

# Surveillance and Broadcast Services Program Overview

Northwest Chapter of the  
American Association of  
Airport Executives (NWAAGE)  
2006 Annual Conference

By: Bobby Nichols, Implementation Lead,  
Surveillance and Broadcast Services

Date: October 3, 2006



Federal Aviation  
Administration

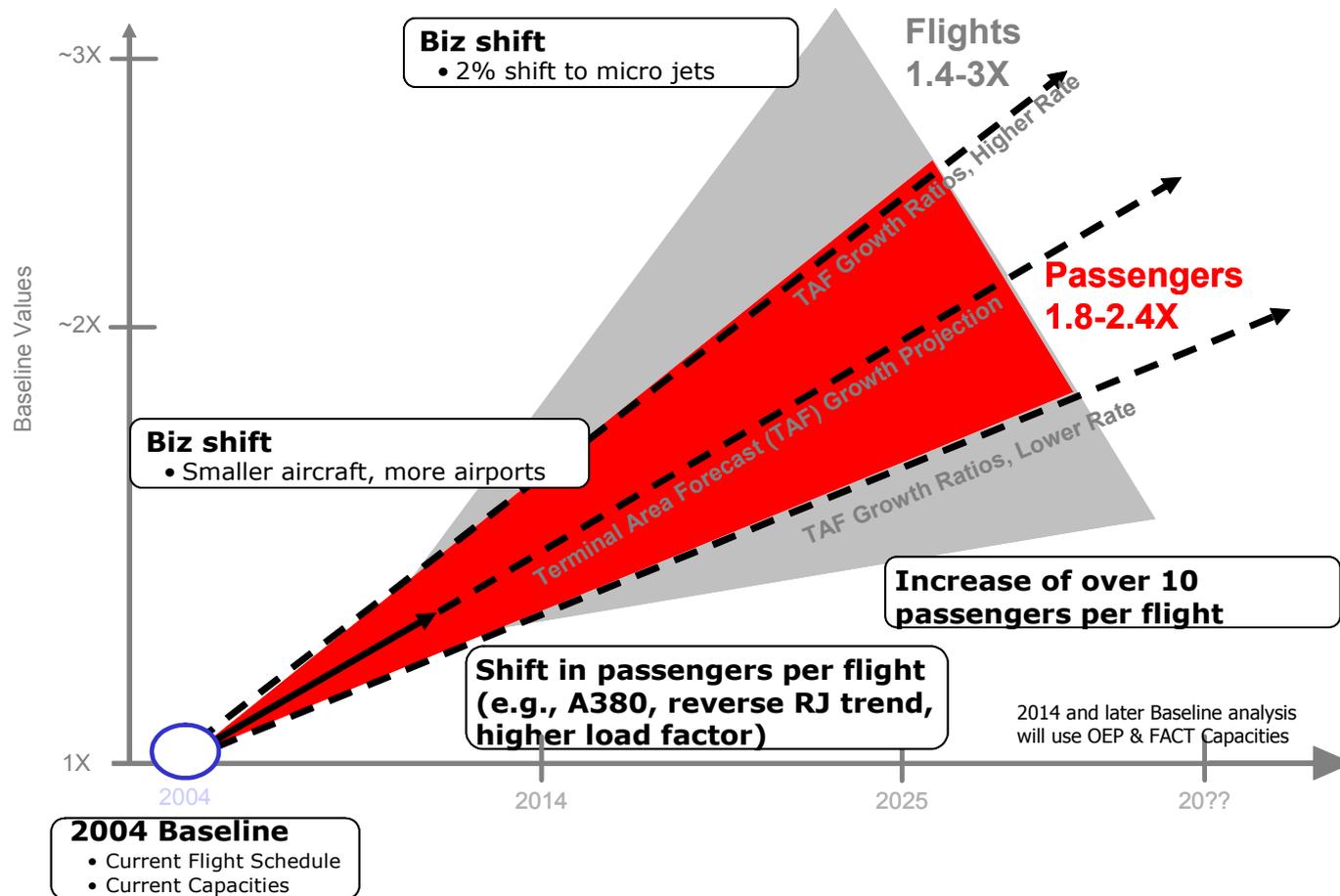


# Agenda

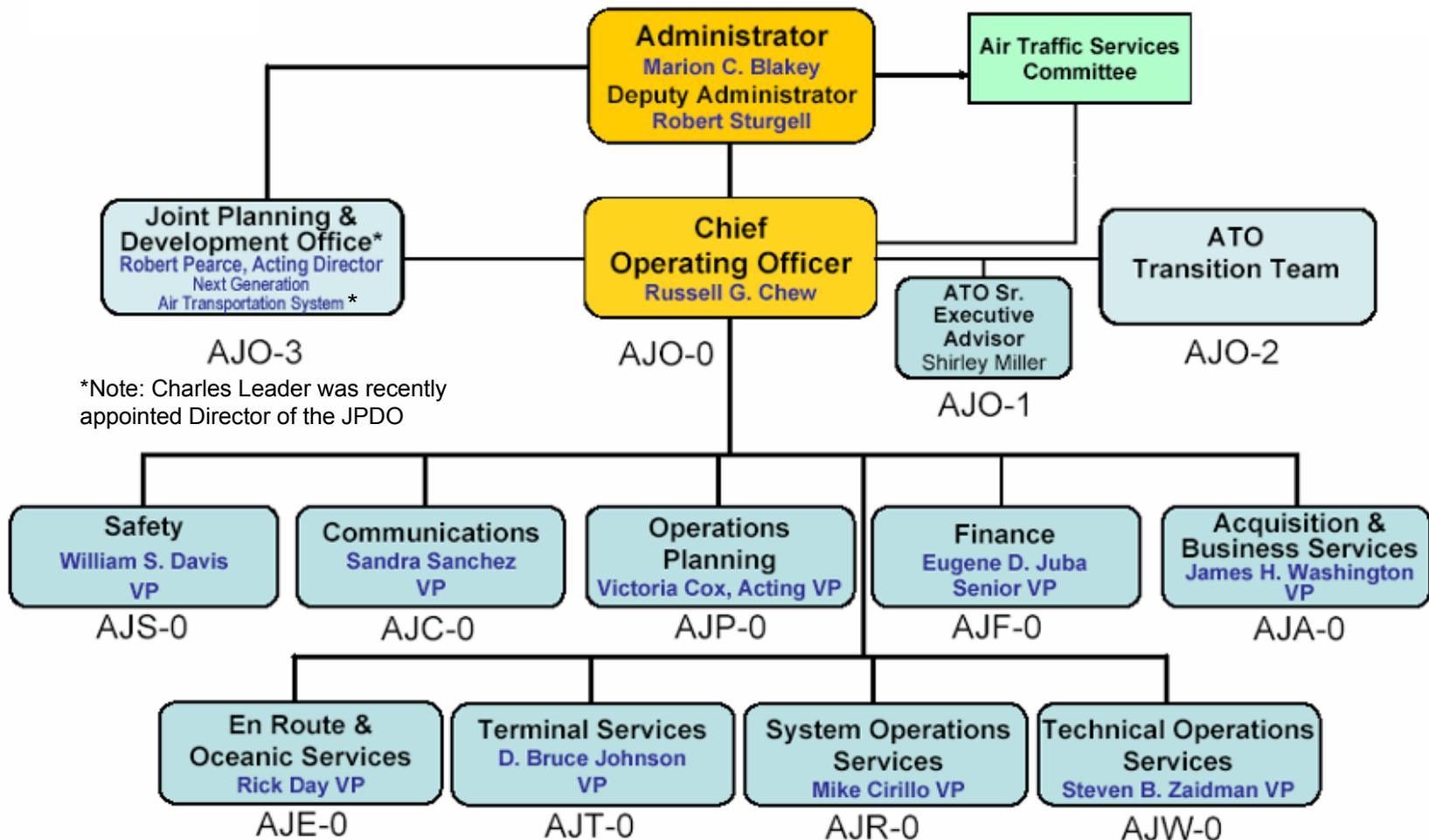
- **NGATS**
- **ATO Organization**
- **Program Charter / Governance**
- **Definition of Program**
- **Business Case Review**
- **Segment 1 Locations**
- **Acquisition Strategy**
- **Summary**
- **Memorandum of Agreement**



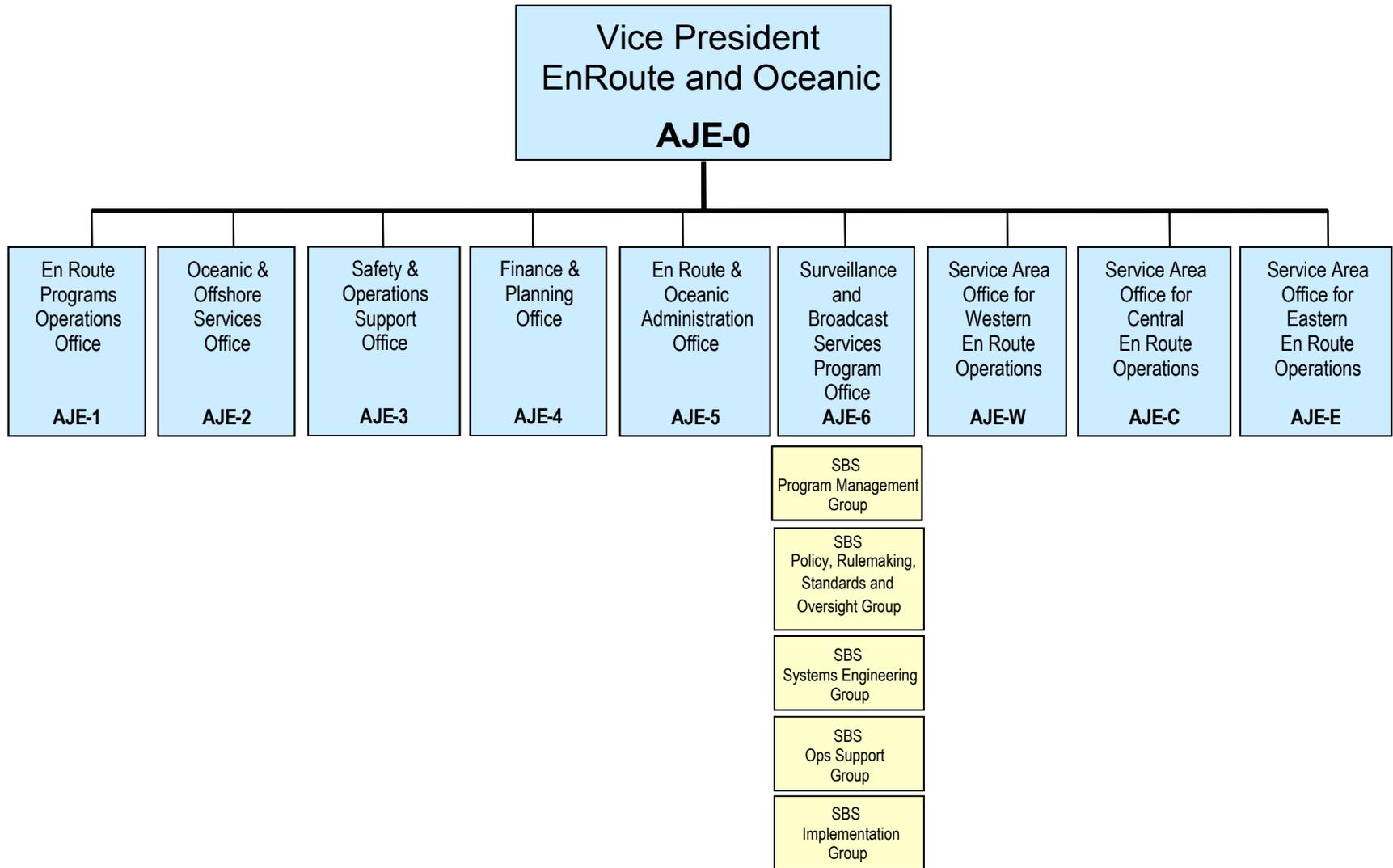
# NGATS...Planning for a Range of Futures



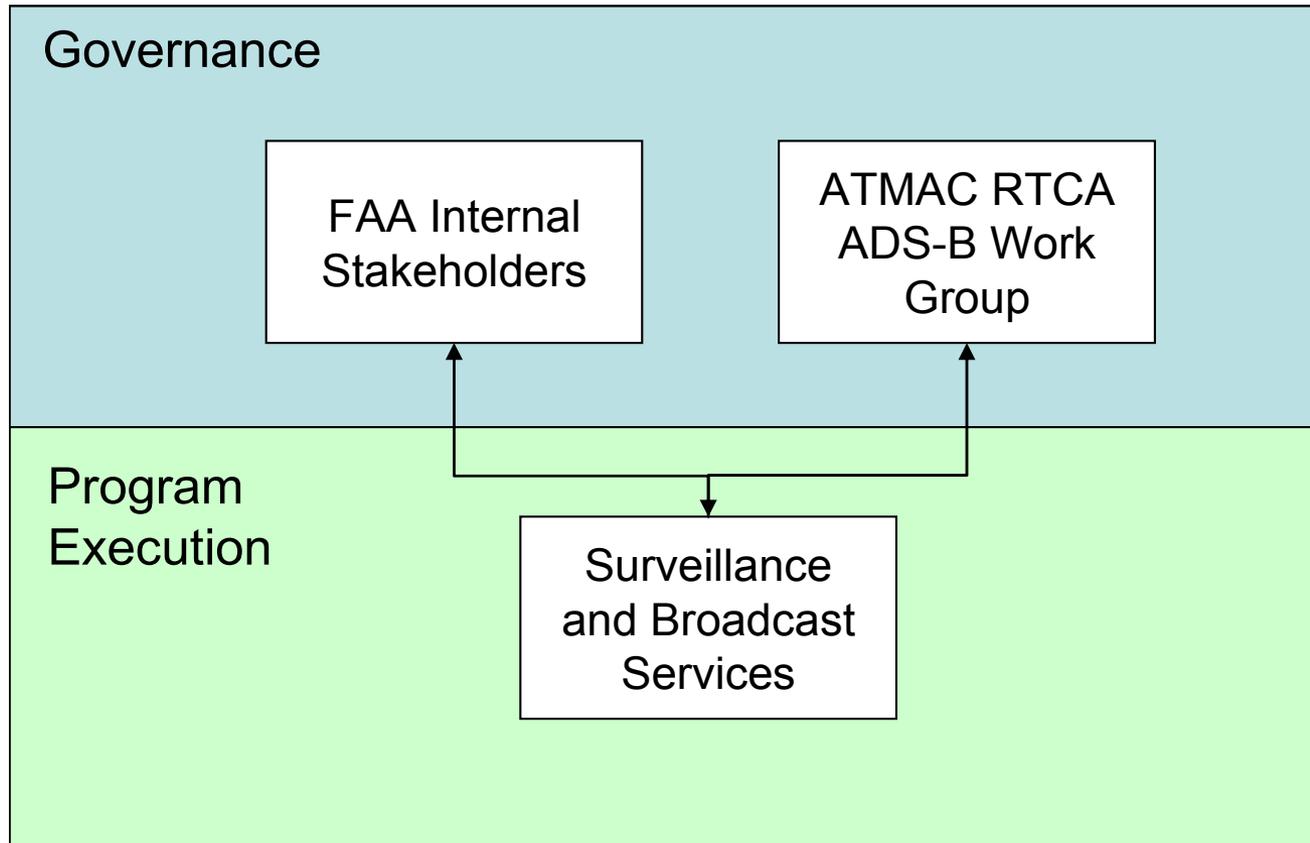
# ATO Organization



# ATO-E Organization

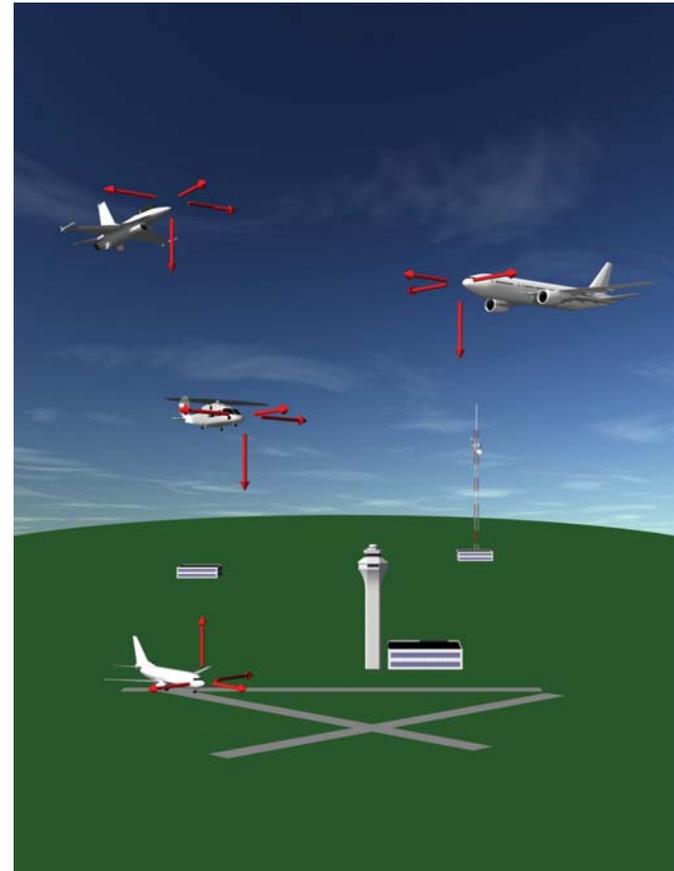


# Program Charter / Governance



# Definition of Program: Automatic Dependant Surveillance - Broadcast (ADS-B)

- **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 asset
- **Broadcast**
  - Transmitted information available to anyone with the appropriate receiving equipment



# Definition of Program: Traffic Information Service - Broadcast / Flight Information Service - Broadcast

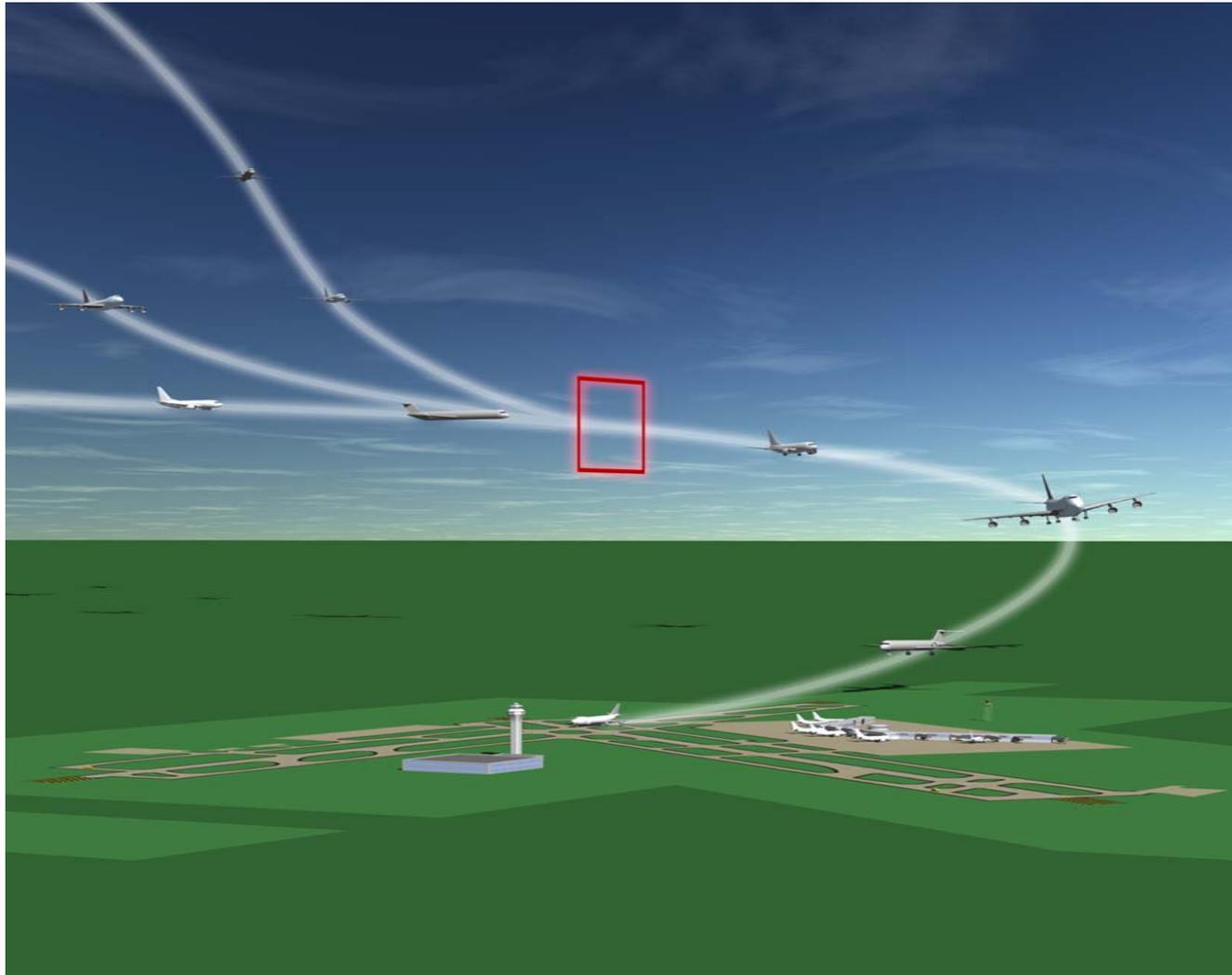
TIS-B is a service which provides ADS-B equipped aircraft with position reports from secondary surveillance radar on non-ADS-B equipped aircraft.



FIS-B transmits graphical National Weather Service products, temporary flight restrictions (TFRs), and special use airspace.



# Reliable Precision Operations Improve Predictability, Safety and Airspace System Capacity



# Surveillance and Broadcast Services Portfolio

- **The Surveillance and Broadcast Services Program Office Portfolio includes:**
  - 2 Services
    - Surveillance Broadcast Services (En Route, Terminal, and Surface)
    - Traffic / Flight Information Broadcast Services
  - 5 Applications
    - Enhanced Visual Acquisition
    - Enhanced Visual Approaches
    - Final Approach and Runway Occupancy Awareness
    - Airport Surface Situational Awareness
    - Conflict Detection
  - 1 Special Initiative
    - Memorandum of Agreement (MOA) with the State of Colorado Department of Transportation

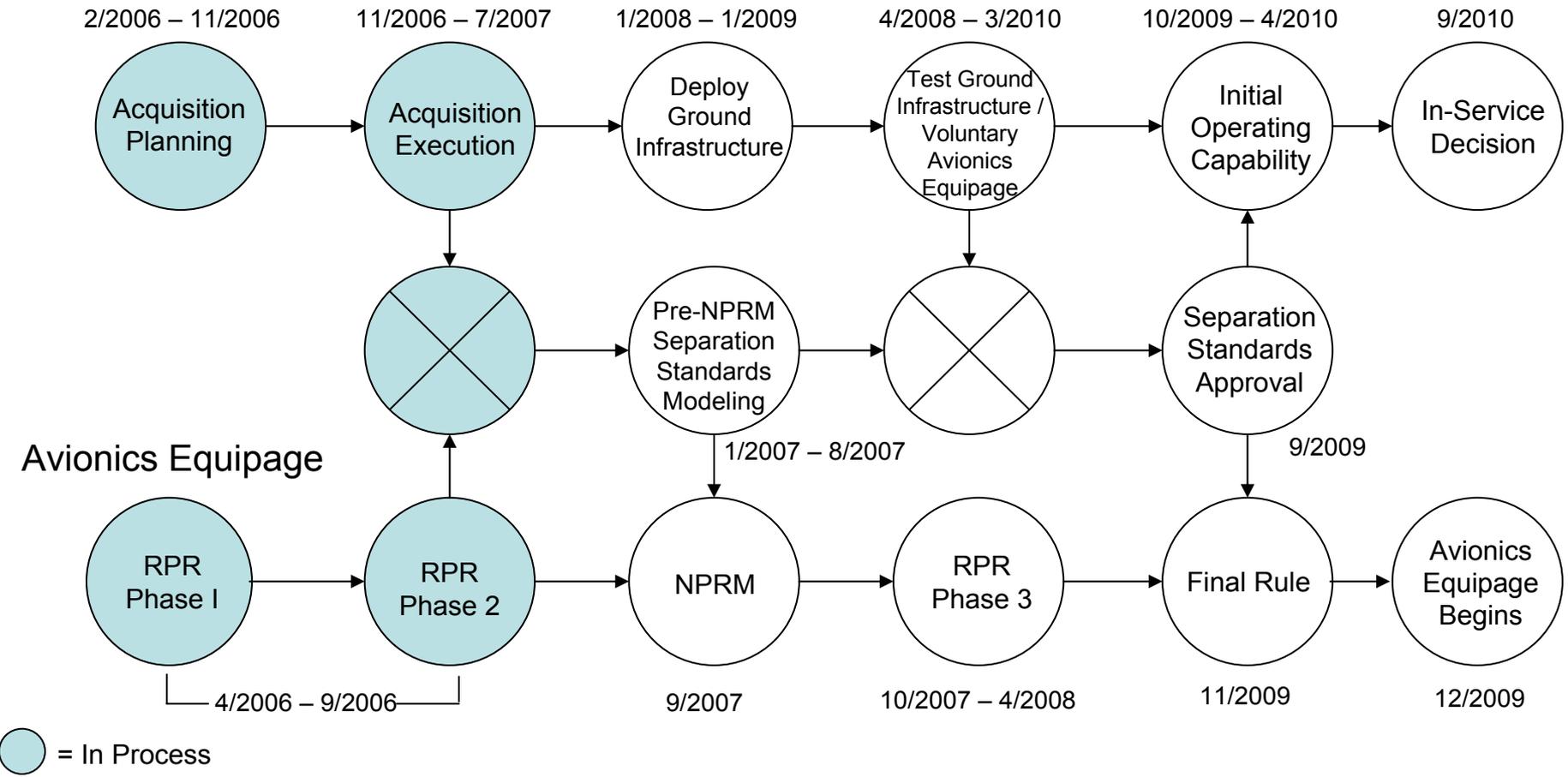


# Program Objective

- **Develop a multi-segment, life cycle managed, performance based ADS-B strategy that aligns with the Next Generation Air Transportation System (NGATS) vision and generates value for the National Airspace System (NAS)**
  - Integrate Concept of Operations for Portfolio of ADS-B Applications
  - Develop Application Life Cycle Management Approach
    - Portfolio Management for Applications
    - Requirements Management Across the Applications
    - Performance Criteria Management
  - Establish Infrastructure
  - Continuously Monitor Value and Adjust Investments

# Dual Track Strategy (Segment 1)

## Ground Infrastructure



# 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
Terminal Separation Standards Approval at Louisville	June 2009
En Route Separation Standards Approval for Gulf of Mexico	July 2009
Terminal Separation Standards Approval at Philadelphia	September 2009
En Route Separation Standards Approval at Juneau	September 2009
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



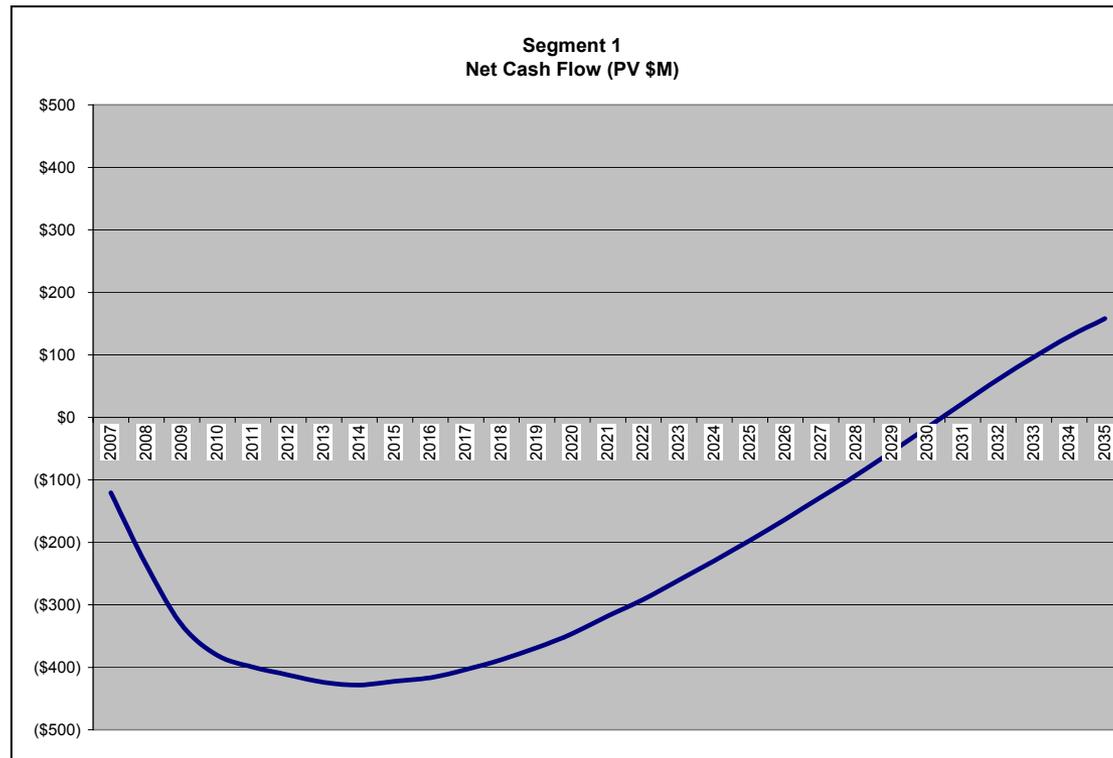
# Proposed Schedule - Segments 2 - 4

Milestone	Projected Dates
<b>Segment 2 (2009 – 2014)</b>	
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
<b>Segment 3 (2015 – 2020)</b>	
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
<b>Segment 4 (2021 – 2025)</b>	
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



# Business Case Review: Economic Analysis – Segment 1

High Confidence Results	Segment 1
Net Present Value (\$M)	\$158.0
B/C Ratio	1.3
Payback Year	2031
Internal Rate of Return	9%

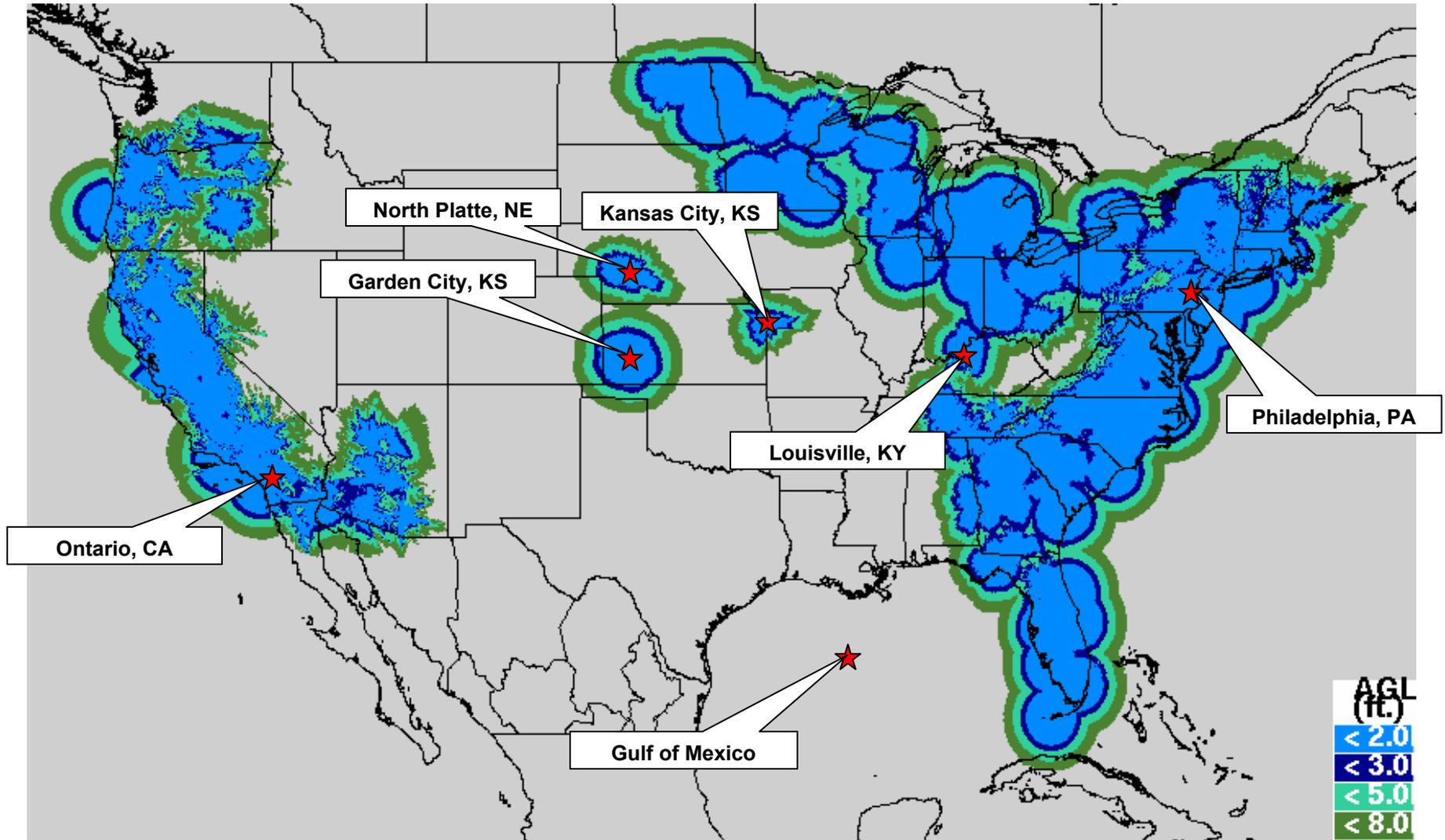


# Business Case Review: Requested Baseline Costs

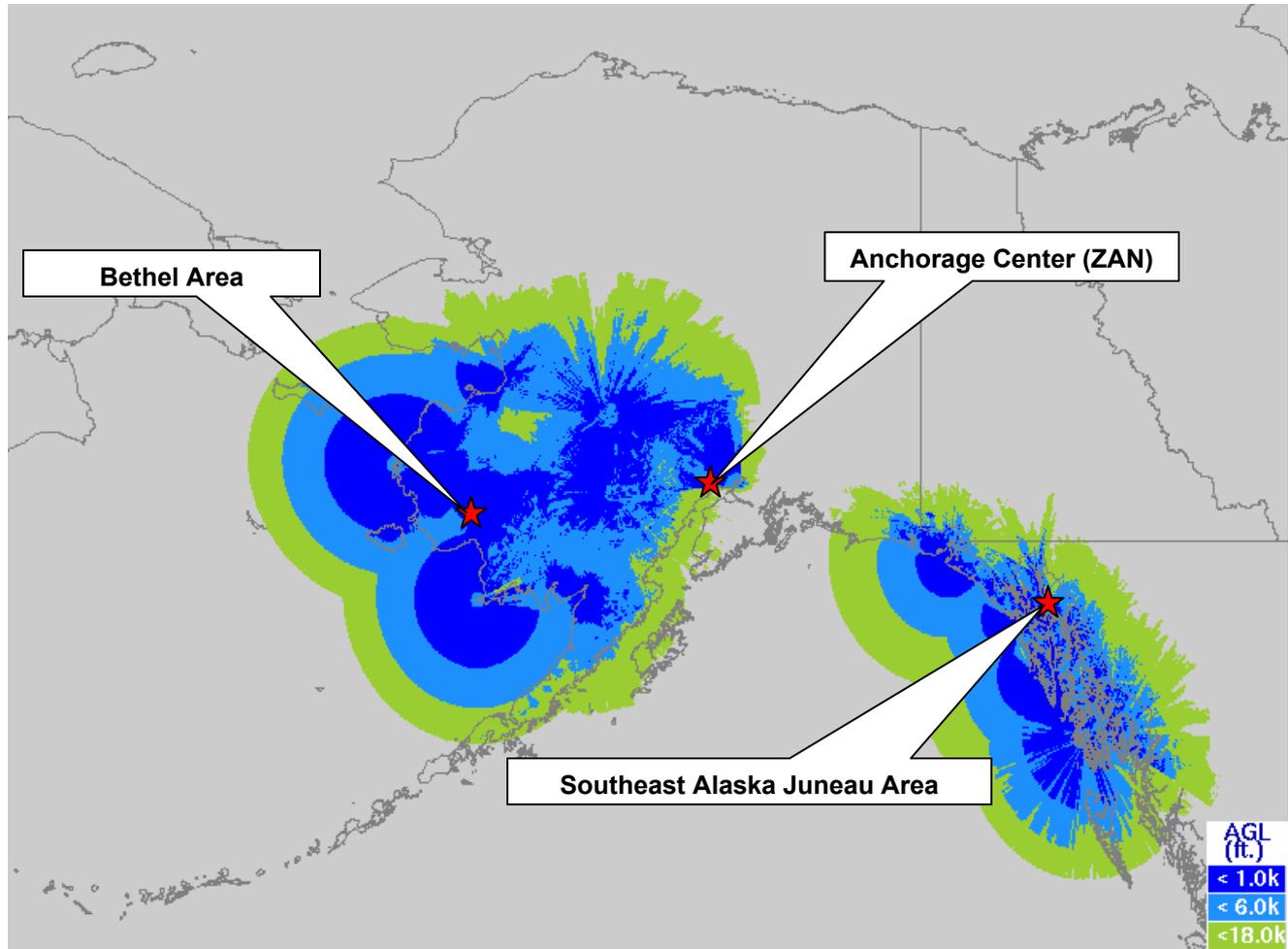
## Requested Baseline Costs (Segment 1)

Estimated Cost	FY06 & Prior	Baselined		
		FY07	FY08	Total
F&E Program Plan	0.0	80.0	85.0	165.0
IOT&E		0.5	1.1	1.6
F&E Funded by Other Sources				
Total F&E Requirements		80.5	86.1	166.6
Delta: CIP less F&E Requirements				

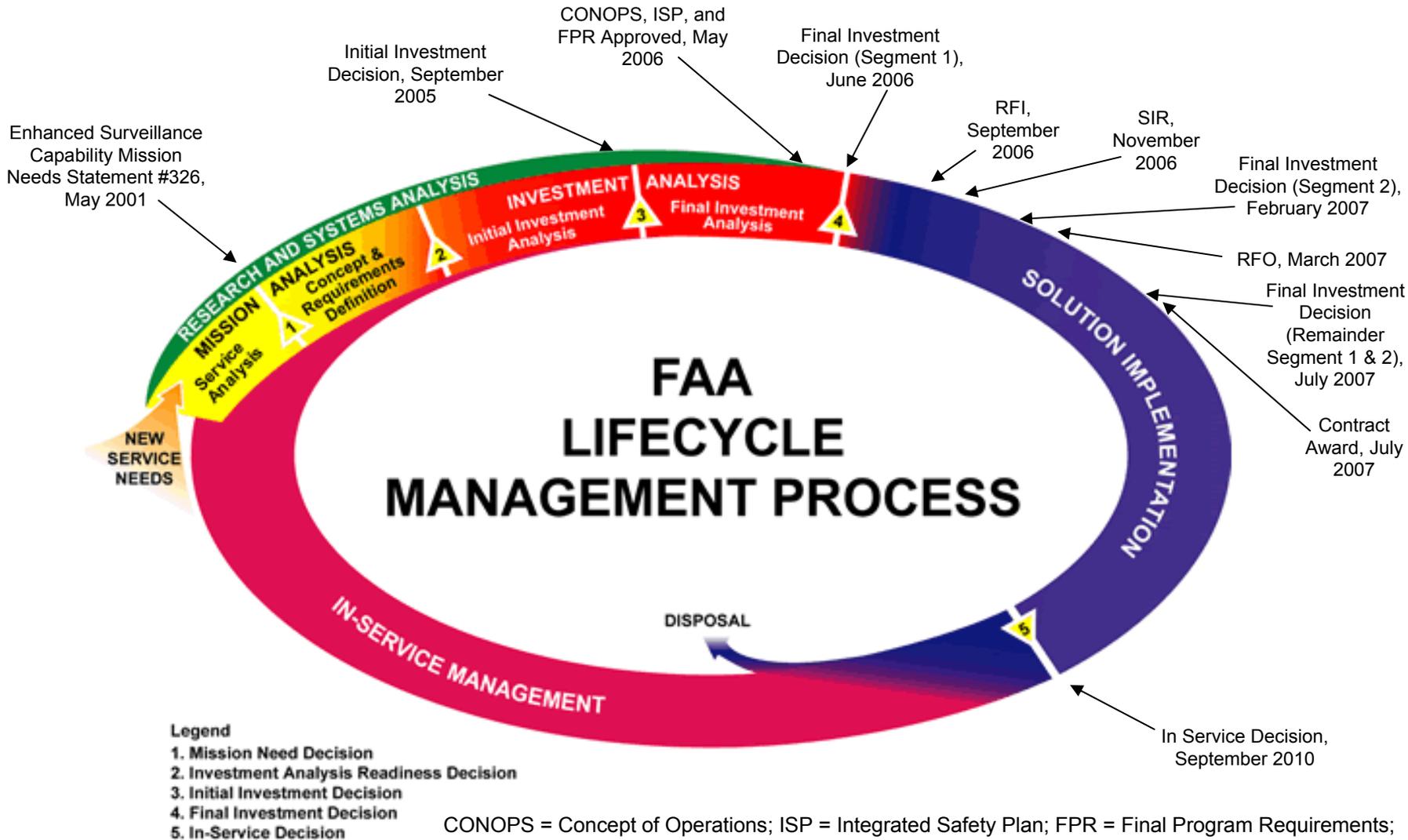
# Segment 1 Locations: Expansion



# Segment 1 Locations (Continued)



# Acquisition: FAA Life Cycle Management Process



# Summary

- **Program has transitioned from Research and Development (R & D) to Implementation**
- **Segment 1 baseline established**
- **Dual track service acquisition and rulemaking activities underway**
- **Risk Mitigation plans in effect**
  - Governance Process
  - Backup Analysis underway
  - Separation Standards Workgroup established
  - Specification coordination with industry and international community

**Success through a collaborative FAA / industry relationship**

# Surveillance and Broadcast Services: Colorado Memorandum of Agreement

Northwest Chapter of the  
American Association of  
Airport Executives (NWAAAE)  
2006 Annual Conference

By: Steve Manley, Surveillance and Broadcast  
Services

Date: October 3, 2006



Federal Aviation  
Administration



# Agenda

- **Background**
- **Milestones**
- **Timeline**
- **Summary**



# Background: Problem Statement

- **Increases in air traffic volume have resulted in an increased number of delays and denied service at the Colorado mountain airports, especially during bad weather**
- **Instrument Meteorological Conditions (IMC) reduces acceptance rates for mountain airports from 12-17 flights per hour to 4 per hour**
- **From November to April each year, the Colorado DOT estimates 75 aircraft per airport, per day are delayed or diverted, creating daily revenue loss for the state**



# Customer Request

- **The FAA, at the request of the State of Colorado Department of Transportation, Division of Aeronautics, conducted an analysis of various mitigating alternative solutions, which identified that the lack of surveillance contributes to reduced capacity during IMC**
- **The analysis identified a multilateration based technology as the preferred solution to provide surveillance to the Colorado mountain airports**



# MOA Description

- The MOA documents a project to plan, install, test and commission a surveillance capability covering defined areas of Colorado

State of Colorado	Federal Aviation Administration
<ul style="list-style-type: none"> <li>•Acquire equipment (purchase, install, test, and accept)</li> <li>•Initiate Site Survey</li> <li>•Provide a Site Engineering Report (SER) (draft and final)</li> <li>•Secure and deliver sites for sensor equipment, including primary power and telecommunications</li> <li>•Oversee site preparation activities</li> <li>•Oversee vendor interface development</li> <li>•Provide documentation required for FAA certification</li> </ul>	<ul style="list-style-type: none"> <li>•Act as an advisor to the Division of Aeronautics in its evaluation of a qualified contractor by providing technical and business expertise</li> <li>•Provide appropriate guidance, advice, and technical assistance regarding acquisition documentation and approaches</li> <li>•Participate in site survey activities, system design/fabrication, program management, Factory Acceptance Test (FAT), and Site Acceptance Test (SAT)</li> <li>•Oversee installation and checkout of equipment at the Denver Center</li> <li>•Certify the system into the NAS for control of aircraft</li> <li>•Commission the system</li> <li>•Assume ownership of the equipment after SAT</li> <li>•Provide life-cycle O&amp;M support</li> <li>•Upgrade ADS-B capability to incorporate UAT upon approval of ADS-B investment decision</li> </ul>



# Scope

- **The surveillance system will supplement long-range radar surveillance by allowing control of approaches and landings at airports within the surveillance area**
- **The control will occur at the Denver Air Route Traffic Control Center (ARTCC)**
- **The requirements for the coverage will be based on the minimum performance necessary to provide air traffic control using En Route separation standards for radar service**



# MOA Locations

- The airports and associated coverage areas include Hayden / Yampa Valley Regional Airport (HDN) and Rifle – Garfield County Airport (RIL)



Yampa Valley-Hayden (HDN)



Garfield County Regional – Rifle (RIL)

# MOA Locations

- **If a decision is made to proceed with additional airports, the MOA will be amended to provide for planning, design, and installation of the system and the associated costs**
  - Potential additional sites include: Craig-Moffat, Steamboat, Montrose, Telluride, Gunnison, Alamosa, Durango, and Cortez

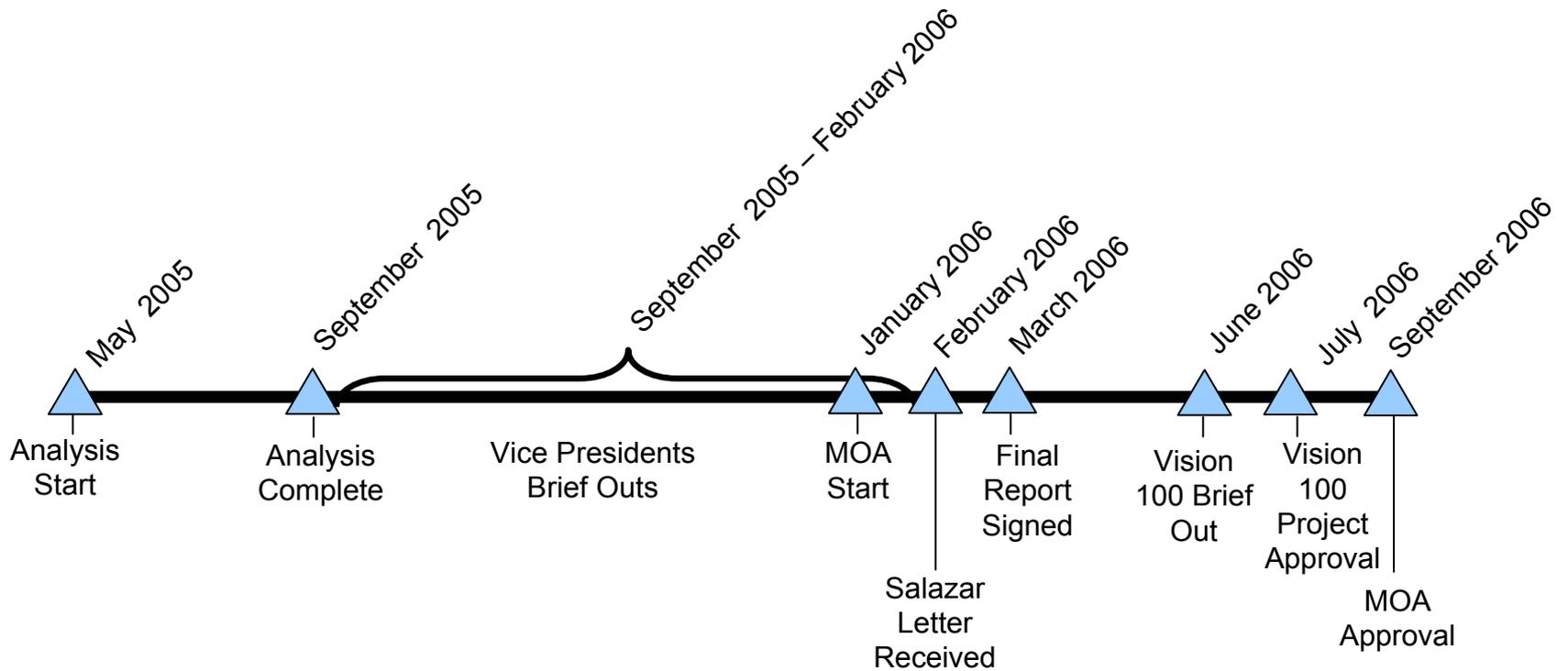


# Milestones

Milestone	Completion Date
Contract Award	1 <sup>st</sup> Quarter FY2007
Site Survey	1 <sup>st</sup> Quarter FY2007
Site Engineering Report (SER)	2 <sup>nd</sup> Quarter FY2007
Interface Development	2 <sup>nd</sup> Quarter FY2007
Site Preparation	2 <sup>nd</sup> Quarter FY2007
System Delivery	2 <sup>nd</sup> Quarter FY2007
Installation	3 <sup>rd</sup> Quarter FY2007
Optimization	3 <sup>rd</sup> Quarter FY2007
System Integration and Test	4 <sup>th</sup> Quarter FY2007
Site Acceptance Test	4 <sup>th</sup> Quarter FY2007
Certification for Wide Area Multilateration Surveillance	4 <sup>th</sup> Quarter FY2007
Initial Operating Capability (IOC)	1 <sup>st</sup> Quarter FY2008
Operational Readiness Date (ORD)	1 <sup>st</sup> Quarter FY2008



# Timeline



# Summary

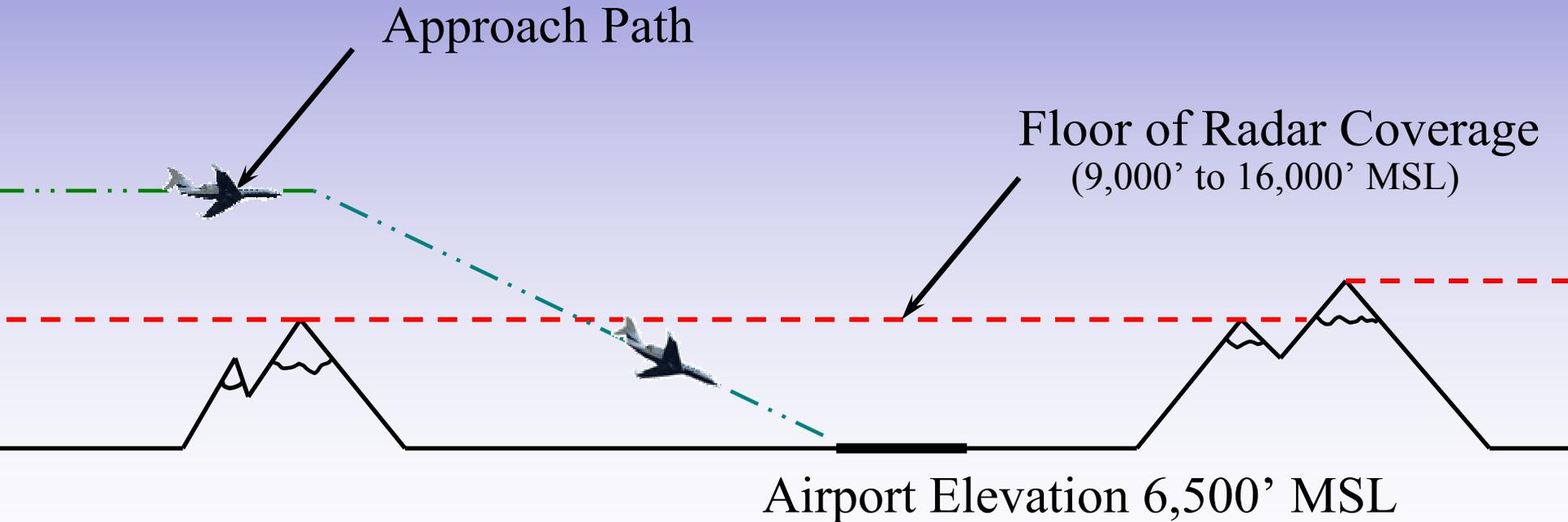
- **This is a collaborative and innovative effort between the State of Colorado and the FAA**
  - Improves safety and increases capacity, while providing potential benefits to the State's economy
  - Allows the FAA to continue its National Airspace System modernization strategy



Travis Vallin

Colorado Department of Transportation,  
Division of Aeronautics

# The Problem with Mountain Radar Coverage



# Non-Radar Coverage 17,000 ft.

Craig

Steamboat Springs

Yampa Valley

Rifle

Eagle

Aspen

Montrose

Gunnison

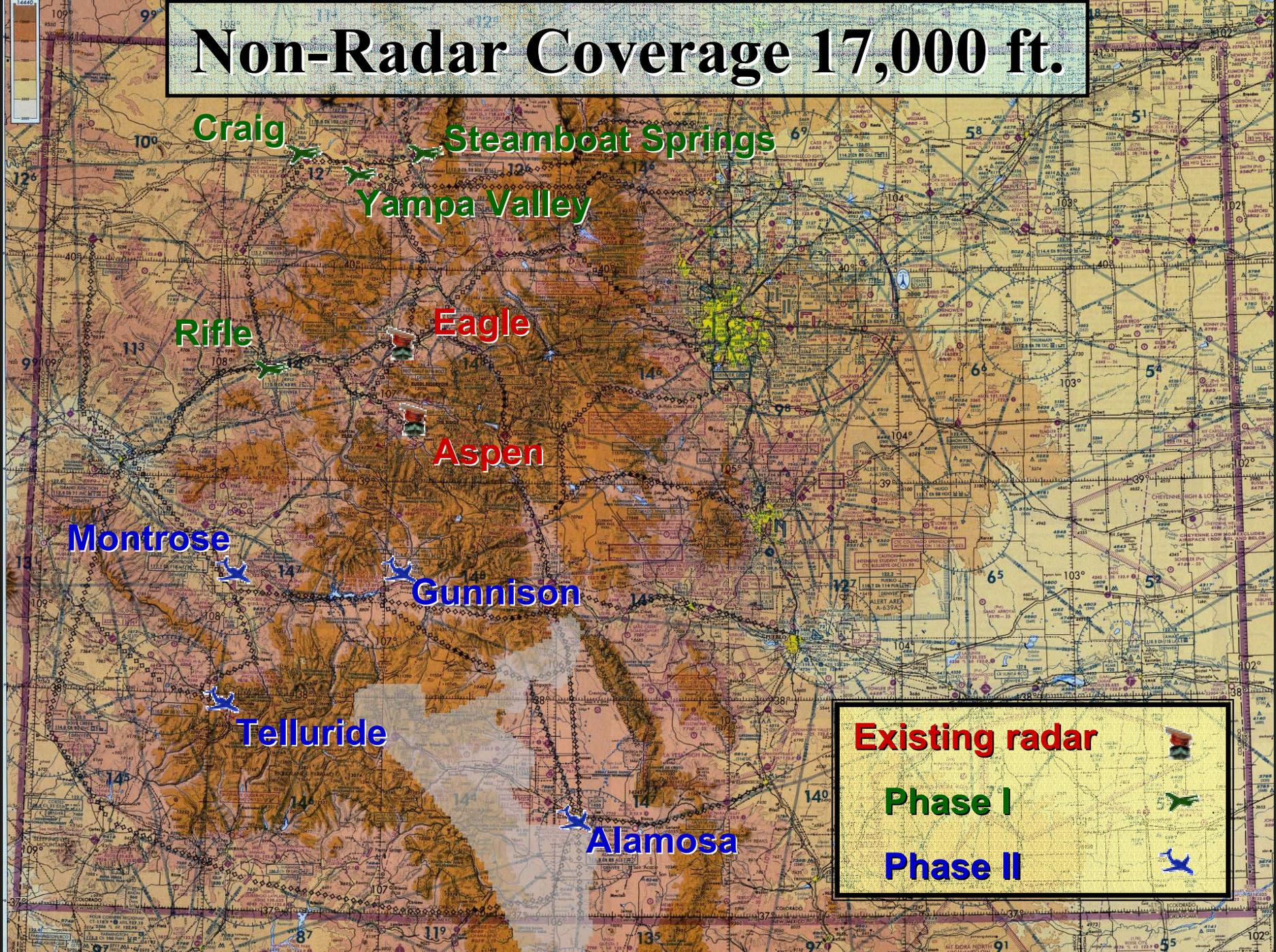
Telluride

Alamosa

Existing radar

Phase I

Phase II



# Non-Radar Coverage 15,000 ft.

Craig

Steamboat Springs

Yampa Valley

Rifle

Eagle

Aspen

Montrose

Gunnison

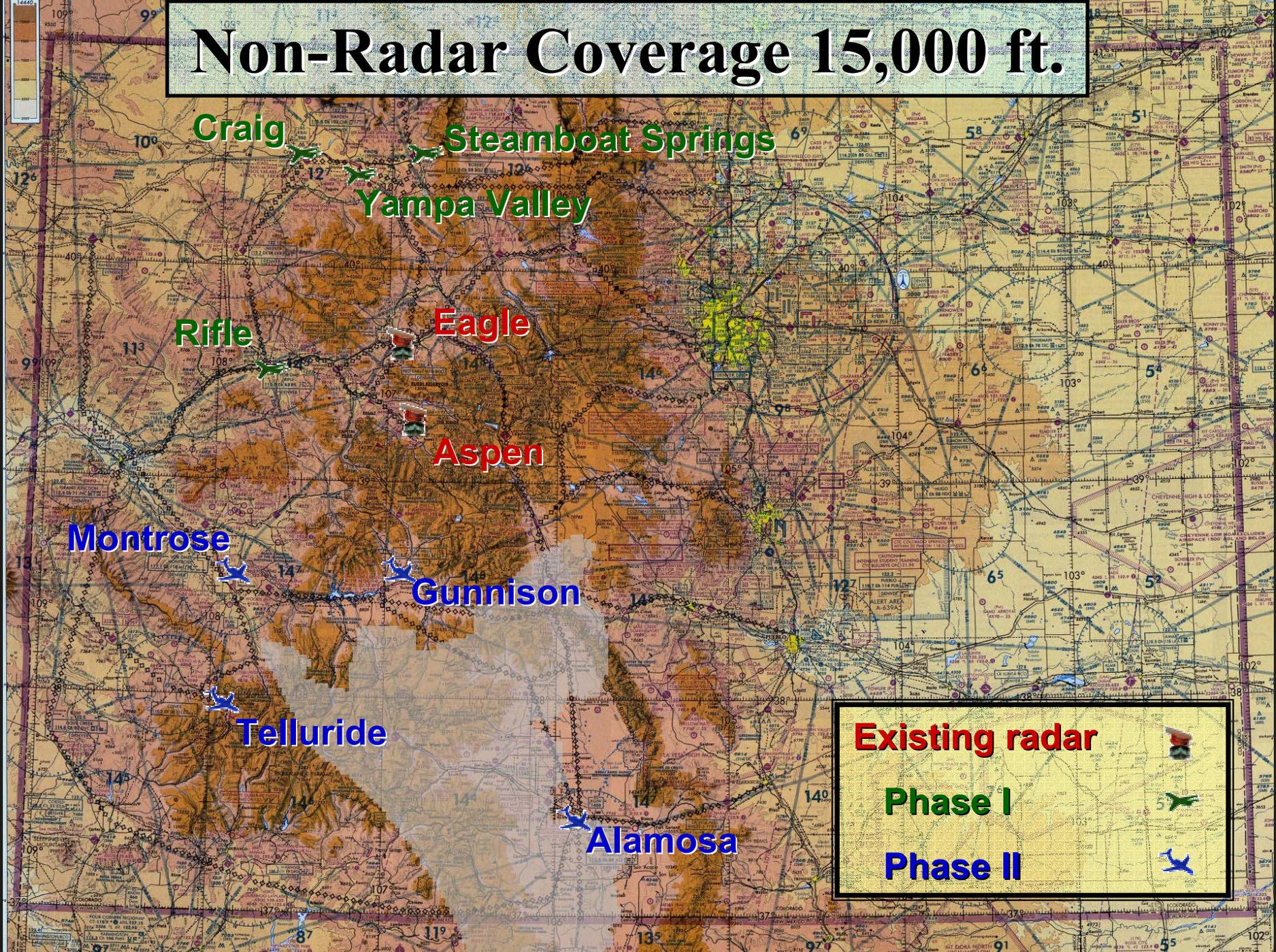
Telluride

Alamosa

Existing radar

Phase I

Phase II



# Non-Radar Coverage 13,000 ft.

Craig

Steamboat Springs

Yampa Valley

Rifle

Eagle

Aspen

Montrose

Gunnison

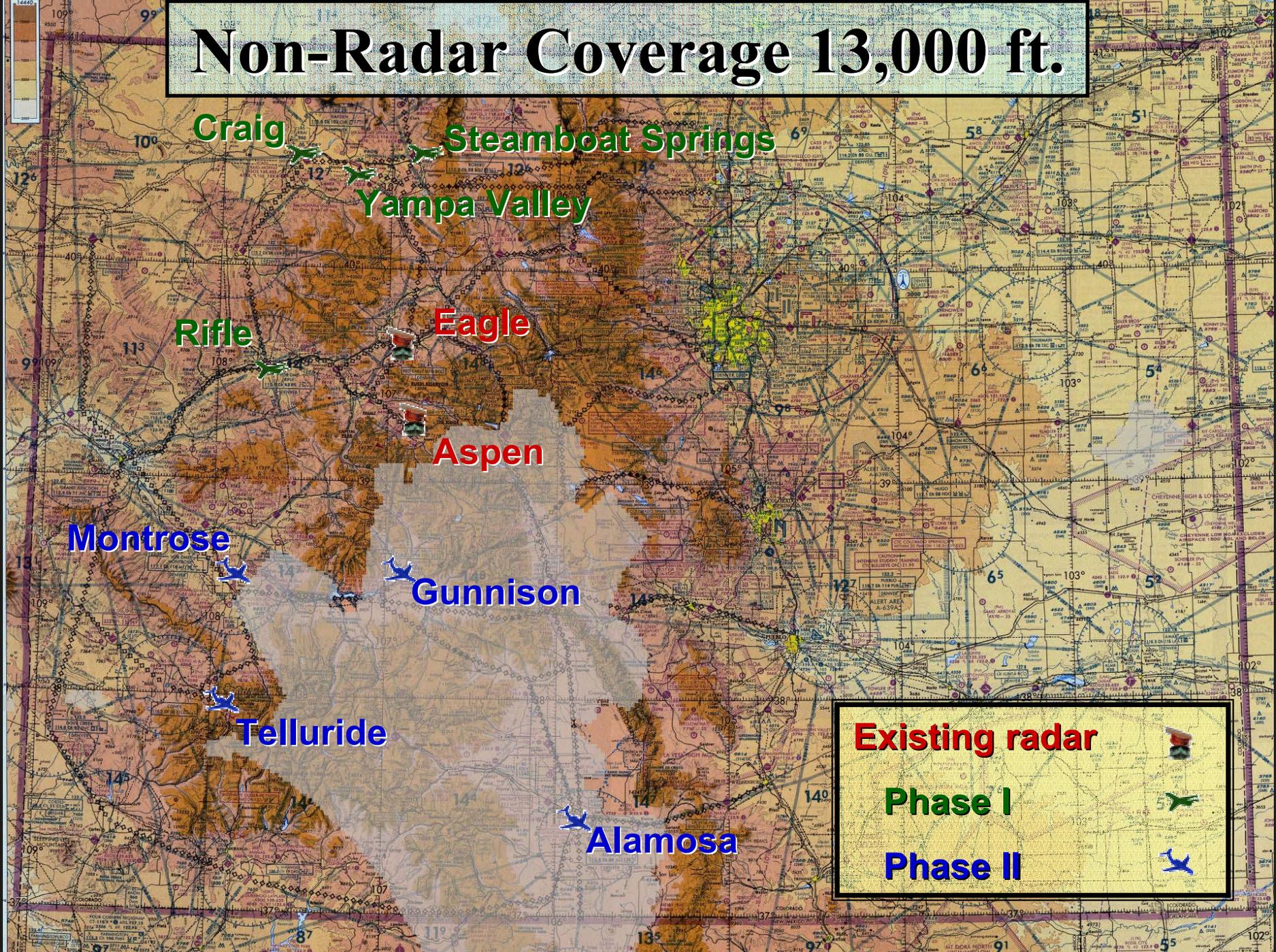
Telluride

Alamosa

Existing radar

Phase I

Phase II



# Non-Radar Coverage 11,000 ft.

Craig

Steamboat Springs

Yampa Valley

Rifle

Eagle

Aspen

Montrose

Gunnison

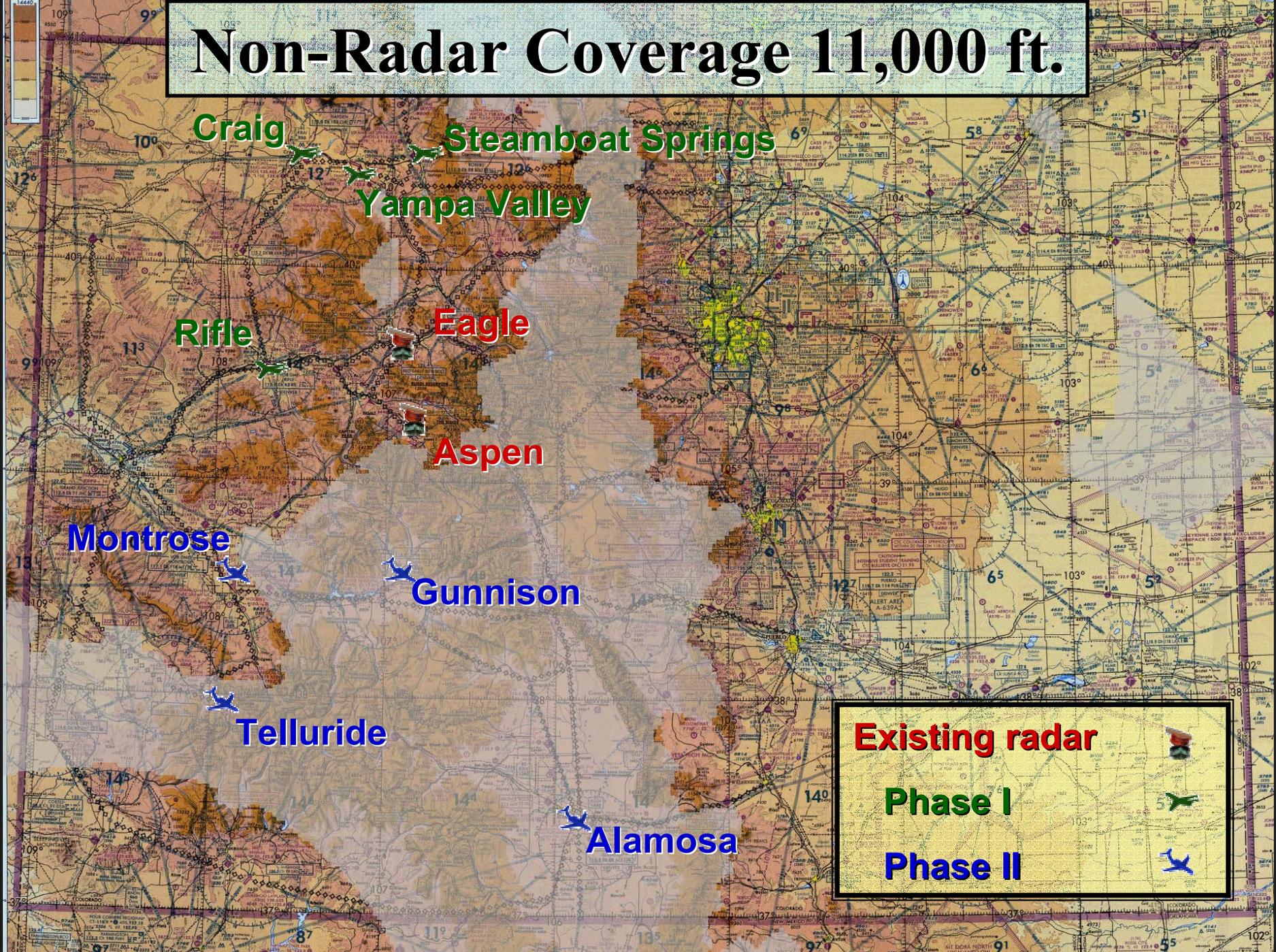
Telluride

Alamosa

Existing radar

Phase I

Phase II



# Non-Radar Coverage 9,000 ft.

Craig

Steamboat Springs

Yampa Valley

Rifle

Eagle

Aspen

Montrose

Gunnison

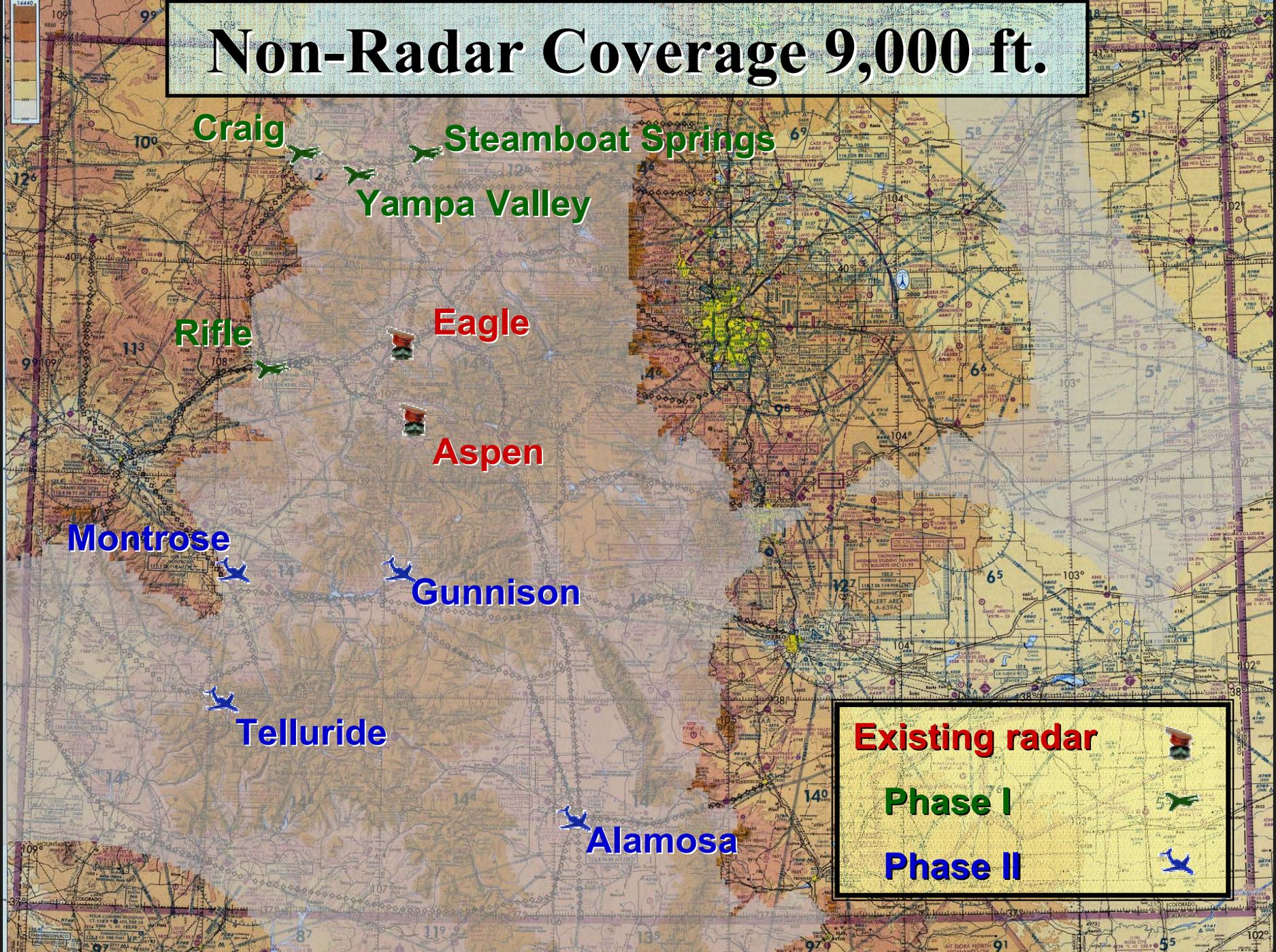
Telluride

Alamosa

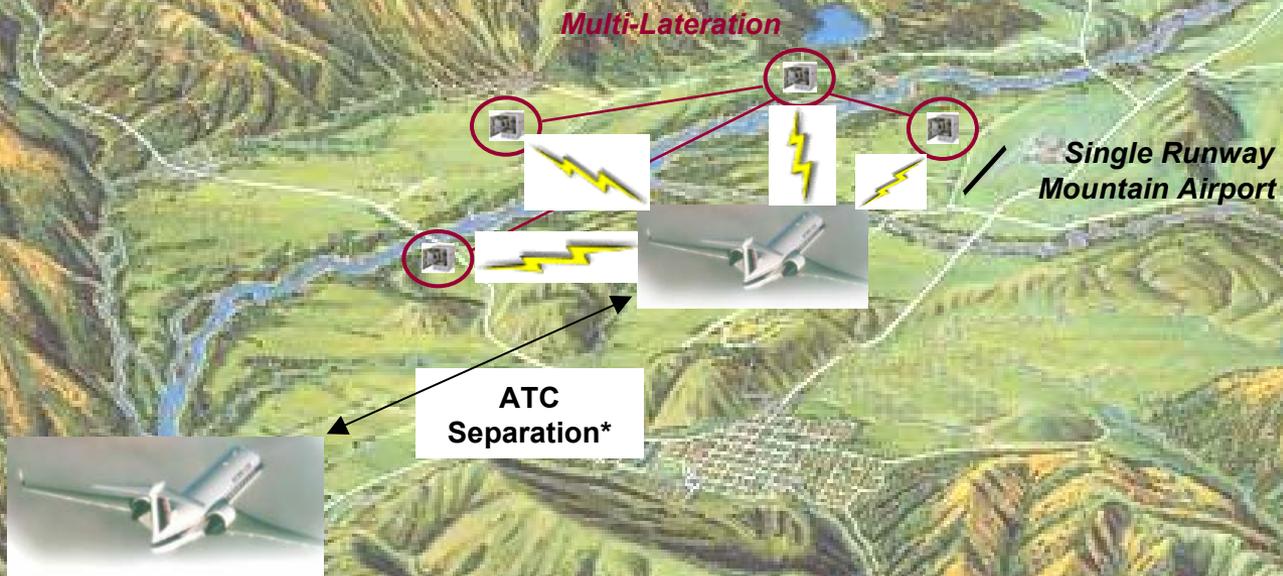
Existing radar

Phase I

Phase II



# Multi Lateration



\* Potentially Replace "One-In, One-Out Operation"

Typical Mountain Airport Approach

**ASE: Green**

**EGE: Red**

**RIL: Dark blue**

**HDN: Light blue**

**GUC: Yellow**

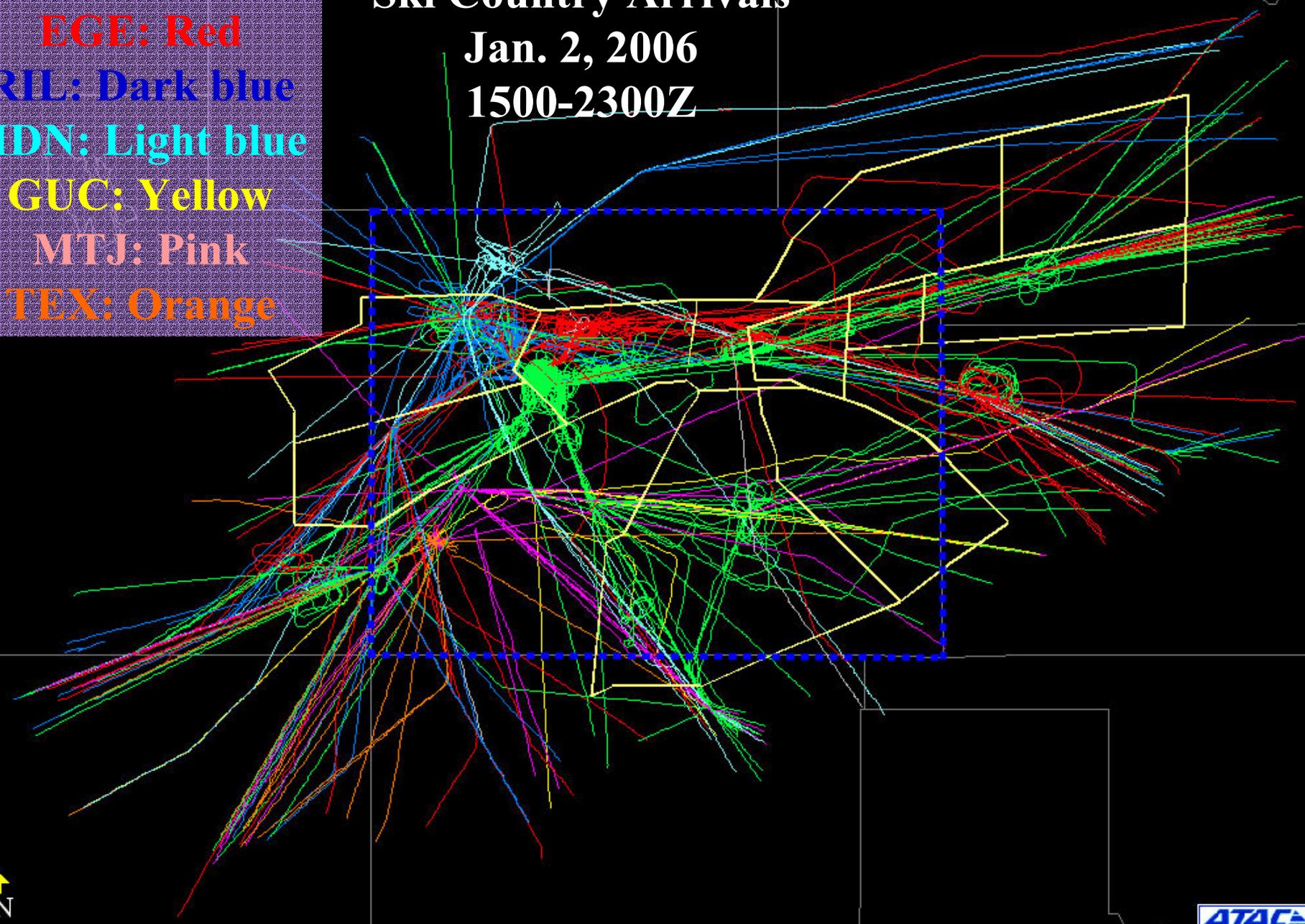
**MTJ: Pink**

**TEX: Orange**

# Ski Country Arrivals

**Jan. 2, 2006**

**1500-2300Z**



**ASE: Green**

**EGE: Red**

**RIL: Dark blue**

**HDN: Light blue**

**GUC: Yellow**

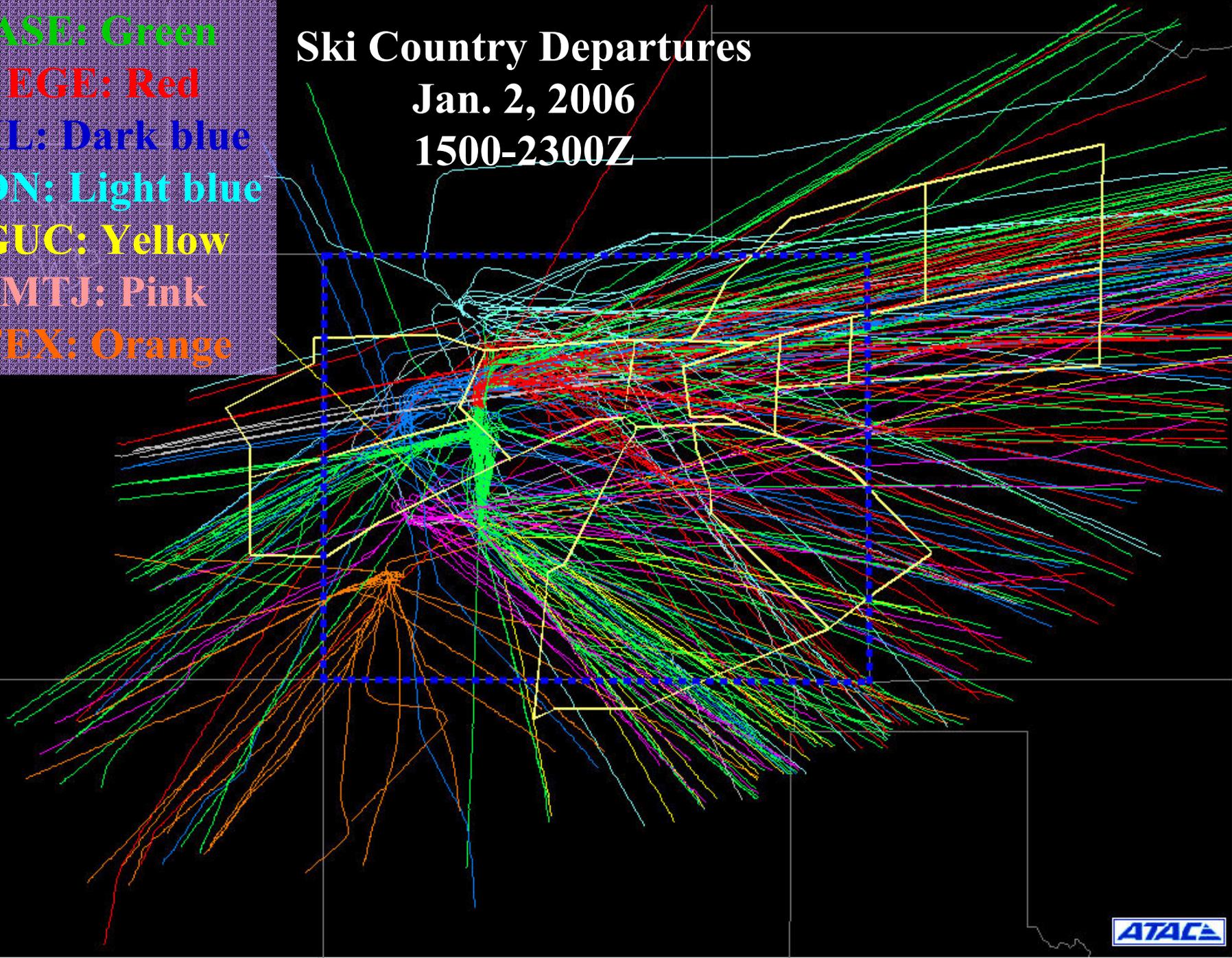
**MTJ: Pink**

**TEX: Orange**

# Ski Country Departures

Jan. 2, 2006

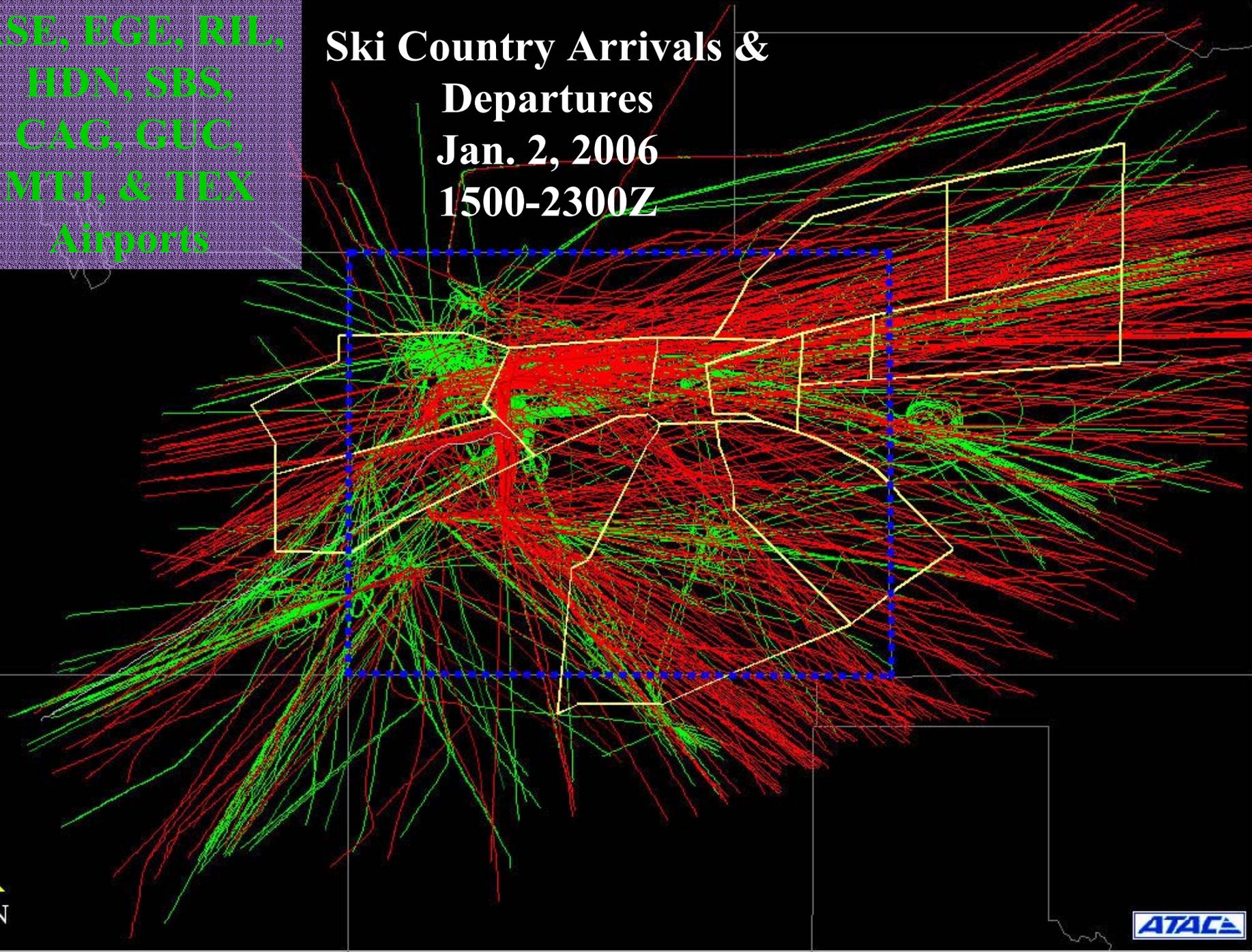
1500-2300Z



ASE, EGE, RIL,  
HDN, SBS,  
CAG, GUC,  
MTJ, & TEX  
Airports

# Ski Country Arrivals & Departures

Jan. 2, 2006  
1500-2300Z



# Benefits of Improved Surveillance

- ➔ **Enhanced Safety** - Increase safety by being able to see aircraft that are currently outside radar coverage.
- ➔ **Improve Overall Flow Efficiency** - Improve arrival and departure efficiency into and out of DIA, as well as mountain airports.
- ➔ **Economic Benefits** - Reduce lost revenue at Colorado ski areas due to diversions of flights to other than destination airports. Improved surveillance translates into more efficient flight tracks, which means less fuel burned and increased hourly capacity at Colorado's Mountain Airports. **Total Benefit \$132 Million**
- ➔ **Multi-Modal Benefits** - Reduction of traffic on highways due to flights being diverted to other than destination airports.