gulf of Mexico operators
 - Some voluntary retrofit to ADS-B In capability from 2014 to 2020 with exception of early adopters (UPS)
 - All new aircraft starting in 2008 are equipped with ADS-B Out (DO-260A)
 - Aircraft that are DO-260 compliant by 2007 will upgrade to DO-260A from 2008 to 2013
 - Some new aircraft manufactured after 2008 are equipped with ADS-B In and is standard on all new large air transport aircraft starting in 2016 and on all regional aircraft starting in 2018



Equipage Assumptions



Equipage Assumptions



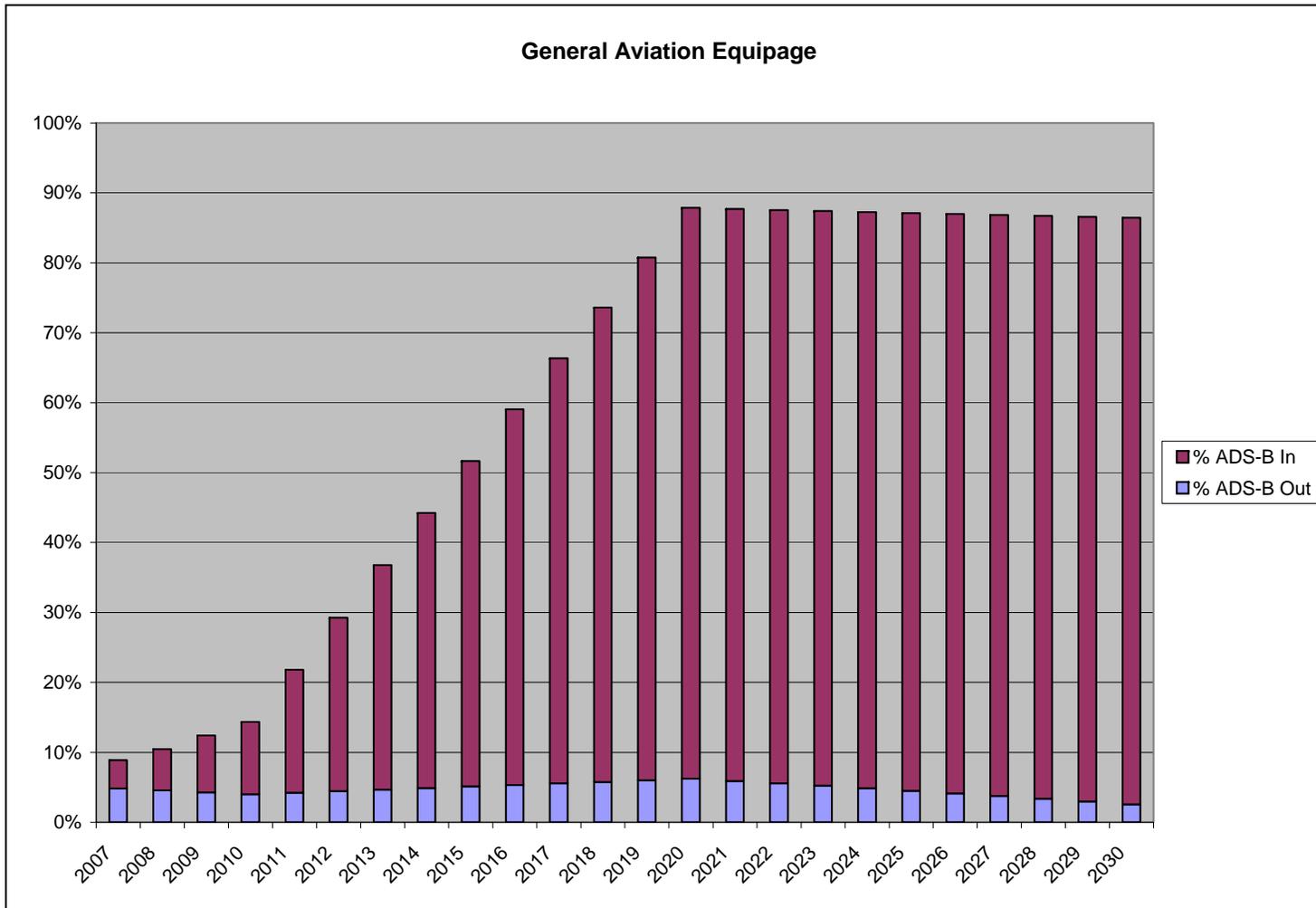
Equipage Assumptions

- **General Aviation**

- Not expected to get full equipage based on percentage currently operating with transponders
- Approximately 10% equip with ADS-B In capability through 2010 in response to Segment 1 Broadcast Services Expansion and anticipation of NAS-Wide deployment
- Turbojets and Turboprops retrofit to either ADS-B Out or ADS-B In capability through 2020; some continue to retrofit to ADS-B Out beyond 2020
- All other GA aircraft retrofit directly to ADS-B In capability through 2020



Equipage Assumptions



Avionics Certification

Paul Lipski

AIR ADS-B Project Lead

Avionics Systems Branch, AIR-130



Basis of Requirements

- **Required Avionics Performance for Operations in Class A, B, C Airspace, and Airports listed in Appendix D of CFR Title 14, Part 91.215**
- **Use the existing Transponder Rule as a model**



Process

- **End-to-End performance requirements, including avionics and ground infrastructure**
- **Evaluation of the avionics portion of performance requirements**
- **Evaluation of existing Technical Standard Orders (TSO) and advisory material**
- **Develop new standards and guidance**
- **Training**



Current Activities

- **Support the SBS Program Office**
- **TSO C154 based on RTCA DO-282A for UAT – Complete**
- **TSO-C166A based on RTCA DO-260A, Change 1 for 1090ES – scheduled release in September 2006**
- **Participate in RTCA MOPS development**
- **Evaluation of existing TSO's and guidance material for applicability to performance requirements**
- **Revise Advisory Circular (AC) 120-86 “Aircraft Surveillance Systems and Applications”**
- **Participate in existing ADS-B certifications projects**



Next Steps

- **Training for Aircraft Certification Office (ACO)**
- **Participation in early certification projects with ACO**
- **Monitoring avionics performance**
- **Participation in development of industry standards**



Separation Standards

Pat Zelechowski

AVS ADS-B Project Lead

Flight Procedures Branch, AFS-410



Problem Statement

- **Program Office identified a high risk related to operational approval of Terminal and En route separation standards for ADS-B surveillance services provided by ATC**
- **There is no approved separation standard to support ATC separation of ADS-B equipped aircraft other than that permitted for ADS-B to ADS-B in the low density airspace of Alaska**

Pre-NPRM Risk Mitigation Plans

- **Demonstrate viability of ADS-B to meet Separation Standards for National Deployment**
 - Develop a model/process that can be used across all ATC Automation Systems
 - Determine Automation System Requirements through a comprehensive Alternatives Analysis: 12/06
 - Identify Minimum Performance Requirements for Avionics to Support Separation Services: 12/06
 - Model End-to-End ADS-B system: 4/07
 - Prototype Automation System Modifications for ADS-B Processing: 5/07
 - Validate Model Based on Prototype Efforts: 5/07
 - Conduct Simulations of Separation Errors for ADS-B separation with both ADS-B and radar targets: 8/07
 - Compare ADS-B Separation Errors to Existing Radar Separation Errors: 8/07



Separation Standards Approval Process

- **Successful Completion of these steps will...**
 - Reduce Separation Standards Risk from High to Medium
 - Provides Justification for Minimum Performance Requirements Planned for NPRM Release in September 2007



Separation Standards Approval Process

- **Deploy ADS-B Infrastructure in Selected Segment 1 Locations**
- **Update ADS-B System Models to Reflect As-Built Systems**
- **Conduct Simulations on Updated ADS-B Model to Prove Separation Errors support terminal and en route standards**
- **Collect and Analyze Separation Errors for Fielded Systems**
- **Conduct Validation Flight Tests**
- **Document Results of Separation Error Analysis**



Separation Standards Approval Process

- **Obtain Separation Standards Approval at Key Sites**
 - Terminal Separation Standards Approval at SDF: 6/09
 - En Route Separation Standards Approval GOMEX: 7/09
 - Terminal Separation Standards Approval at PHL: 9/09
 - En Route Separation Standards Approval at JNU: 9/09
- **Risk Retired for Separation Standards: 10/09**
- **Final Rulemaking Published: Anticipated 11/09**



ADS-B Separation Standards Work Group

- **The ADS-B Separation Standards Work Group is supported by FAA Mission Needs Statement (MNS #326), “Enhanced Surveillance Capability” (May 2001)**
- **The purpose of MNS #326 is to exploit ADS-B technological opportunities that increase the FAA’s surveillance capabilities in the terminal, en route, and oceanic airspace environments and the airport surface movement area**



ADS-B Separation Standards Work Group

- **The purpose of the ADS-B Separation Standards Work Group is to identify and validate aircraft separation standards for use with ADS-B**
- **Workgroup defines the methodologies and outlines the processes necessary to effectively determine suitable separation standards for ADS-B**



ADS-B Separation Standards Work Group

- **Workgroup identifies and conducts analyses, modeling, simulations, and tests to validate separation standards**
- **Workgroup generates technical notes, papers, and reports, with supporting conclusions and recommendations, to support decision making for requested separation standard approvals**
- **Products produced are expected to be of such quality to be considered credible research or documents and may be published for academic and technical review**



ADS-B Separation Standards Work Group

- **Workgroup consists of a Steering Committee and Core Team members**
- **Steering Committee directs and oversees the activities of the Core Team and provides the resources necessary to support the Work Group efforts**
- **Core Team will conduct the separation standards work, including modeling, simulation, test, analyses, and other activities to evaluate separation standards for ADS-B**
- **Core Team will provide its products to the Steering Committee for review and approval prior to release outside of the Work Group**



Program Schedule

- **En route (5NM Mixed)**

- Micro-EARTS Nov 2006
- HOST/ERAM July 2009
- ATOPS

- **Terminal (3NM Mixed)**

- STARS Sept 2009
- Common-ARTS June 2009



Next Steps

Vincent Capezzuto Surveillance and Broadcast Services Program Office



Next Steps

- **Request for Information (RFI): September 2006**
- **Backup Analysis Draft Report: October 2006**
- **Industry Day: Week of October 23, 2006 (Tentative)**
- **Screening Information Request (SIR): November 2006**

