

# FAA NAS Enterprise Architecture Briefing

## Tying it Altogether

Presented at: NAS Performance Workshop

By: Jesse Wijntjes

Date: April 15, 2009



# Objective

- **Overview/Background**
- **NAS EA Framework**
- **NAS EA Architecture Views**
- **NAS EA Roadmaps**
- **NAS EA Portal / Conference**
- **Wrap Up**



# Why Architect ?

- **Enterprise architecture (EA)** provides the **structure** to **relate** organizational mission, vision, and **goals** to business processes and the technical or IT infrastructure required to execute them
  - An orderly arrangement of parts; structure - a style and method of design and construction

- **System architecture** relates requirements and the external world to system structures, including both hardware and software, so that the effectiveness of a system design concept can be communicated
- **Software architecture** relates requirements, fixed system hardware, and infrastructure to software structures in order to demonstrate software effectiveness

You'll recognize these...

But maybe not this...



Stairs to Nowhere



Door to Nowhere

# Why EA?

People

Process

Technology

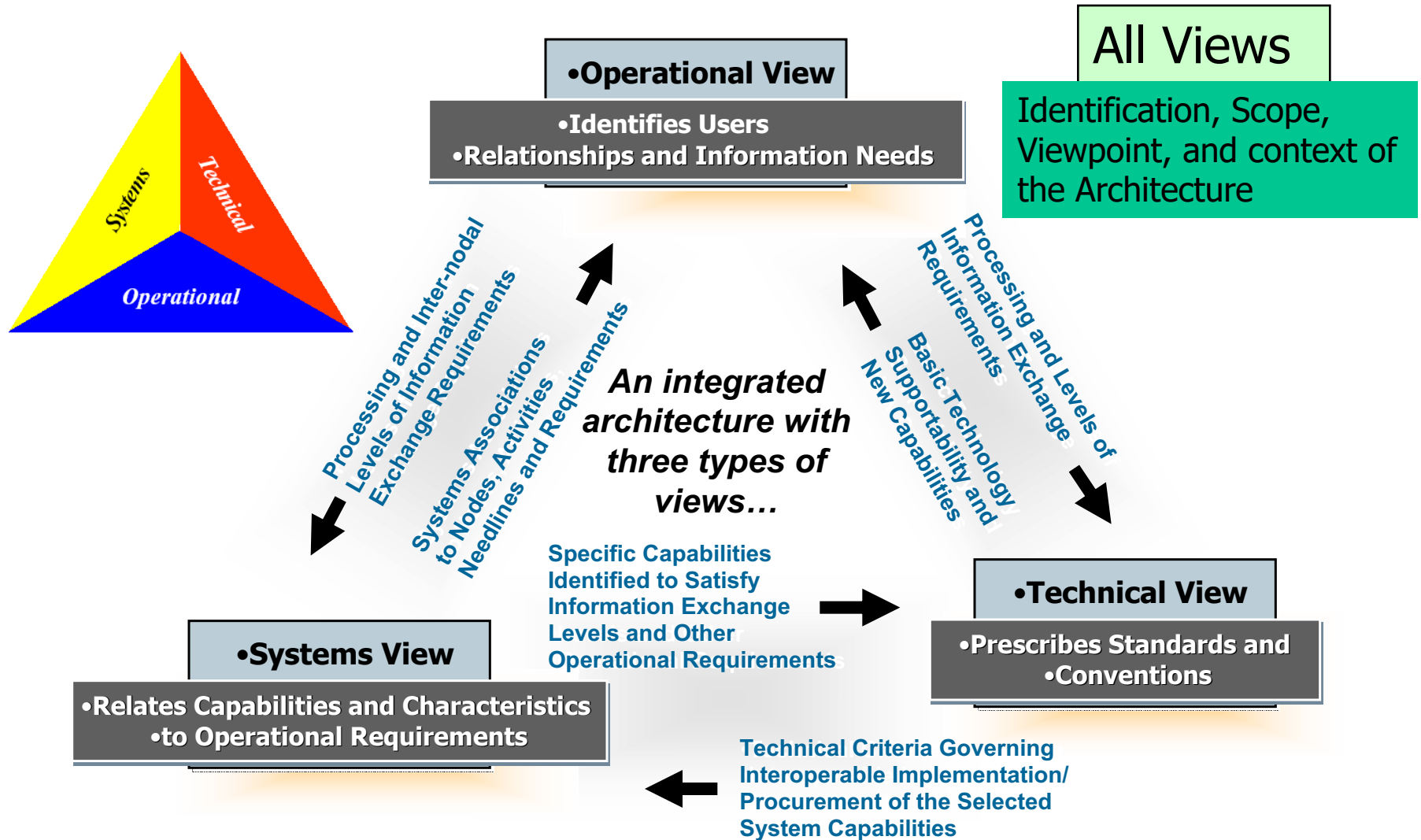
Business

- Improve the **alignment** of systems and technologies with the mission/business needs of the operators and the organization
- **Identify** duplication of effort in mission and IT expenditures and facilitate the reduction of investments where applicable
- **Address** the need for increased efficiency in information exchange and interoperability
- **Provide** a common language to facilitate linkages and communications between complex architectures & organizations
- Provide a unifying approach to minimize the burden for the collection, storage, and access to data
- **Facilitate** efficient identification of necessary changes and change implementation – identifies reuse opportunities
- Helps provide a framework for managing change during spiral and evolutionary development
- And, because the OMB and GAO says so





# DoD Architecture Framework (DoDAF)



# Enterprise Architecture – Aligning the Mission, Benefits, and Capabilities with Investments

- The FAA has developed and is using an EA to manage the portfolio of investments
- The FAA's EA aligns with the DoT EA and FEA
- The EA has two components: Operational Systems and Regulatory/Administrative
- The EA contains architecture products and views which describe the current NAS portfolio and the target architecture including the definition of the mid term
- The EA also contains roadmaps to describe the transition from the current portfolio to the target architecture
- The EA is aligned with the Agency's goals and strategic objectives as well as the budget



# \$ ↔ Mission ↔ Services ↔ Infrastructure

Public Law – U.S. Code  
< Title 31: Money & Finance >

Public Law – U.S. Code  
< Title 49: Transportation >

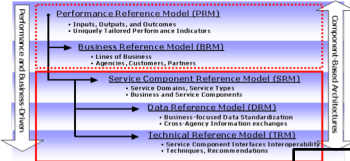
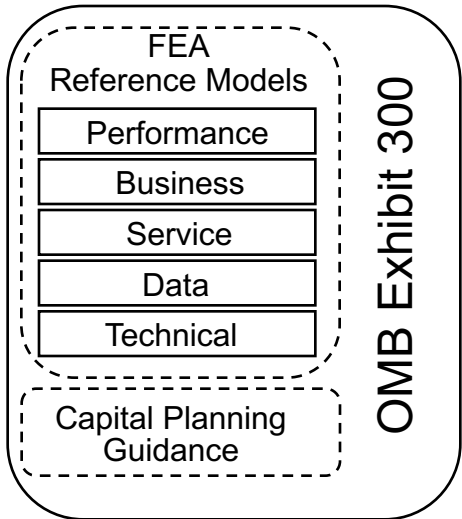
Regulations – CFR  
< Title 14: Aeronautics & Space >

- FAR
- ICAO Convention
- SARP
- PANS

President's Budget

OMB

OMB A-11



- Mission
- Appropriation

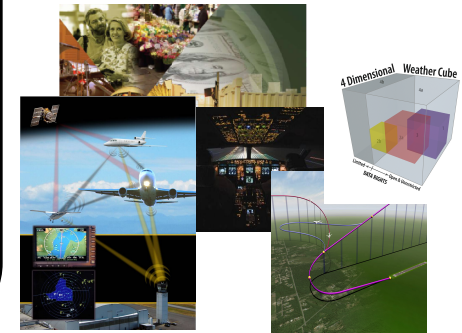
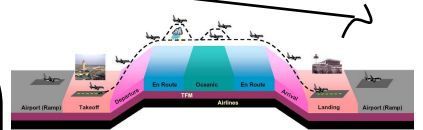
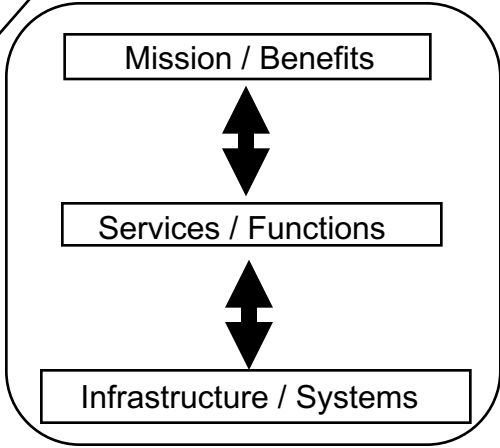
Dept of Transportation (EA)

FAA (Enterprise Architecture)

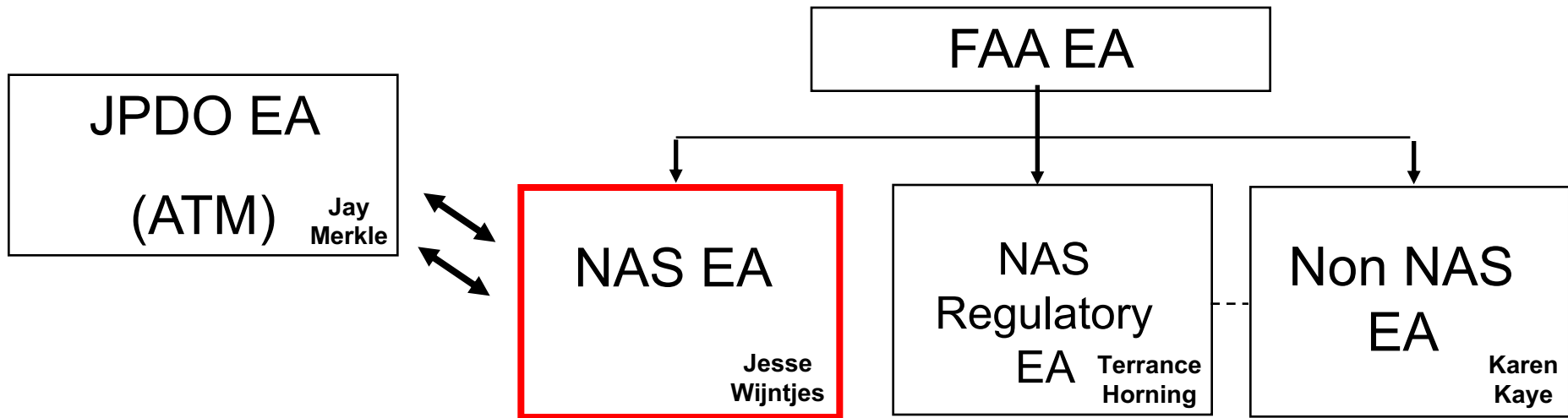
Regulatory & Admin EA

National Airspace System EA

Agency EA Aligns with FEA



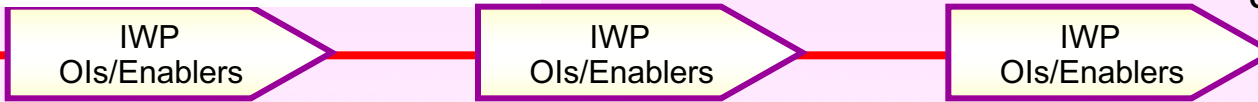
# Overview - FAA Enterprise Architecture



- FAA Enterprise Architecture (EA) has three parts
  - NAS - Activities that support Operational Air Traffic Services
  - Regulatory - Activities that support the FAA Mission
  - Administrative - Activities that support operation of the FAA
- FAA CIO has responsibility for entire FAA EA - Delegates responsibility to develop and implement NAS EA to ATO COO

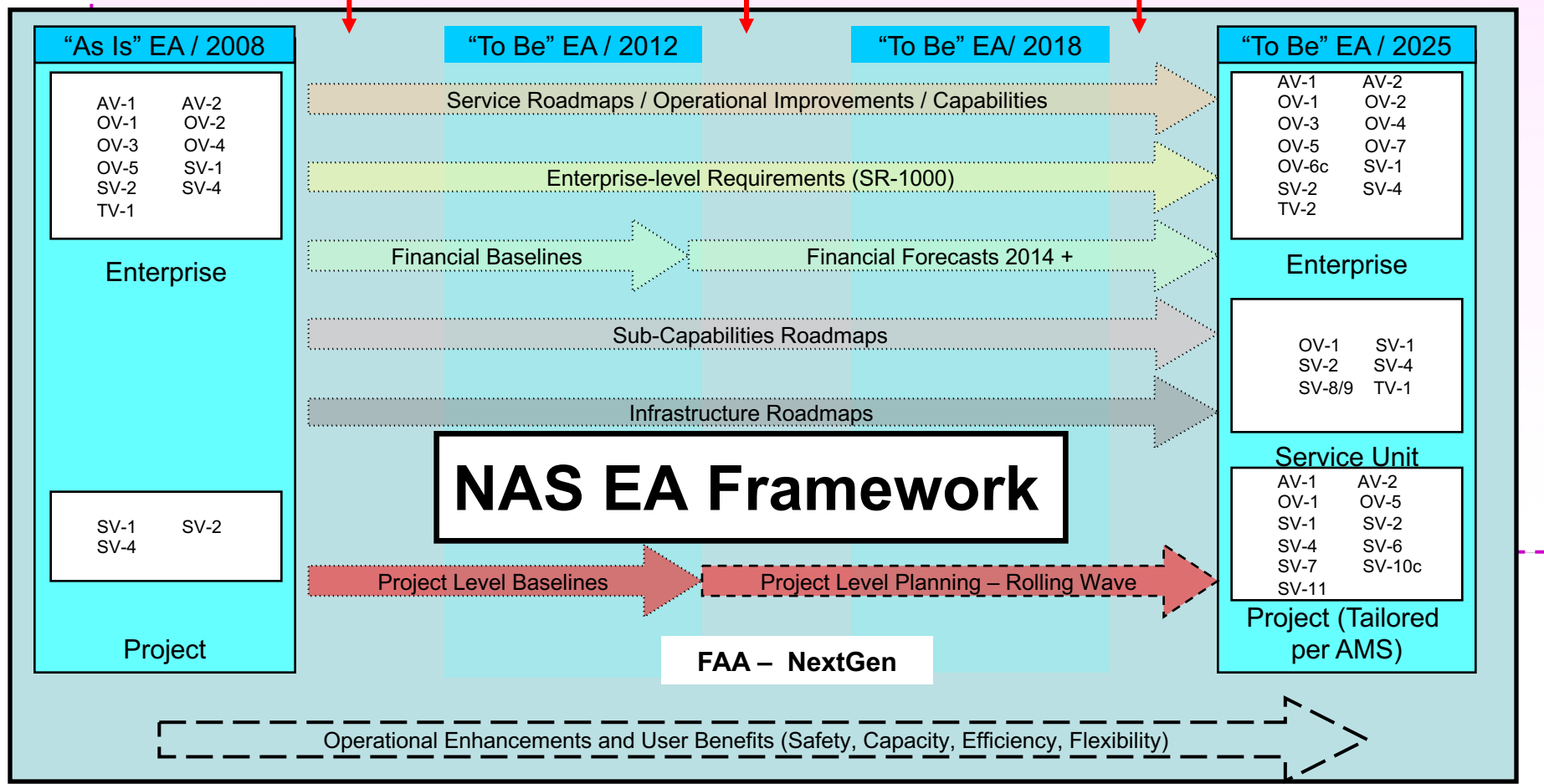
**JPDO - NextGen – External Stakeholders**

AV-1, AV-2,  
OV-1, 2, 3, 5, 6c  
SV-1, 2, 4, 5H



**CONOPS (2025)**

2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 +



**FAA – NextGen**



**Current  
2008**

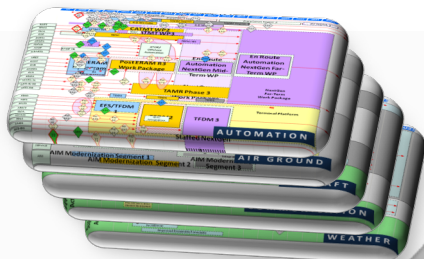
**"As Is" EA / 2008**

AV-1	AV-2
OV-1	OV-2
OV-3	OV-4
OV-5	SV-1
SV-2	SV-4
TV-1	

Enterprise

SV-1	SV-2
SV-4	

Project



**NextGen  
2025+**

**"To Be" EA / 2025+**

AV-1	AV-2
OV-1	OV-2
OV-3	OV-4
OV-5	OV-7
OV-6c	SV-1
SV-2	SV-4
TV-2	

Enterprise

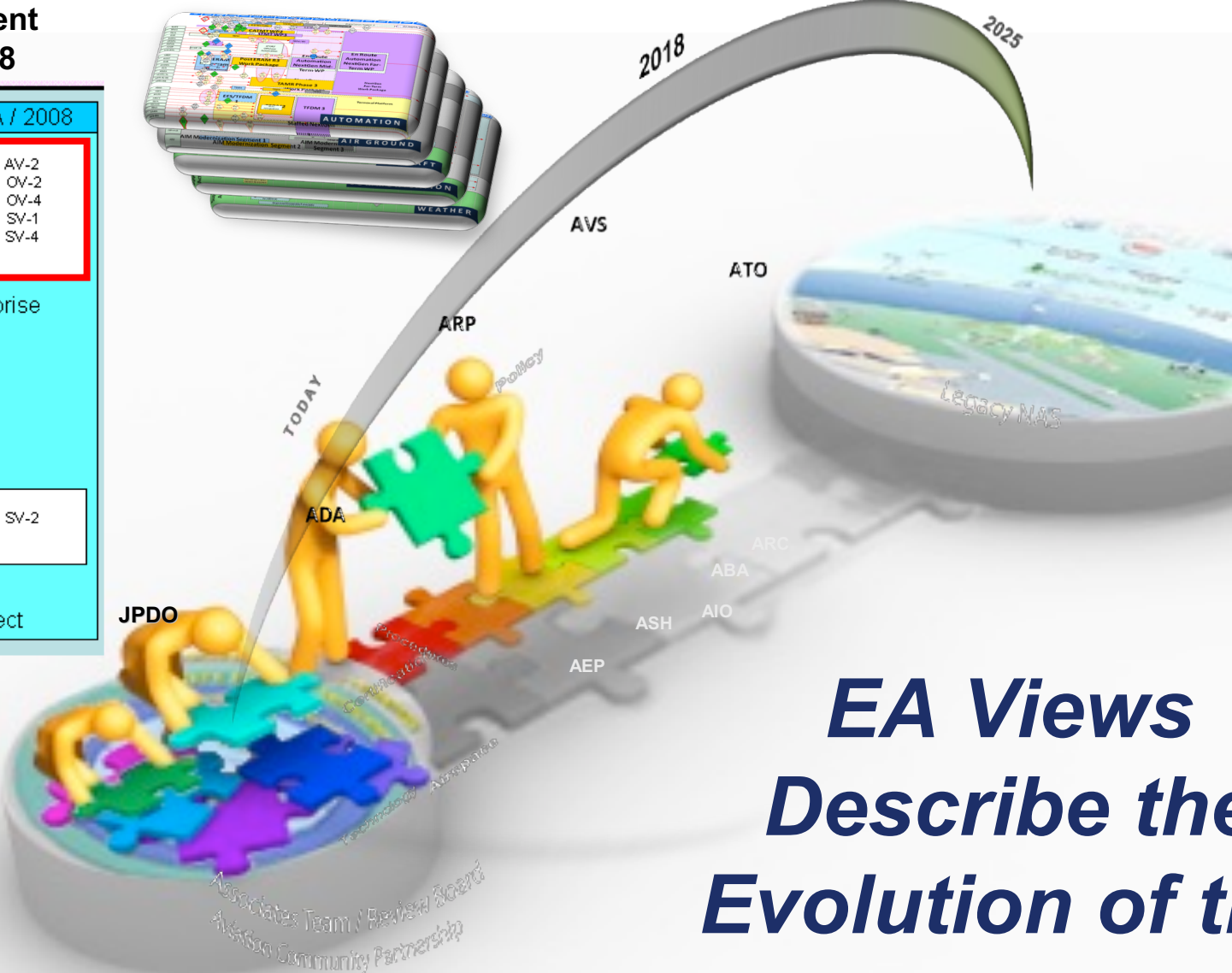
OV-1	SV-1
SV-2	SV-4
SV-8/9	TV-1

Service Unit

AV-1	AV-2
OV-1	OV-5
SV-1	SV-2
SV-4	SV-6
SV-7	SV-10c
SV-11	

Project (Tailored per AMS)

# EA Views Describe the Evolution of the NAS

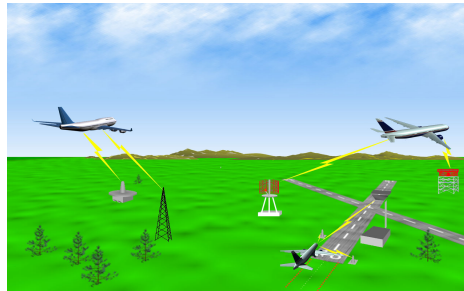
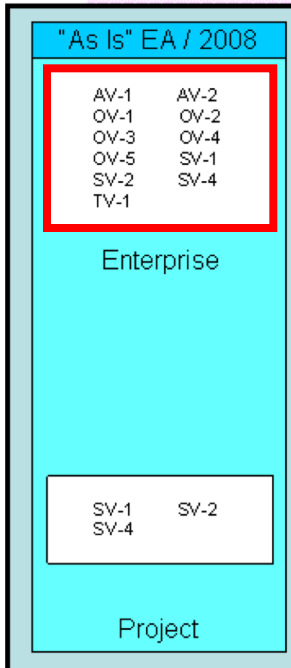


*Associates Team / Boeing / Scientific Aviation Community Partnership*

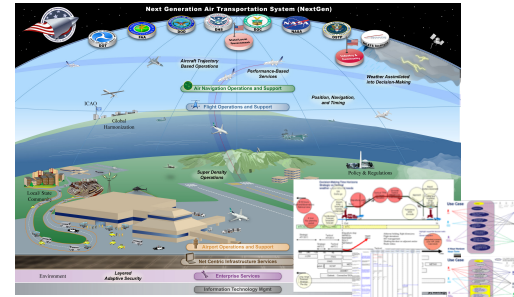


# Architecture Views Frame the Evolution of the NAS

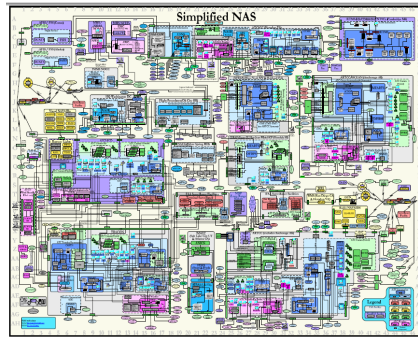
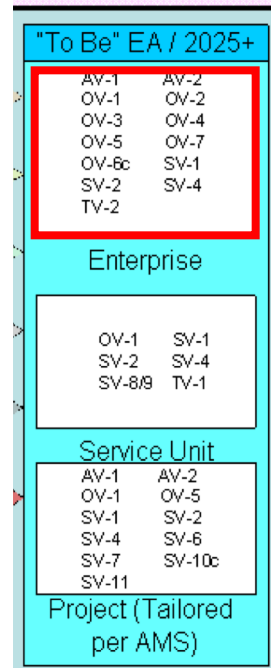
**Current  
2008**



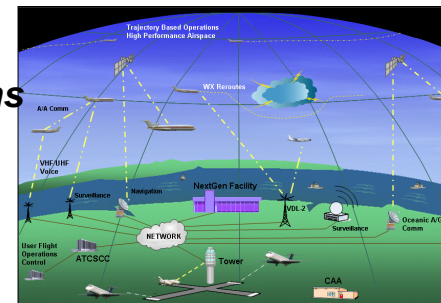
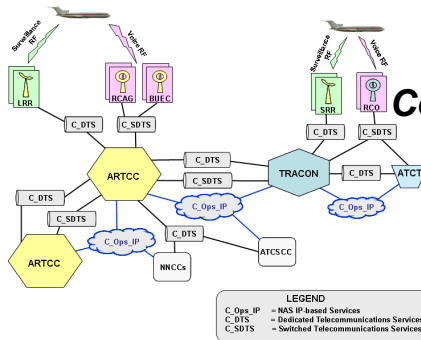
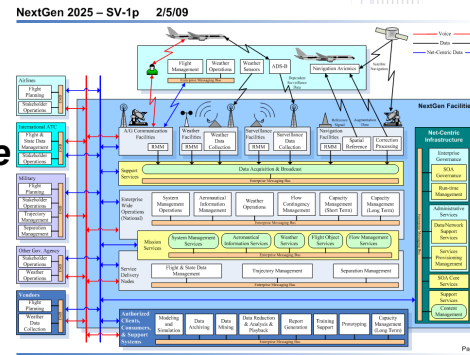
**Ops  
Concepts**  
→  
**OV-1**



**NextGen  
2025+**



**System  
Architecture**  
→  
**SV-1**

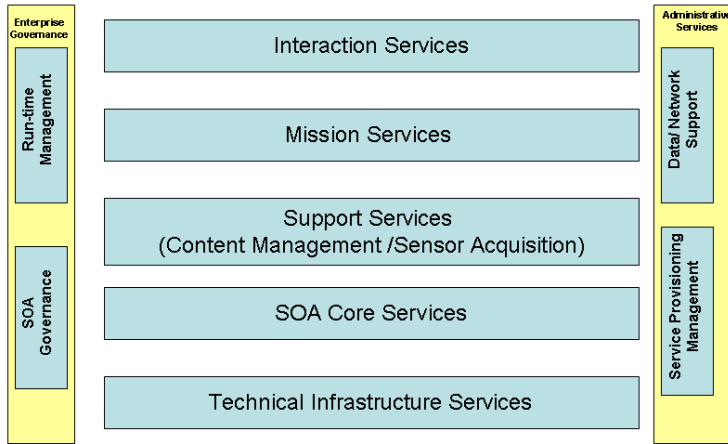


*other EA views too...*

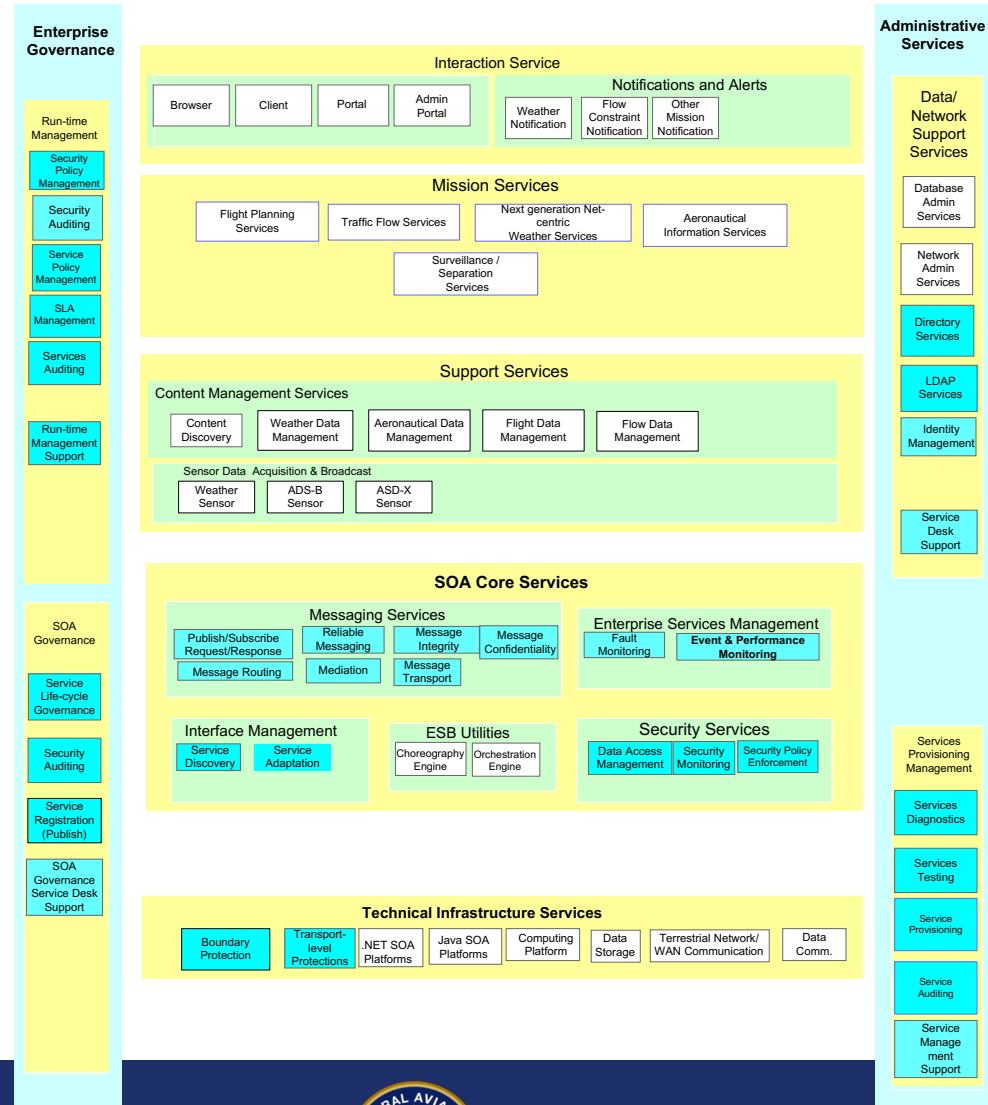
# SV-4 for NextGen -Functionality

**DRAFT - WORK IN PROGRESS**

## Simplified SV-4 Framework



1



# TV-1 for NextGen – Tech Standards

**DRAFT - WORK IN PROGRESS**

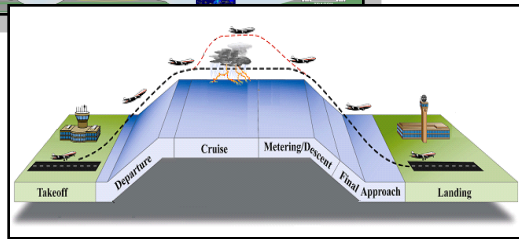
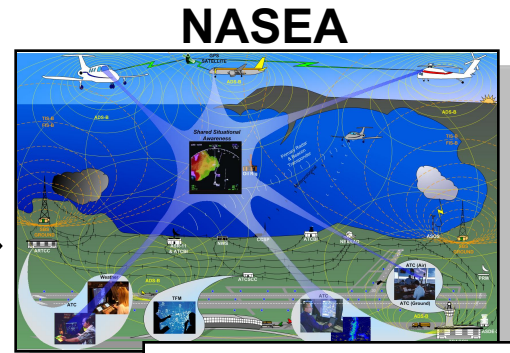
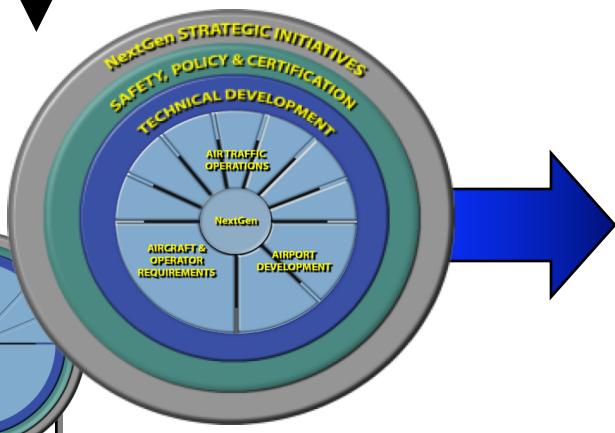
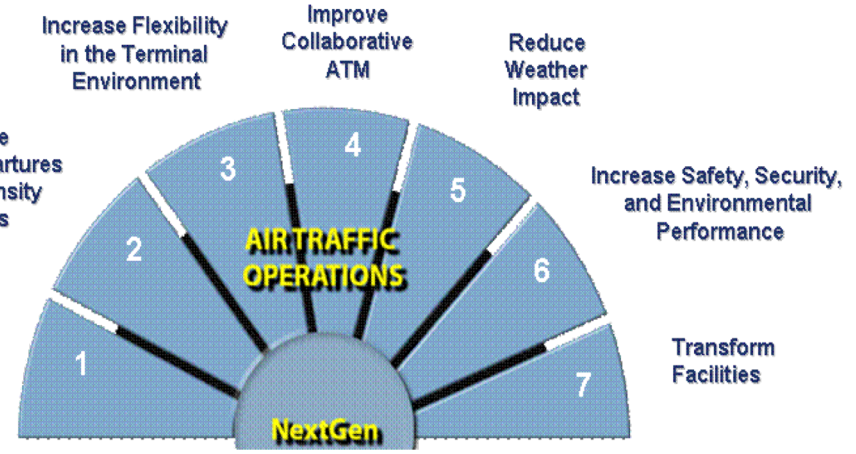
Standard Designation	Standard Title	Standard Date	Status	Source
<b>1.0 NAS IT Policies and Guidance</b>				
ITMRA of 1996	Information Technology Management Reform Act of 1996		active	NASEA Training
OMB Circular A-130	Management of Federal Information Resources		active	NASEA Training
<b>2.0 Information Processing Standards</b>				
<b>2.1 Software Engineering Services</b>				
MIL-STD-498	Software Development and Documentation	December 5, 1994	active	Automation
ANSI/ISO 9899-1999	ANSI Standard for the C Programming Language		active	Automation
ISO/IEC Std 14882:2003	Programming Language C++	October 1, 2003	active	Automation
<b>2.2 User Interface Services</b>				
FED-STD-795	Uniform Federal Accessibility Standards (UFAS)	April 1, 1998	active	Automation
IEEE Std 1003.1	Portable Operating System Interface Part 1 - Library Routines, Systems Calls and Header Files		active	Automation
ISO/IEC 9945.1	Conforming POSIX.1 Application Using Extensions	December 13, 2002	active	Automation
OSF Motif 2.1			active	Automation
CDE 2.1			active	Automation
<b>2.3 Data Management Services</b>				
<b>2.4 Document Interchange</b>				
HTTP v1.1	Hypertext Transfer Protocol (RFC 2616)	June 1, 1999	active	SWIM
XML v1.0 & v1.1	Extensible Markup Language (XML)	September 29, 2006	active	Weather & SWIM
XSD (working draft) v1.1	XML Schema Definition Language	June 20, 2008	active	Weather & SWIM

# EA Views – “Roadmaps”

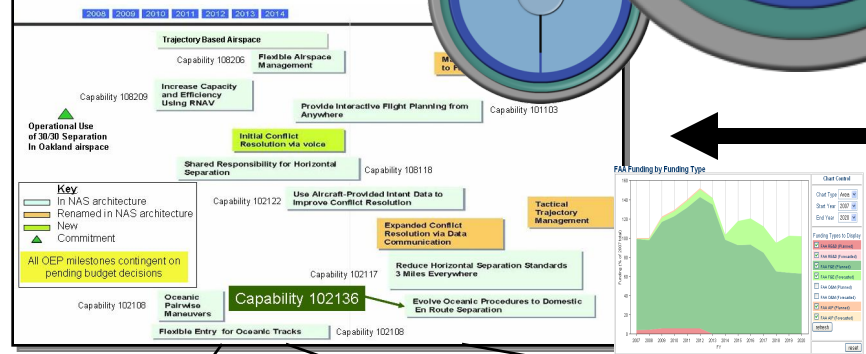


# NextGen Key Capabilities

Seven (7) Solution Sets address and deliver *Capacity, Efficiency, Safety and Security* benefits for air transportation operations



## Roadmap



## Programs

En Route Automation Modernization (ERAM)	NextGen Collision Avoidance System	NextGen Traffic Flow Management	SWIM	Aeronautical Data Link
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# Infrastructure Roadmaps

- **Infrastructure Roadmaps are...**
  - Used to define the FAA's *plan* for enterprise level system, sub-capabilities, and project evolution over time
  - Updated annually using an iterative process within a “swim lane” or Roadmap
- **“Swim Lanes/Roadmaps” for this year’s update are:**
  - **Aircraft** (Steve VanTrees), **Automation** (Chuck Romano), **Air-to-Ground** (new) (Ron Stroup), **Airspace & Procedures** (new) (Brian Holguin), **Communications** (Brent Phillips), **Facilities** (Chuck Dudas), **Navigation** (Dave Olsen), **Surveillance** (Jim Baird), **Weather** (Cheryl Souders), **Enterprise Services** (new) (Mike Hritz), **Human Systems Integration** (new) (Glen Hewitt), **Security** (new) (Ken Kepchar)
  - Roadmaps capture *decision points (and major milestones)*, assumptions, and dependencies
  - Infrastructure Roadmaps mapped to sub-capabilities and to the NextGen Solution Set OIs for this year’s update
  - Final products capture contributions from ATO service units, AVS, etc.

# Roadmap Enhancements from Last Year

- **New roadmaps – Air-to-Ground, Airspace & Procedures, Security, HSI, and Enterprise Services**
- **Broader participation - Human factors, Safety, RE&D, etc.**
- **Decision point reporting – revised framework and coding**
- **Integration of R & D activities – Roadmap Injection/Decision Pts (including TRL identification)**
- **Alignment of EA and Infrastructure Roadmaps with JPDO IWP Ols, OEP (NxtGenImp Plan) Ols & capabilities, and the service roadmaps – graphics and spreadsheets**
- **Addition of remaining sustainment efforts and legacy programs**



# New Decision Point Attribute/Coding



Decision Point (DP)/Commit



Planning DP



Higher Priority Decision Point



Completed

AMS Decision Points (IARD, IID, FID, BCD, ISD)



Policy



Strategy



Executive Level

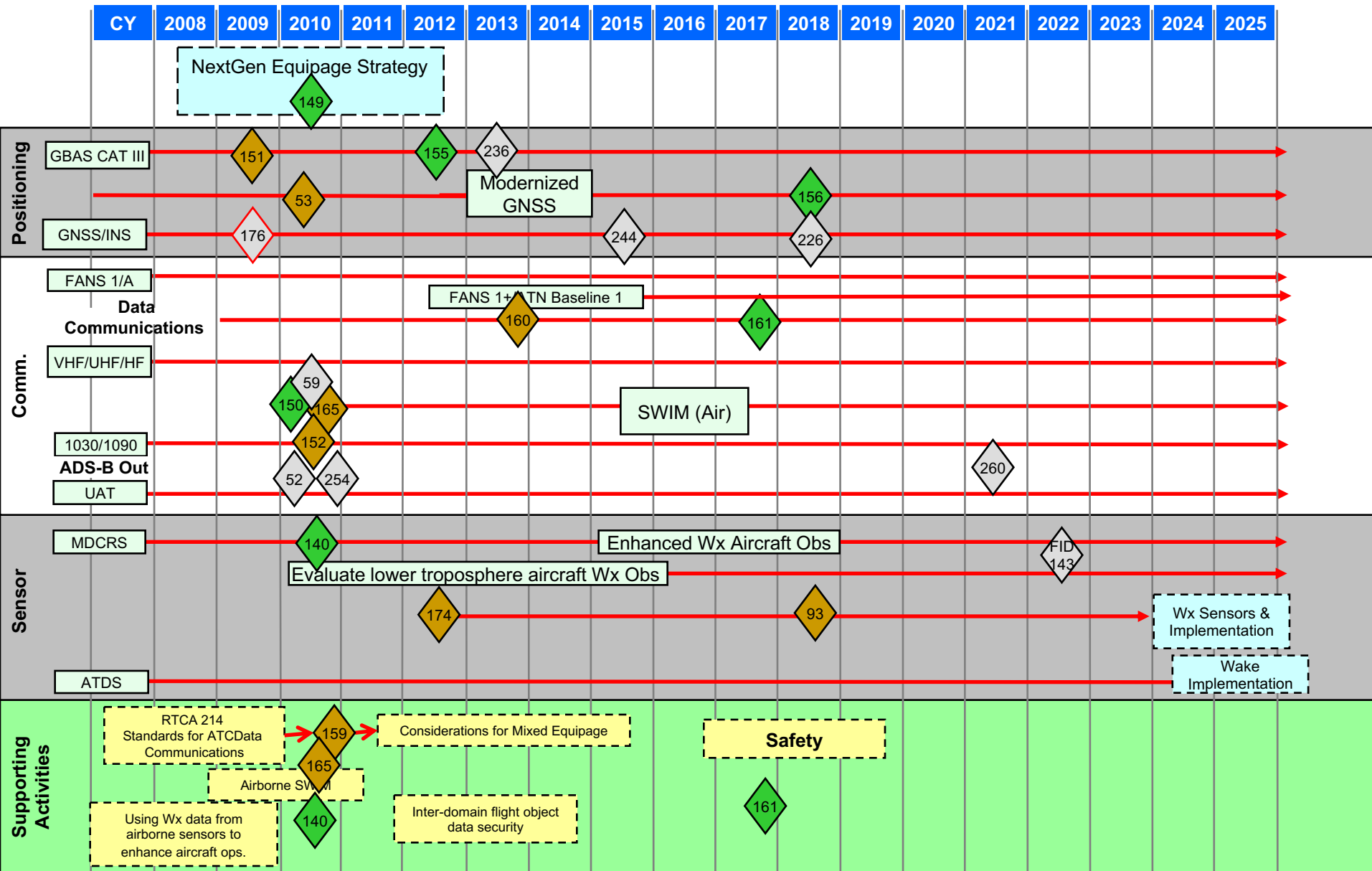


DP Owned by Another Roadmap

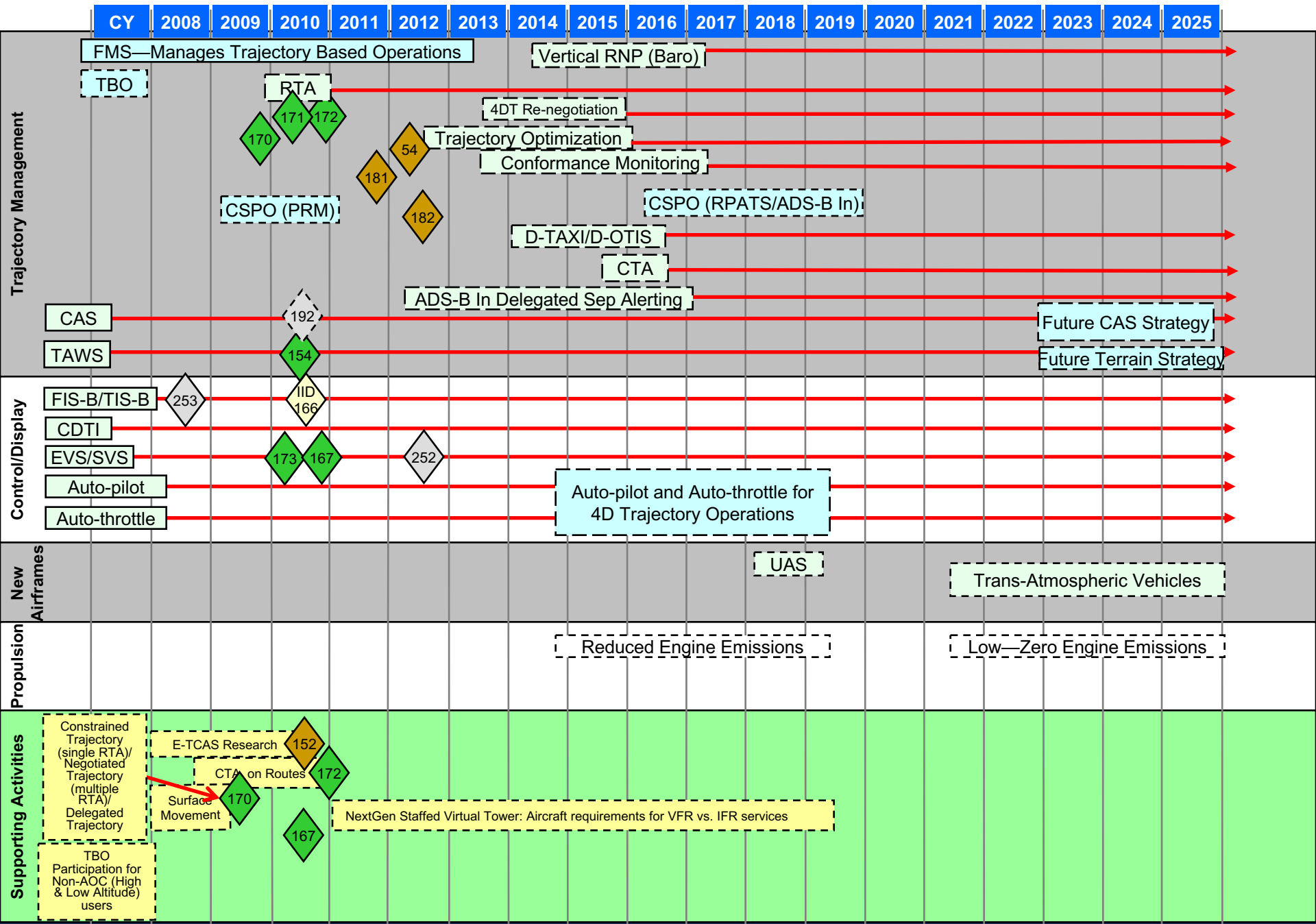


Border colored red if also a critical DP

# Aircraft Roadmap (1 of 2)



# Aircraft Roadmap (2 of 2)

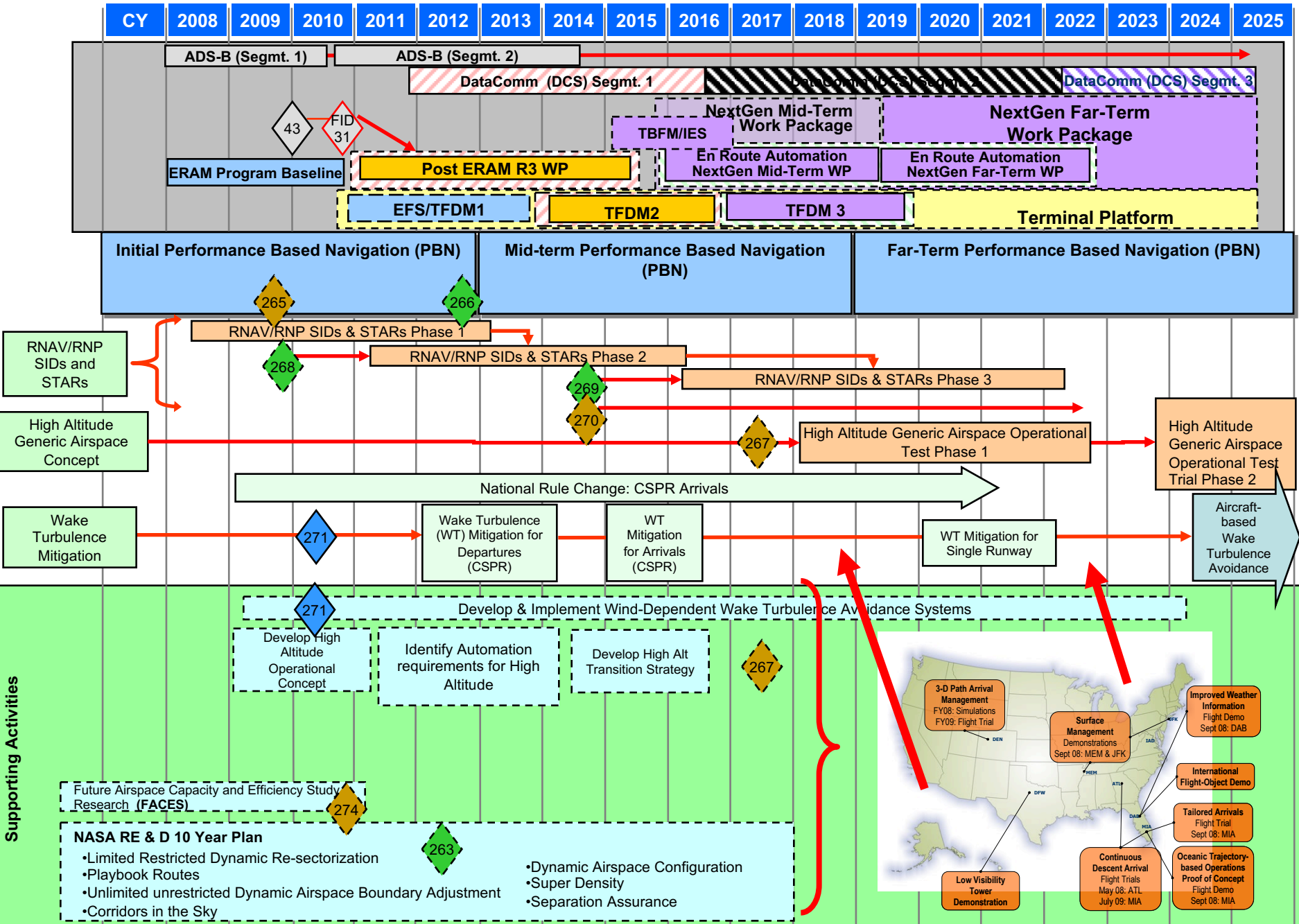








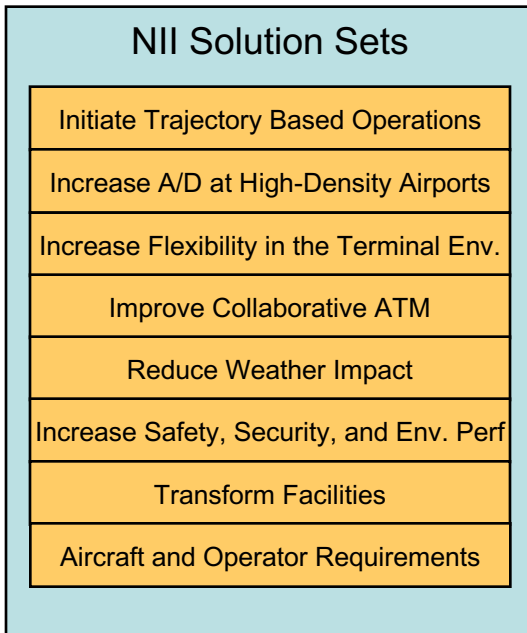
# Airspace & Procedures Roadmap (2 of 3)



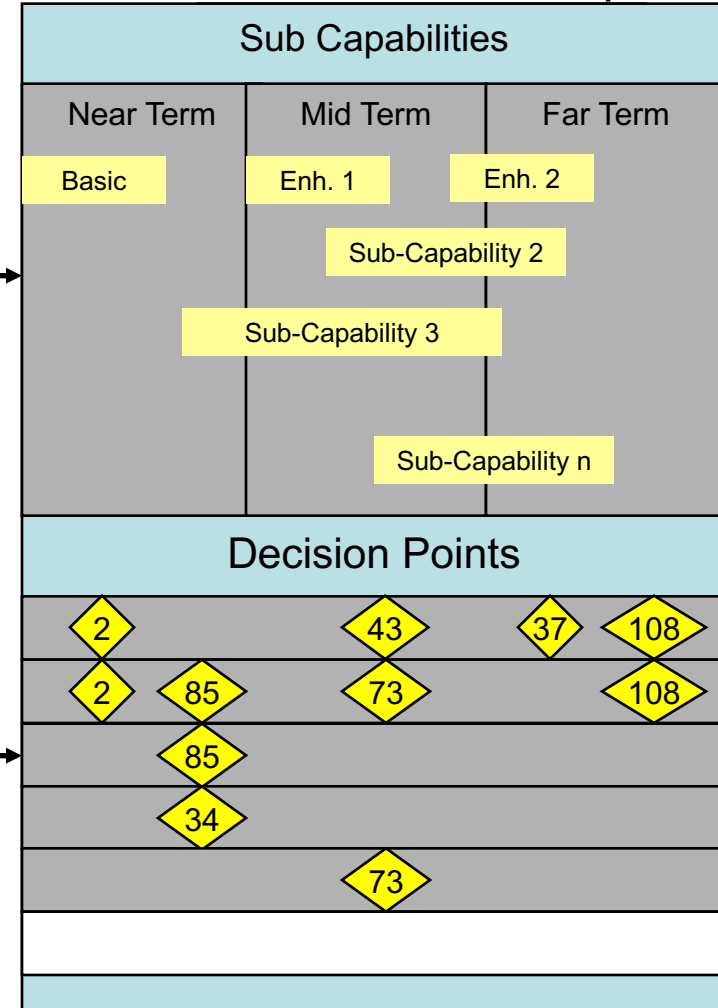
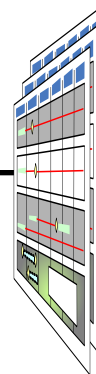
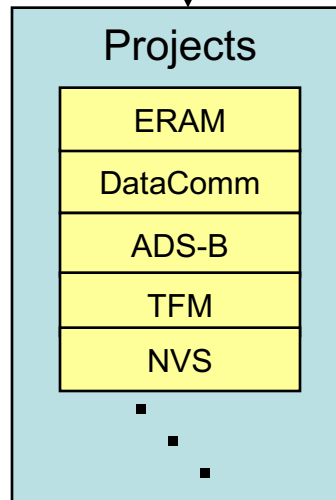
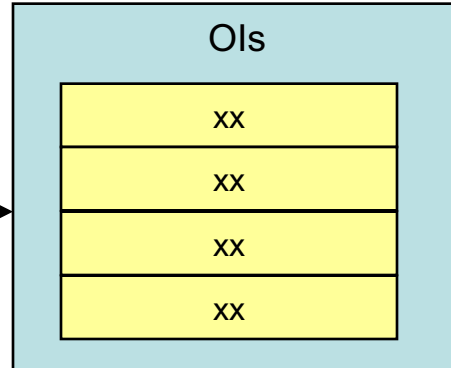
# Integration Framework - Alignment

## Infrastructure Roadmaps

### NGIP / Svc Roadmaps



*NextGen Imp Plan  
(NGIP)*

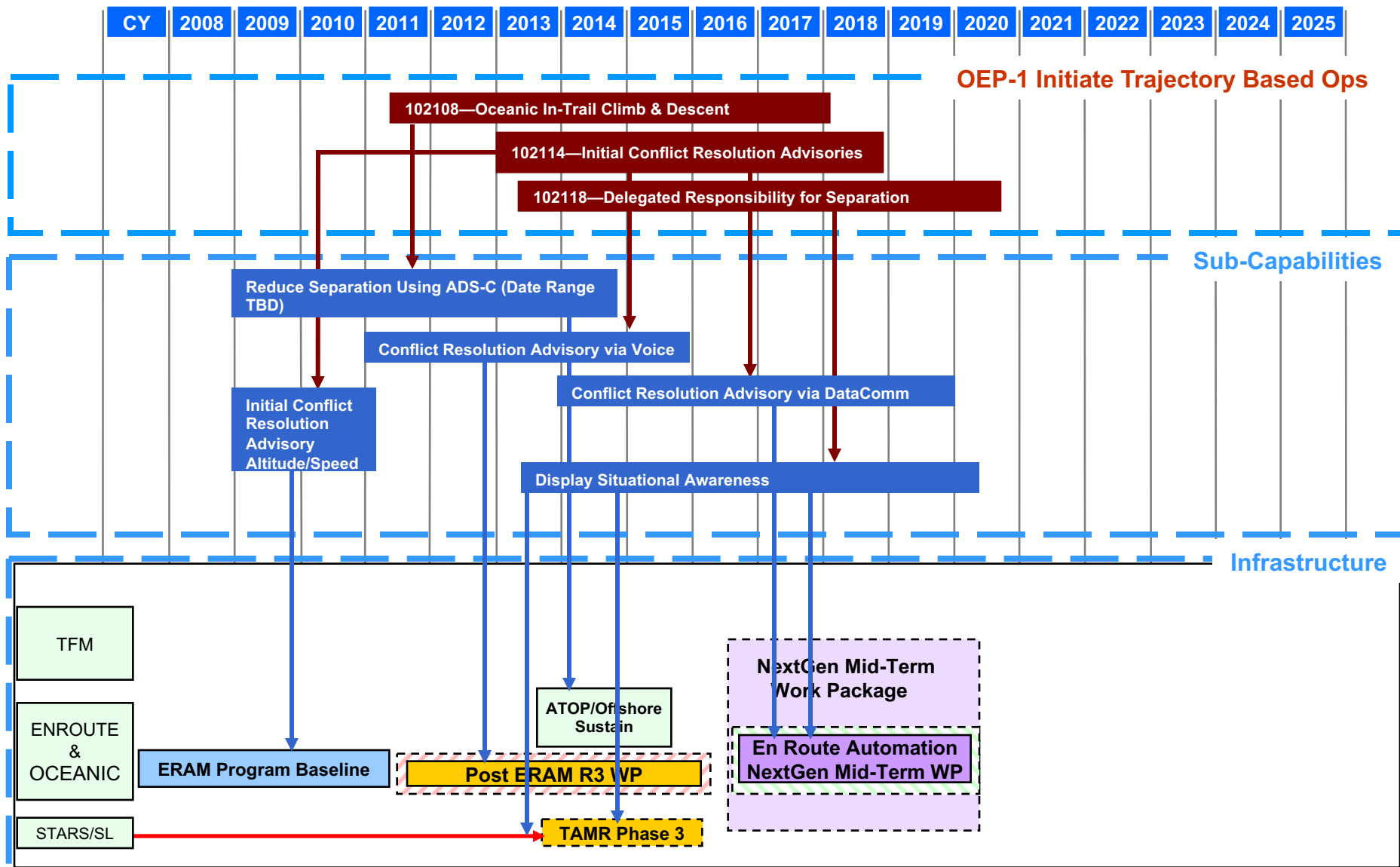


# Alignment Matrices

Roadmap	System/ Program	Sub-Capabilities (Functions)	Roadmap Date Range	Sol. Set Key Enabling Pgm Date Range	Decision Points	Issues/Risks/Comments
Aircraft	Voice Comm.	<ul style="list-style-type: none"> <li>7-004 Enhance Aircraft/ANSP Information Exchange—Negotiate</li> </ul>	2012-2025	2012-2018		Note: OI 102114 near/mid term and allows use of voice for Initial CRA.
Aircraft	Voice Comm.	<ul style="list-style-type: none"> <li>7-005 Enhance Aircraft/ANSP Information Exchange—Contract</li> </ul>	2012-2025	2012-2018		
Aircraft	Voice Comm.	<ul style="list-style-type: none"> <li>7-006 Enhance Aircraft/ANSP Information Exchange—Execute</li> </ul>	2012-2025	2012-2018		
Air/ Ground		<ul style="list-style-type: none"> <li>See Note</li> </ul>				<p>Note: The Air /Ground Team do not believe that this capability has any A/G applications with respect to NextGen applications. There are no Aircraft and Operator requirement in the NextGen Implementation Plan (NIP). It simply enhances existing ANSP DST's (i.e., URET) to provide rank-ordered resolutions.</p> <p>Current communications with the aircraft will remain the same in the Mid-Term timeframe. The Far-Term OI # 104105, "Expanded Conflict Resolution via Data Communication" will have Air/ Ground implications; Air/Ground Sub-Capabilities will be addressed in that OI.</p>
Automation	ERAM Initial Baseline	<ul style="list-style-type: none"> <li>Initial conflict resolution advisory altitude/speed</li> </ul>	2009-2010	2013-2017		Update roadmap, concern about NextGen funding the implementation of this capability, process.
Automation	Post ERAM R3 WP	<ul style="list-style-type: none"> <li>Conflict resolution advisory via voice.</li> </ul>	2011-2015		31	Automation to take convection/turbulence into account in conflict resolution if this is determined to be suitable role of Automation.
Automation	ERAM Midterm WP	<ul style="list-style-type: none"> <li>Conflict resolution advisory via datacomm.</li> </ul>	2015-2019		75	Assume datacomm shows linkage to this capability in this timeframe.
Weather	WARP	<ul style="list-style-type: none"> <li>Enhanced Forecasts -Winds, Convection &amp; Turbulence</li> </ul>				Minimal support.

**SAMPLE**

# Automation Roadmap: Linkages (1 of 19)



# **‘09 Roadmap Activities / Focus Areas**

- Improve Integration and Alignment of Supporting Activities**
- Align EA with financial management systems**
- Align EA with benefits/models**
- Add DPs for CRD Readiness**
- Look for activities that may produce environmental benefits**
- Look for opportunities for convergence**
- Portfolio Management Definition Activities**
- JPDO Workgroup Activities – Alignment**
- Functional Integration Areas**





# NAS EA Portal Re-Design



# NAS EA Portal (NAS 6.0)

**Federal Aviation Administration**

**NAS 6 Toolset** Home {D} < login > < print > < comment > < help >

Home  
Site Search

FAQ  
Reference & Tutorial  
Downloads  
Submit Comment

PRM  
Programs Repository

**VIEWS**  
Executive  
NAS  
Financial  
Location  
Mechanisms  
Services

**Welcome to the FAA NAS Architecture 6**

This site is a tool for displaying the National Airspace System (NAS) Architecture 6. NAS Architecture 6 was released August 2006 as an update to NAS Architecture Version 5, released October 2003. Incorporating the FAA's strategic plans and programs, Architecture 6 represents a multi-year framework to measure progress in modernizing the NAS.

Use the left-hand navigation area to begin exploring !

Authorized users can also [Login](#) or [Register for an Account](#).

**Site Point of Contact**

For Further Information or questions, please use the [COMMENT](#) button.

**Recent Hit Record**

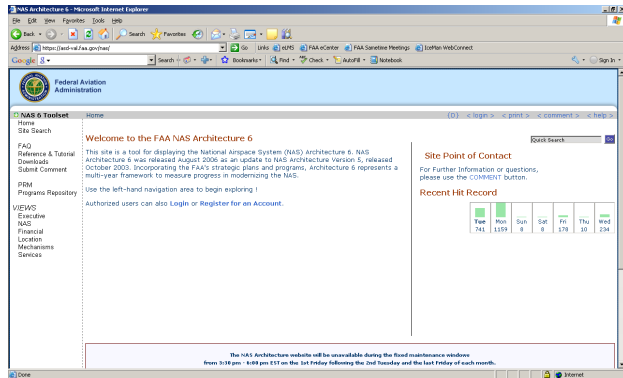
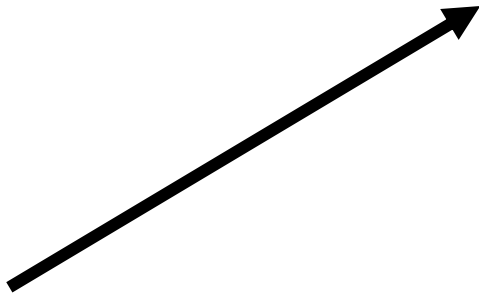
Tue	Mon	Sun	Sat	Fri	Thu	Wed
741	1159	8	8	178	10	234

The NAS Architecture website will be unavailable during the fixed maintenance windows from 3:30 pm - 6:00 pm EST on the 1st Friday following the 2nd Tuesday and the last Friday of each month.

<http://nas-architecture.faa.gov>

# NAS EA Portal Re-Design...

**Fall 2009  
Launch Date**



**Federal Aviation Administration**  
NAS Enterprise Architecture Portal

Help | Contact Us | Search [Go] Advanced Search

Overview For Executives For Enterprise For Service Units For Programs For IA For Engineers My NASEA

**NASEA Portal**  
National Airspace System  
Enterprise Architecture Portal  
*bringing the architecture to you*

**NAS Enterprise Architecture Topics**

- Executive View**  
Roadmaps, NAS Transition Roadmap...
- Enterprise Level Views**  
All Views, Operational Views, Service Views, Tech Views...
- Service Unit Level Views**  
AVs, OVs, SVs, TVs...
- As-Is / To-Be**  
Mission Threads, Current NAS, 2012, 2018, 2025...
- Operational Improvements**  
NextGen, JDPO, Enablers, Capabilities, User Benefits...
- Financial Views**  
Baseline, Forecast 2014+, CIP Alignment...
- Requirements**  
NextGen Conops, SR-1000...
- How can I learn more?**  
Training, References, Briefings, Dictionary...

**About the NASEA**

- Mission
- Organization
- Points of Contact
- Schedule of Updates

**Tools & Resources**

- NASEA Video
- System Architect
- SA/XT
- NextGen Portal
- Joint Planning Environment
- Programs Repository
- AMS

**Publications**

- NAS Transition Roadmap
- Simplified NAS Diagram (SV-1)
- NASEA Framework Vol I, II, III
- NARP

**NASEA News & Events**

**Nov 1** - Lorem ipsum dolor sit amet, consectetur adipiscing elit.  
**Oct 22** - Suspendisse nisl ante, aliquam nec, aliquam in, semper ac, odio.  
**Oct 19** - Nullam facilisis, orci vitae faucibus mollis, ipsum ipsum aliquet felis, sed porttitor nisi tortor at ipsum.

**NASEA For You**

- Executive
- Enterprise
- Service Units
- Programs
- Investment Analysis
- Engineers
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- Governance
- Service Areas
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- Policy
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- Safety

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 NASEA Portal Version: 0.3 ALPHA  
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 Federal Aviation Administration | Department of Transportation



# NAS EA Conference

- **First Annual NAS EA Conference planned for June 23-25, 2009 – Washington, DC Metro**

*Mark your calendars!!*

**<http://nasea.faa.gov/conference/2009>**

# Wrap Up

- Questions?

