

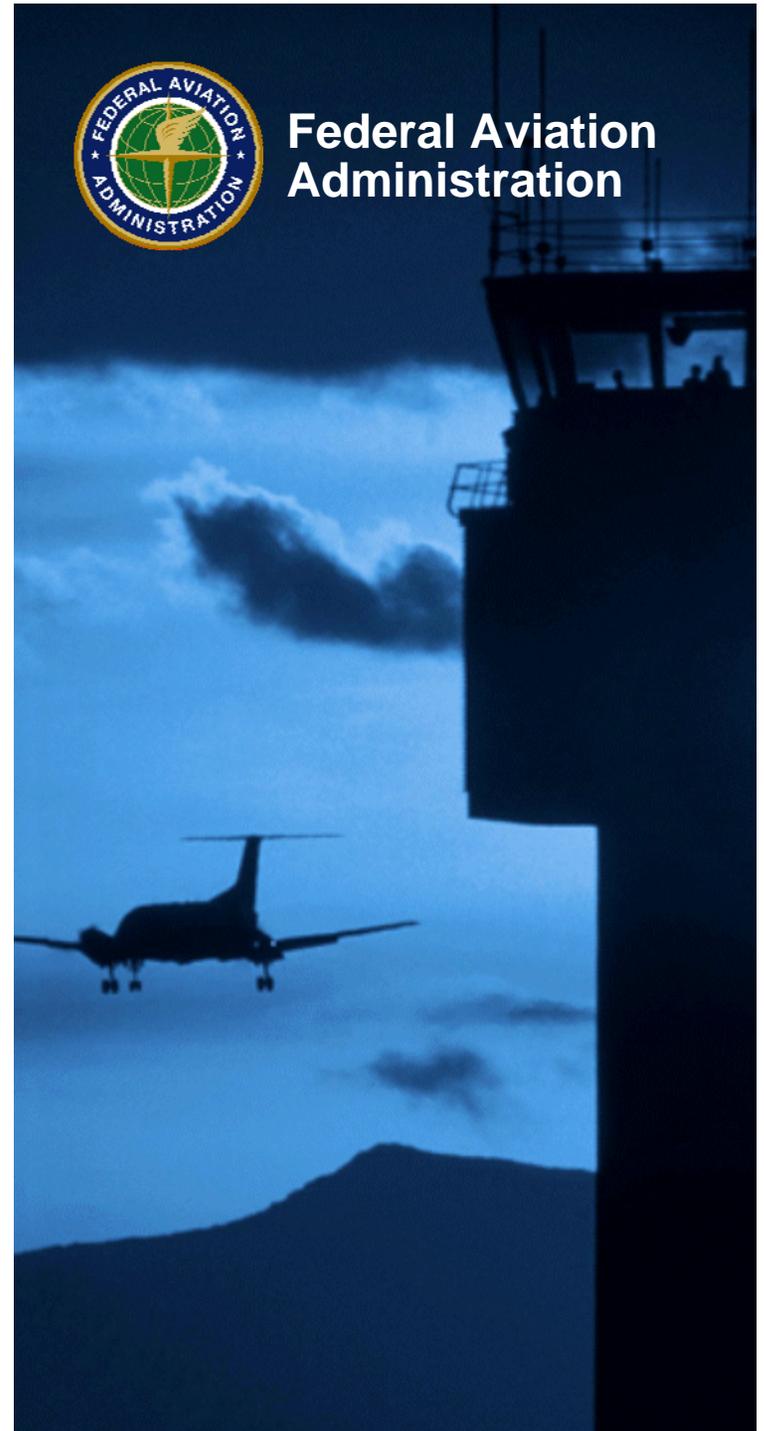
Automatic Dependent Surveillance – Broadcast (ADS-B)

Surveillance and Broadcast
Services Office

ATO-E



Federal Aviation
Administration

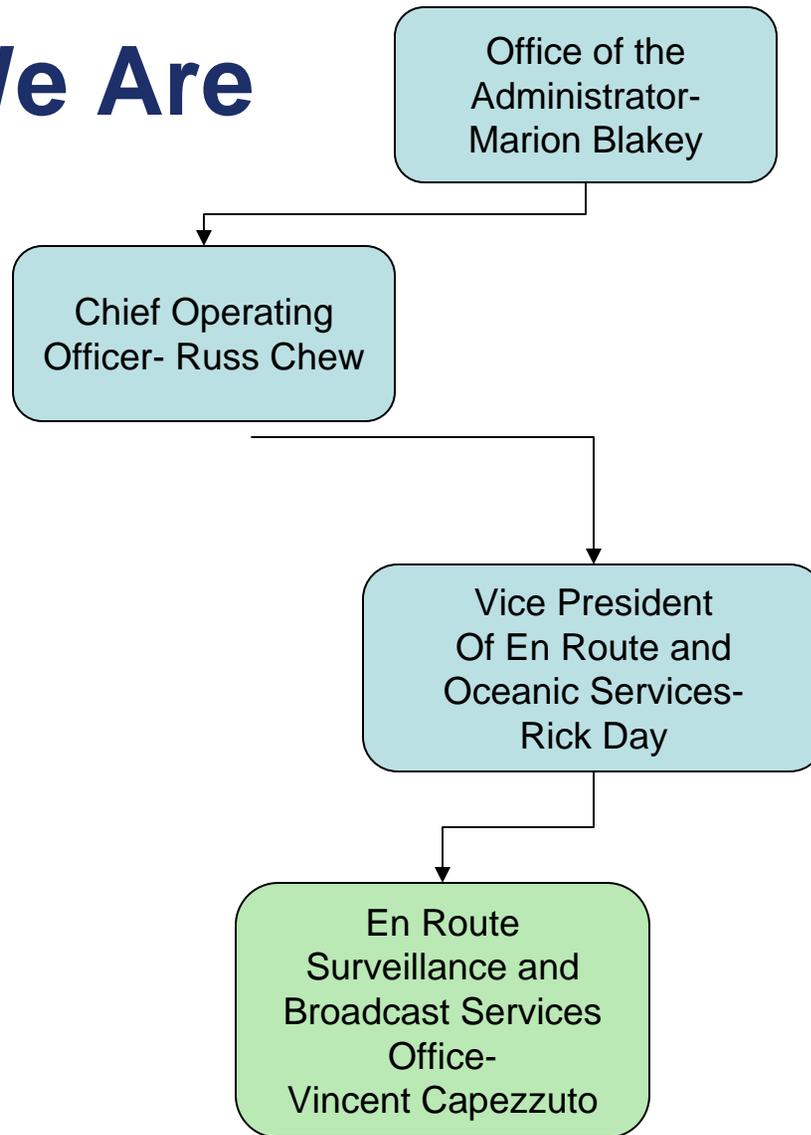


Who We Are

The ADS-B program is represented by the Surveillance and Broadcast Services Office, established by the Joint Resource Council September 9, 2005.

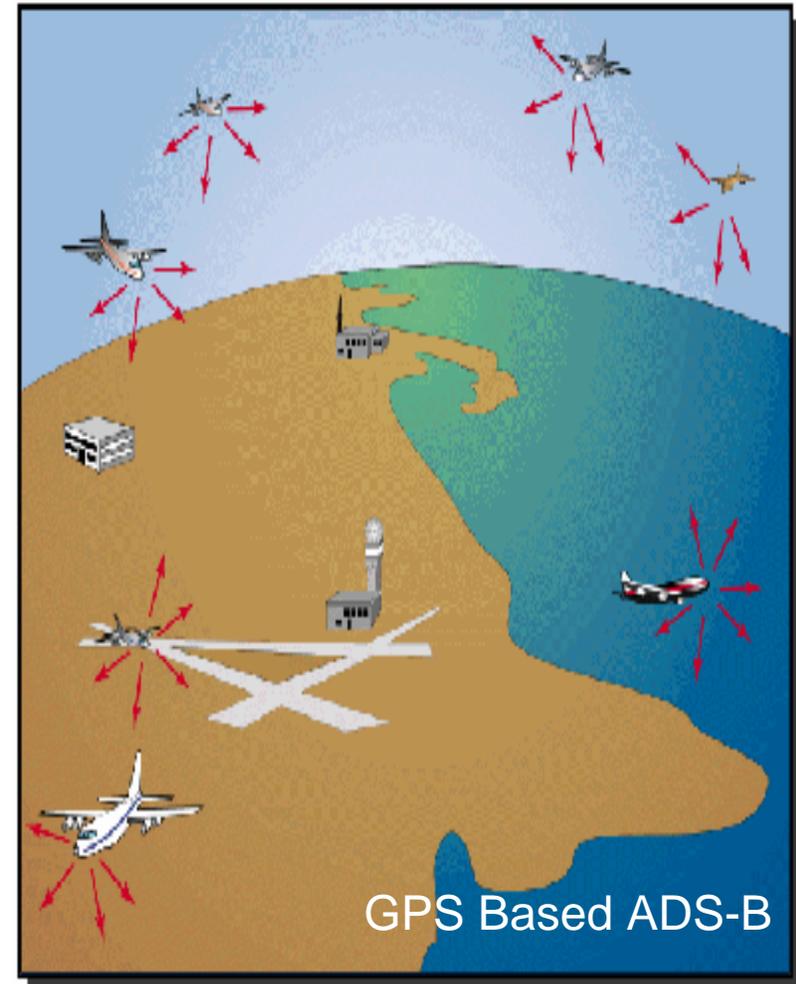
**Program Manager- Vincent Capezzuto
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Who We Are



Automatic Dependant Surveillance - Broadcast (ADS-B) Description

- **Automatic**
 - Periodically transmits information with no pilot or operator input required
- **Dependent**
 - Position and velocity vector are derived from the Global Positioning System (GPS) or a Flight Management System (FMS)
- **Surveillance**
 - A method of determining position of aircraft, vehicles, or other assets
- **Broadcast**
 - Transmitted information available to anyone with the appropriate receiving equipment



Automatic Dependant Surveillance - Broadcast (ADS-B) Description

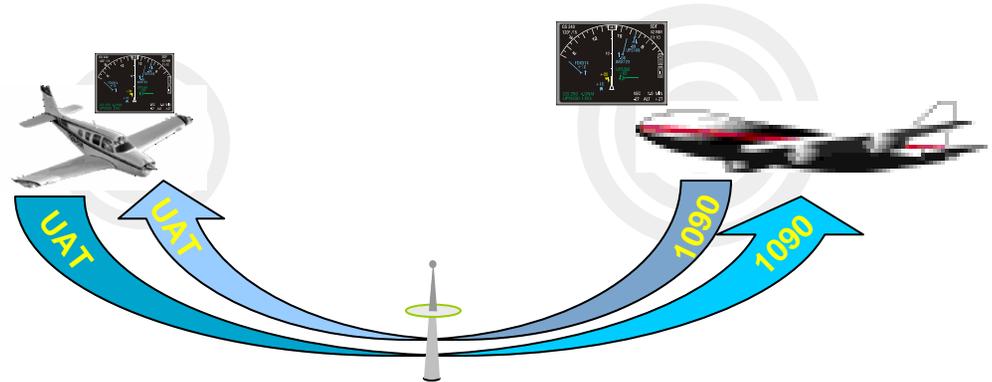
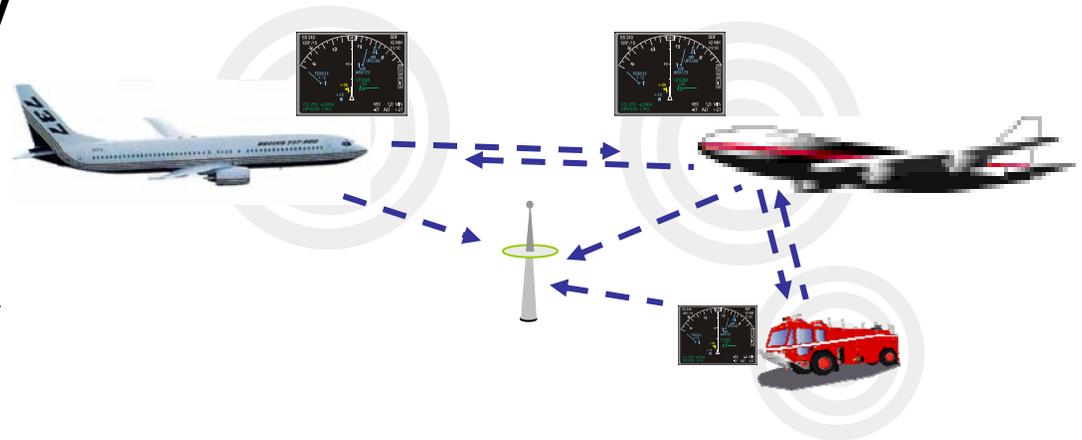
- **The ADS-B system is a crucial component of the Next Generation Air Transportation Systems (NGATS). It provides surveillance and situational awareness simultaneously to pilots and air traffic control facilities. ADS-B is designed to improve the safety, capacity, and efficiency of the National Airspace System (NAS) while providing a flexible and expandable platform to accommodate future air traffic growth.**

ADS-B Description

- **Full implementation of ADS-B capabilities requires**
 - Aircraft avionics equipage (datalink radio and/or display capability)
 - Ground stations supporting datalink to aircraft
 - Integration into existing Air Traffic Control (ATC) automation systems (Micro EARTS, Common ARTS, STARS, ASDE-X, ERAM)

ADS-B Data-link

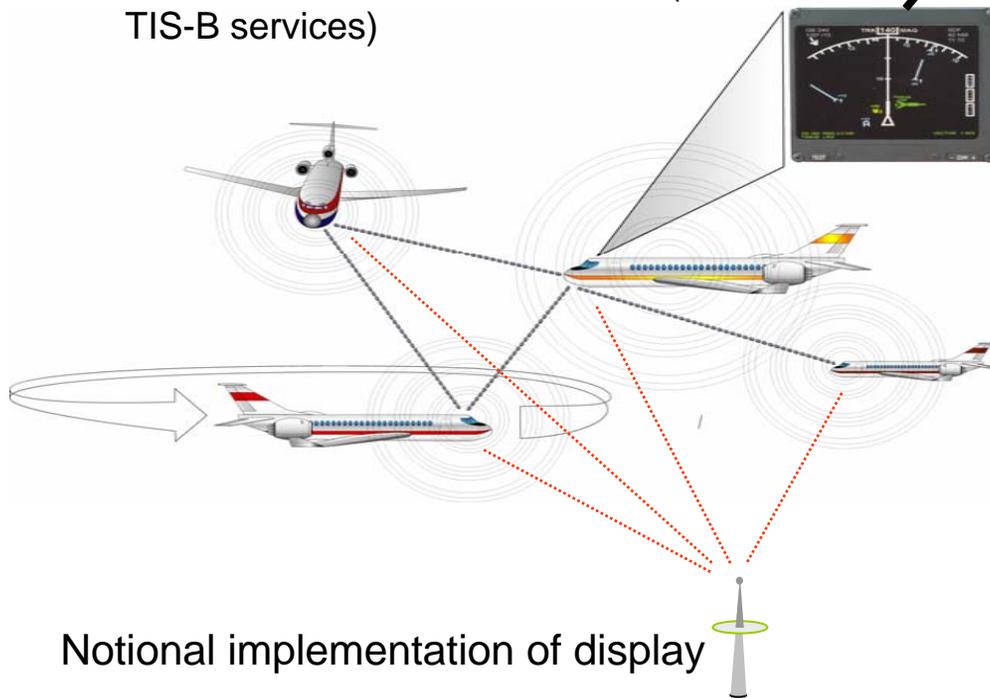
- **Two ADS-B “links” or frequencies are approved by the FAA**
 - Mode S “extended squitter” (1090 MHz)
 - Used for most commercial aircraft
 - Universal Access Transceiver (UAT) (978 MHz)
 - Typically used for other aircraft and vehicles
- **Dual links may require a multilink or ADS-Rebroadcast (ADS-R) function to ensure 1090 and UAT users see each other**



Aircraft CDTI

Cockpit Display of Traffic Information (CDTI)

- Aircraft / vehicle “broadcasts” known GPS position and additional data
- Radar like display for ADS-B traffic in aircraft cockpit or vehicle
- Other capabilities include broadcast traffic information, terrain, and weather (via FIS-B and TIS-B services)



- ADS-B message includes:
 - Heading
 - Altitude
 - Call sign
 - Speed
 - Distance
 - Aircraft category

ADS-B Broadcast Services

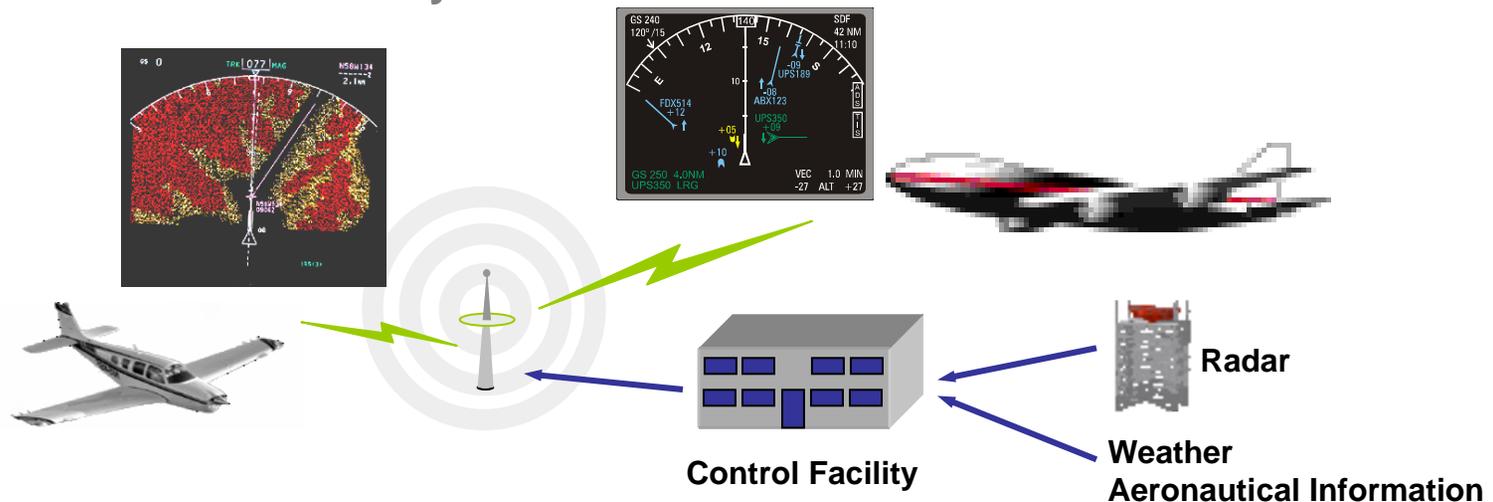
Traffic Information Service – Broadcast (TIS-B)

- TIS-B broadcasts surveillance data

Flight Information Service – Broadcast (FIS-B)

- Graphical NEXRAD Weather, meteorological observations, and Terminal Area Forecasts (TAFs) broadcast from ground stations
- Early planned enhancements include graphical Temporary Flight Restrictions (TFRs) and additional graphical weather products

* These services are advisory



*Notional physical architecture

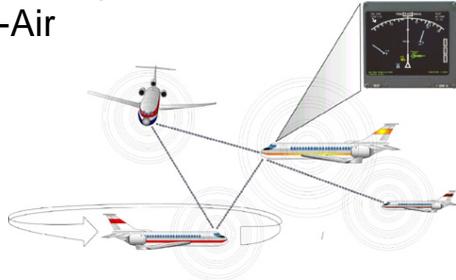
Why deploy an ADS-B system?

- **An ADS-B system provides the air/ground infrastructure upon which applications can be deployed when available to obtain additional benefits**
 - Air-to-air applications
 - Other information services
 - Surveillance Information

Proposed Capabilities

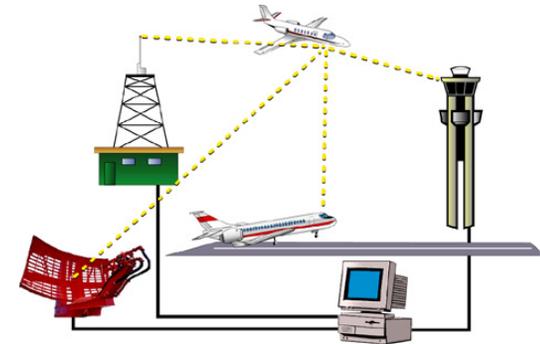
Air-to-Air

- Improved Separation Standards
- Improved Low-Visibility Approaches
- Enhanced See and Avoid
- Enhanced Operations for En Route Air-to-Air



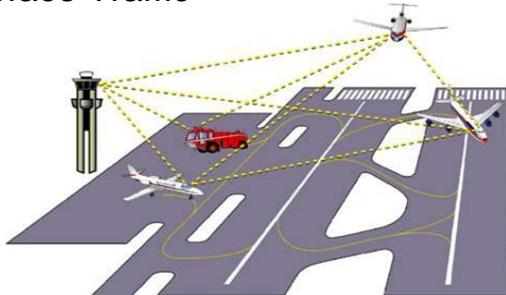
Air-to-Ground

- Surveillance Coverage in Radar / Non-Radar Airspace



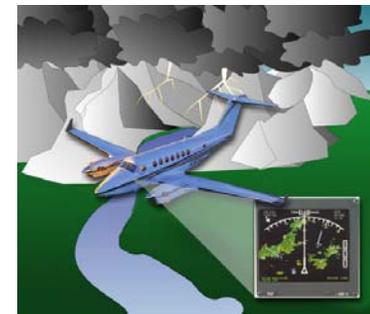
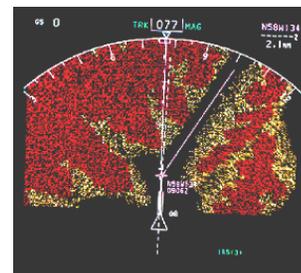
Ground-to-Ground

- Improved Navigation on Taxiways
- Enhanced Controller Management of Surface Traffic

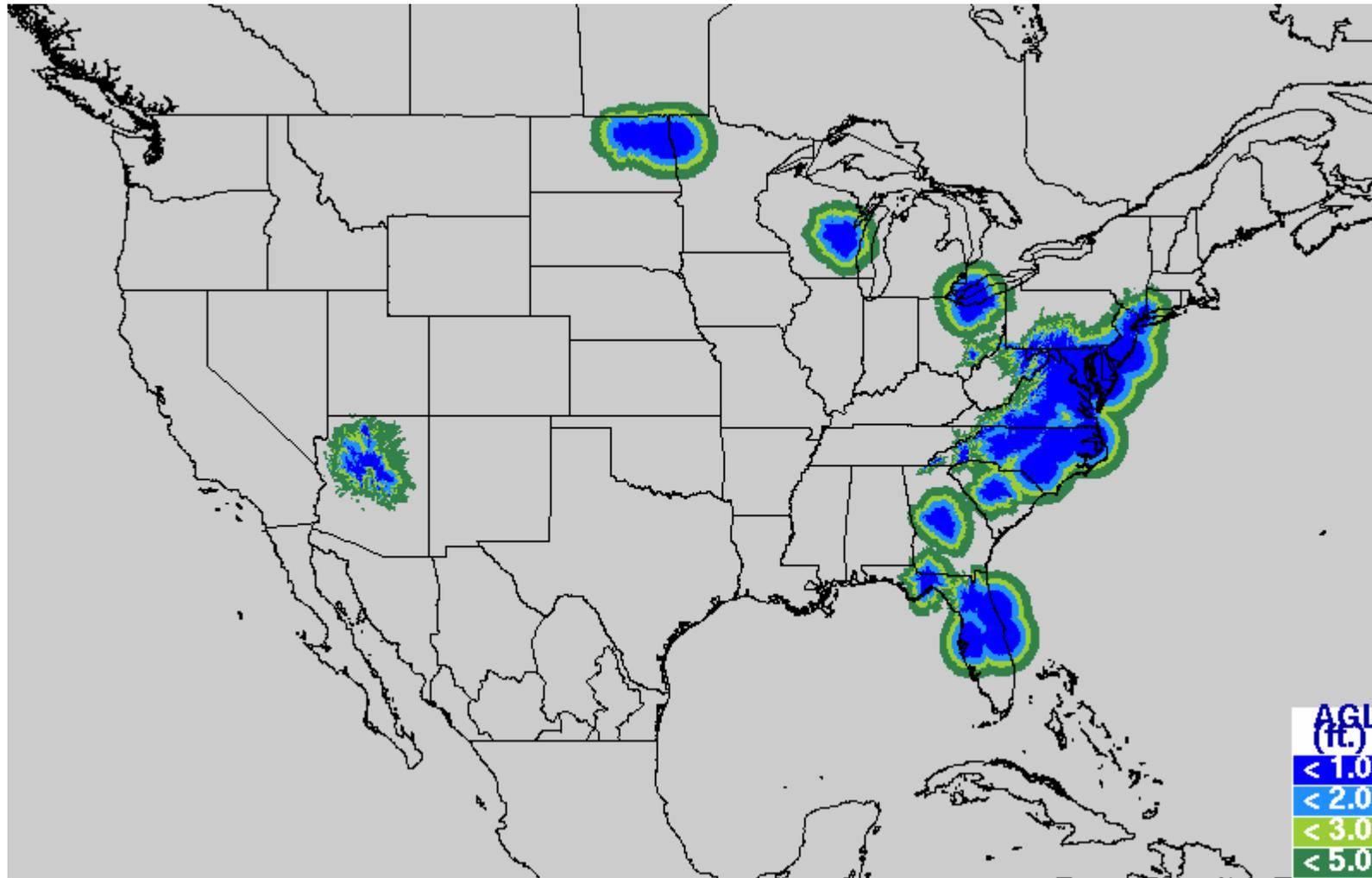


Ground-to-Air & Self-Contained

- Weather and SSR Traffic to the Cockpit
- Affordable Reduction of Controlled Flight into Terrain (CFIT)



TIS-B / FIS-B Service



Coverage for 40 existing sites

Approach: Initial ADS-B Applications

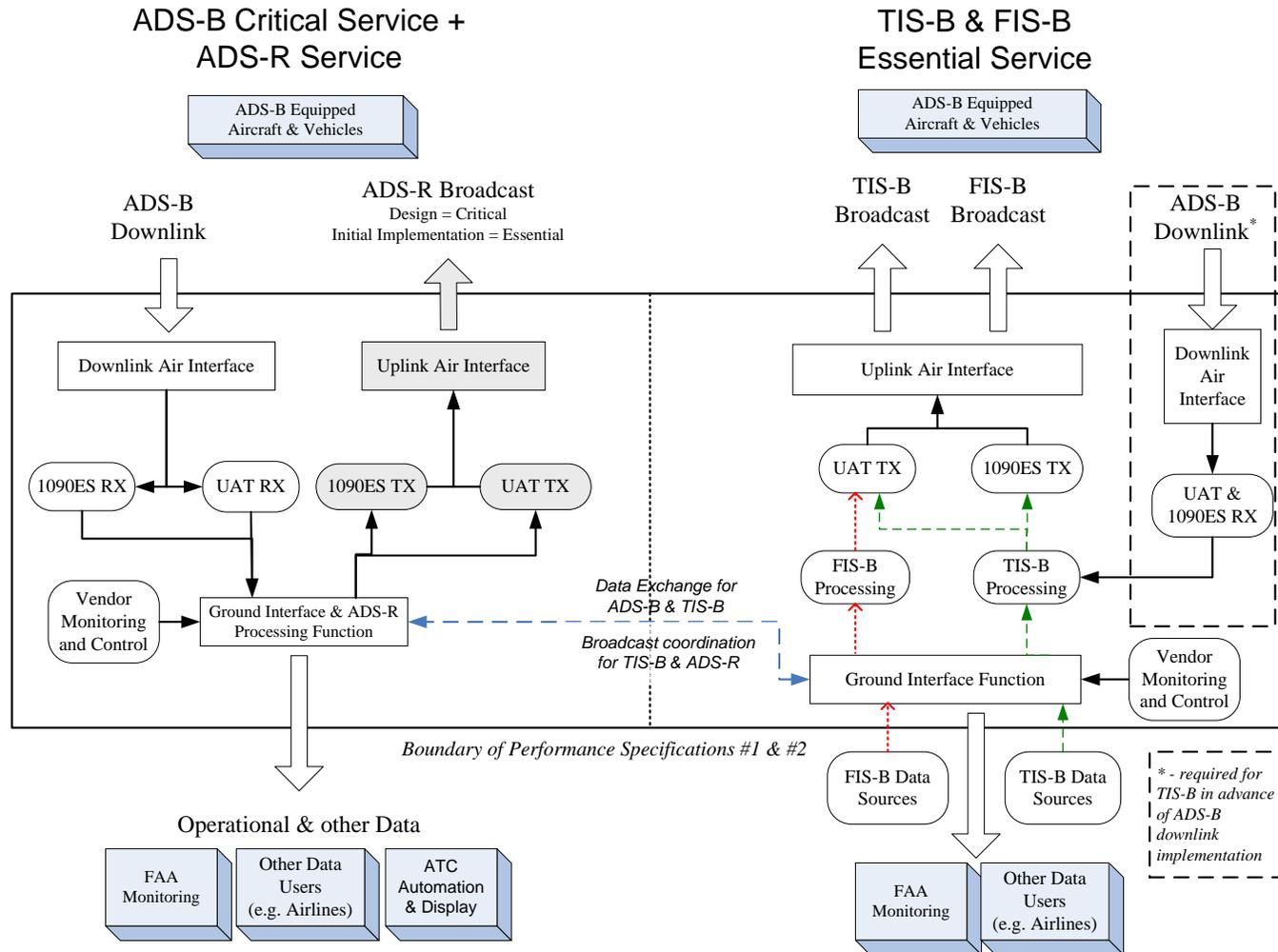
Application:	Segment:
Surveillance Broadcast Services (En Route, Terminal, Surface)	Segment 1 & 2
Traffic / Flight Information Broadcast Services	Segment 1 & 2
Enhanced Visual Acquisition	Segment 1 & 2
Enhanced Visual Approaches	Segment 1 & 2
Final Approach and Runway Occupancy Awareness	Segment 1, 2 & 3
Airport Surface Situational Awareness	Segment 1, 2 & 3
Conflict Detection	Segment 1, 2 & 3

Additional Aircraft to Aircraft Requirements Definition – Segment 1, 2 & 3

Program Status JRC-2B

Deliverable	Completion Date	Completed
Formulate Plan / Scope	2/24/06	X
ATMAC Brief	2/24/06	X
Draft PMP	3/24/06	X
Updated Schedule w/ Risk - Segment 1	4/7/06	X
Final Schedule Evaluation Activities (ATO-F & Cost Team)	4/28/06	
Risk Management Plan	4/28/06	
CONOPS Complete	4/28/06	
Implementation Strategy & Planning (OMB 300 Attachment 3)	4/28/06	
Schedule Complete	5/4/06	
Lifecycle Cost Analysis	5/9/06	
Benefits Analysis	5/9/06	
JRC Readiness Briefing	5/15/06	
CIT Review (F&E and OPS Budget Impact) (ATO-F)	5/22/06	
Final Program Requirements (fPR) (OMB 300 attachment-1)	5/23/06	
Updated OMB 300	5/23/06	
ATO-F Final Review & Approval (PMR-Juba)	5/23/06	
JRC Secretariat Prep Cycle - Initiate ACM Checklist / JRC Agenda	5/24/06	
Business Case Analysis	5/30/06	
Executive Council Briefing	5/31/06	
JRC 2b	6/7/06	

Acquisition Strategy



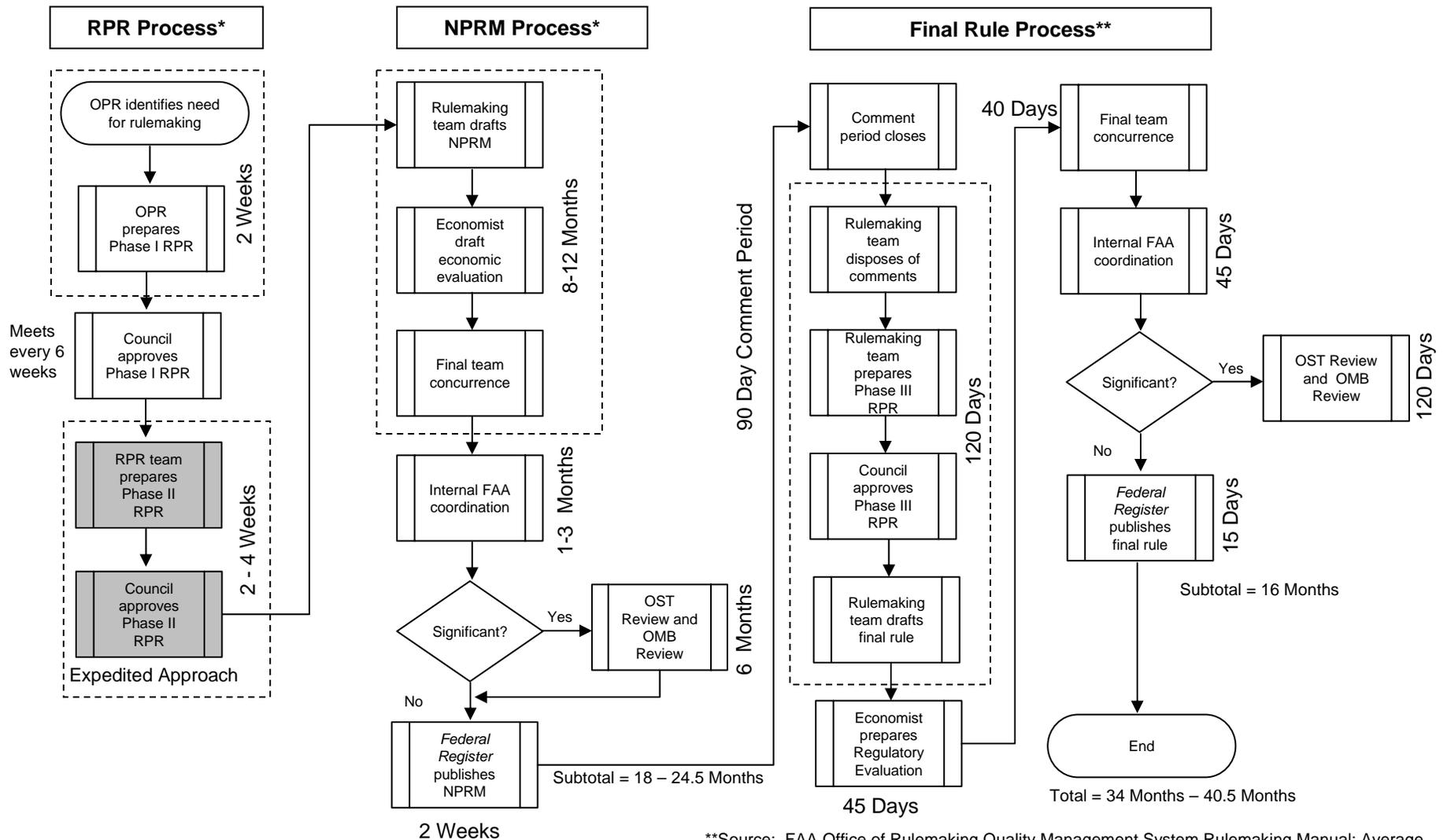
Acquisition Strategy (Continued)

- **Addresses acquisition approach and total cost of ownership:**
 - Maximize competition, minimize protests due to patent issues, competition with XM radio style service providers, level playing field for all respondents to RFO, reduce total cost of ownership:
 - Performance specification maximizes acquisition alternatives
 - FAA awards, owns, and maintains
 - Service Award
 - Performance Based Acquisition can be exploited for the two approaches

Acquisition Strategy (Continued)

- **Segment 1 ADS-B service locations include the following:**
 - Service Coverage Volume: Southeast Alaska Juneau Area
 - Service Delivery Point: Anchorage Center and Juneau Air Traffic Control Tower
 - Service: Surveillance
 - Service Coverage Volume: Gulf of Mexico Area
 - Service Delivery Point: Houston Center and Helicopter Operator Dispatch Center
 - Service: Communication, Weather, Surveillance
 - Service Coverage Volume: Louisville (KY), Kansas City (MO), Garden City (KS), North Platte (NE) Area
 - Service Delivery Point: Louisville TRACON and UPS Airline Operations Center
 - Service: Surveillance
 - Service Coverage Volume: Philadelphia Area
 - Service Delivery Point: Philadelphia TRACON and UPS Airline Operation Center
 - Service: Surveillance
- Additional potential locations include:
 - Ontario, CA
 - Memphis, TN
 - Indianapolis, IN
 - Oakland, CA
 - Newark, NJ

General Rulemaking Process

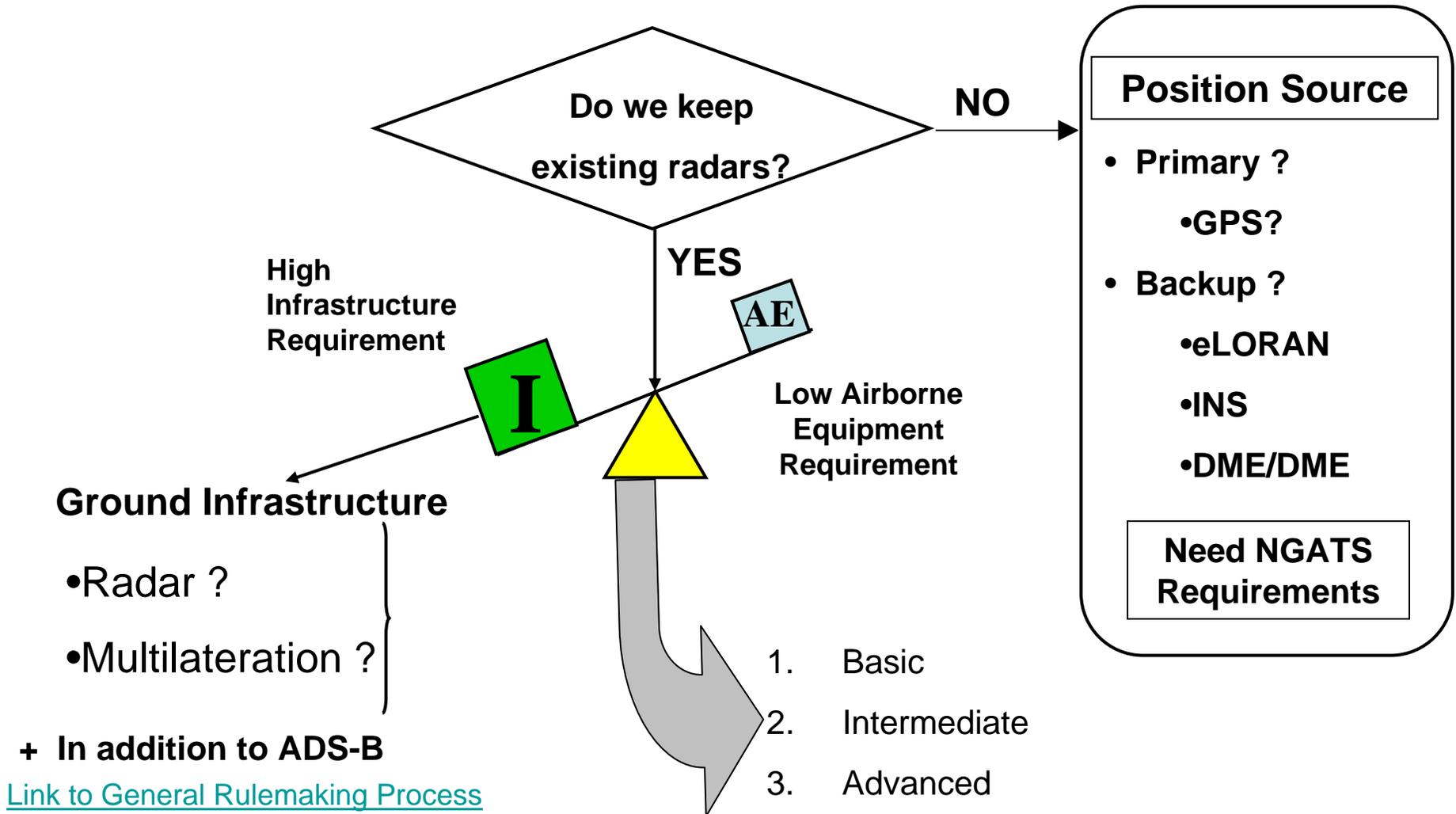


*Estimated durations and diagram provided by AVS/Mitre

**Source: FAA Office of Rulemaking Quality Management System Rulemaking Manual; Average timeframes provided, actual timeframes depend on size and complexity of project



Critical Decision



Summary

- **Program has transitioned from Research and Development (R & D) to Implementation**
- **Dual track service acquisition and rulemaking strategy being examined**
- **Technical issues under investigation**
 - Surveillance / Navigation Backup
 - Effects of 1090 Mhz uplink saturation in high density airspace
- **Collaborative FAA / industry effort will achieve a balanced customer – owner – employee approach**