

# NAS Enterprise Architecture

## Infrastructure Roadmaps Version 4.0a

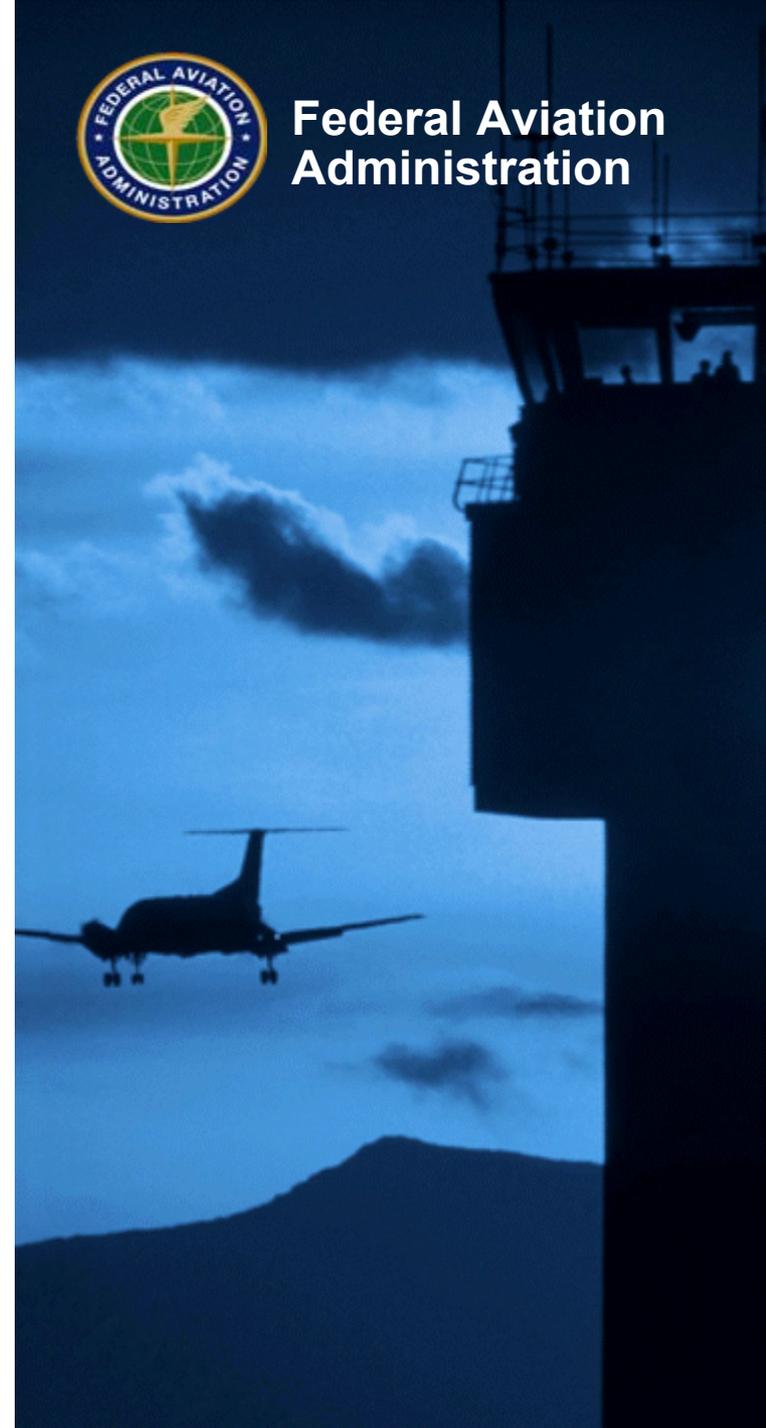
Aircraft—Air-Ground—Automation—Airport—Weather—  
Communication—Navigation—Surveillance—Airspace &  
Procedures—Enterprise Services—Facilities—Human  
Systems Integration—Information Systems Security—Safety

Approved

June 2, 2010



Federal Aviation  
Administration





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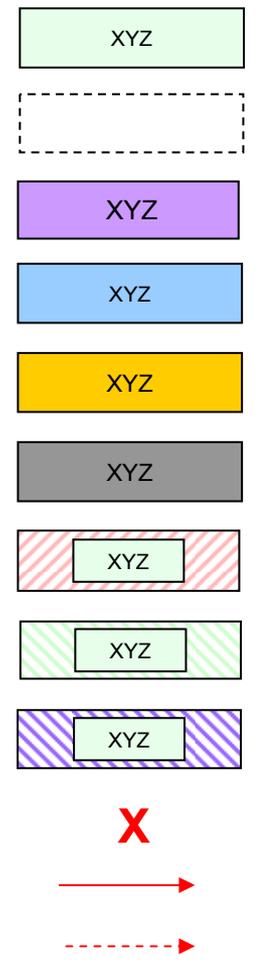
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# Infrastructure Roadmap Legend

2009 | 2010 | 2011



**Timeline**

**System**

**Functional System\***

**System related to Automation Convergence**

**System related to SWIM Segment 1**

**System related to SWIM Segment 2**

**System related to SWIM Segment 3**

**System related to Data Communications Segment 1**

**System related to Data Communications Segment 2**

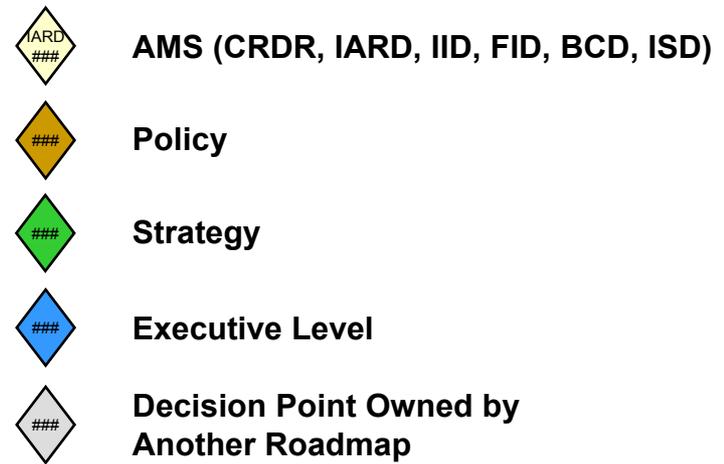
**System related to Data Communications Segment 3**

**Decommission**

**System successor**

**System in Draw-Down Mode**

## Decision Point Fill Colors



**AMS (CRDR, IARD, IID, FID, BCD, ISD)**

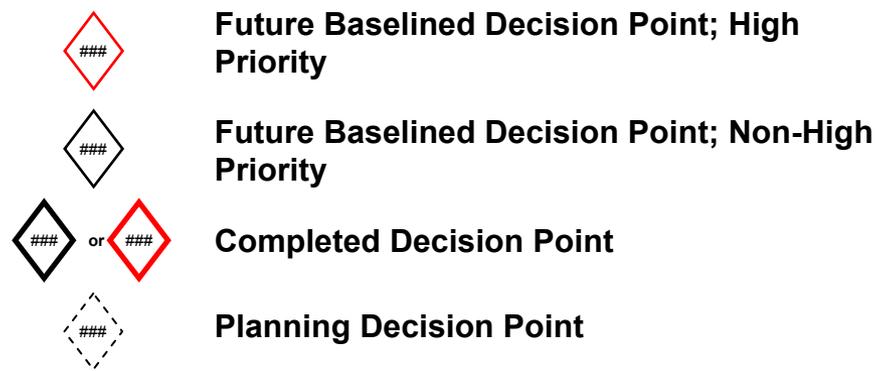
**Policy**

**Strategy**

**Executive Level**

**Decision Point Owned by Another Roadmap**

## Decision Point Borders\*\*



**Future Baselined Decision Point; High Priority**

**Future Baselined Decision Point; Non-High Priority**

**Completed Decision Point**

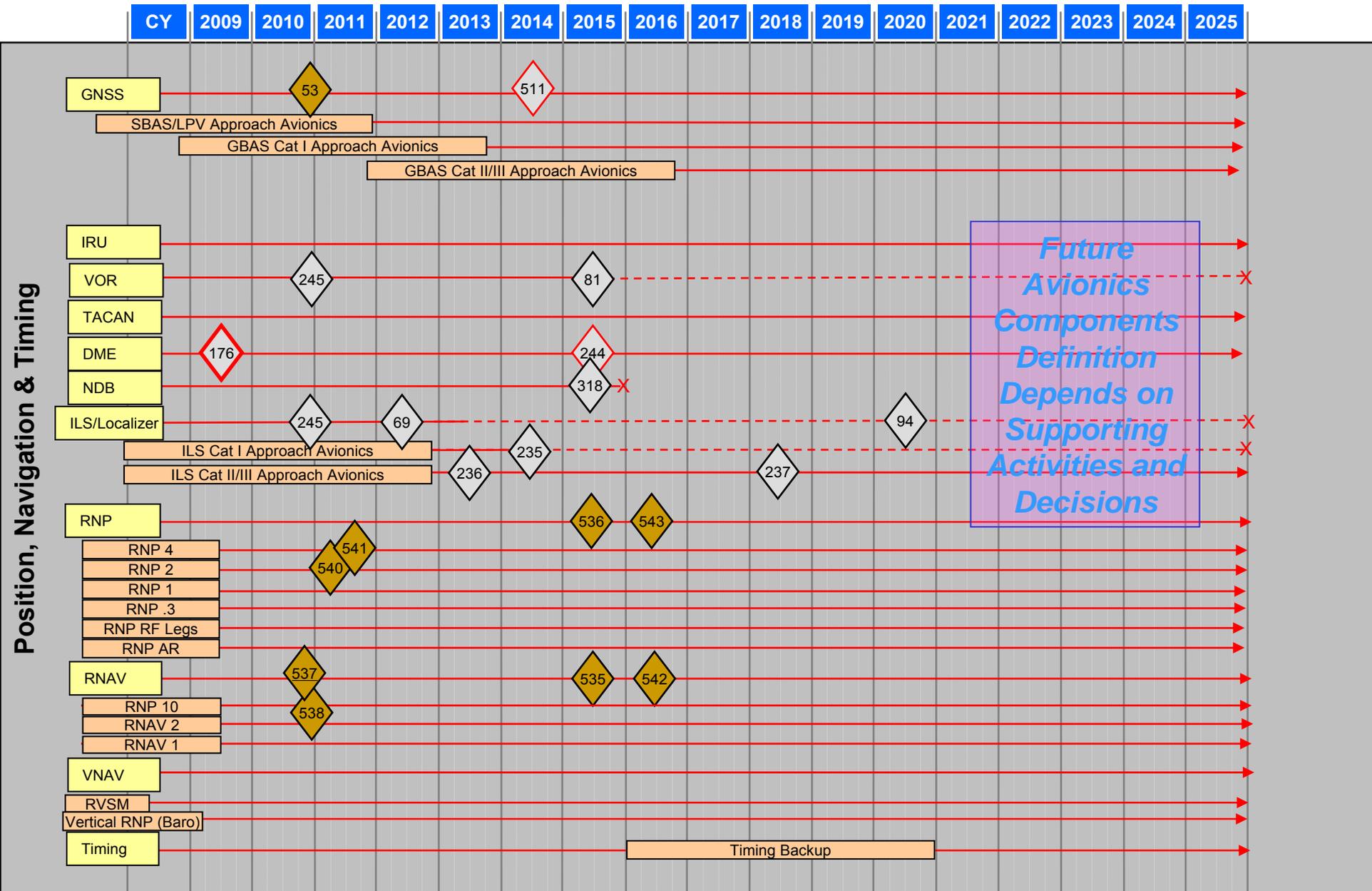
**Planning Decision Point**

\* Applies to any System fill color type

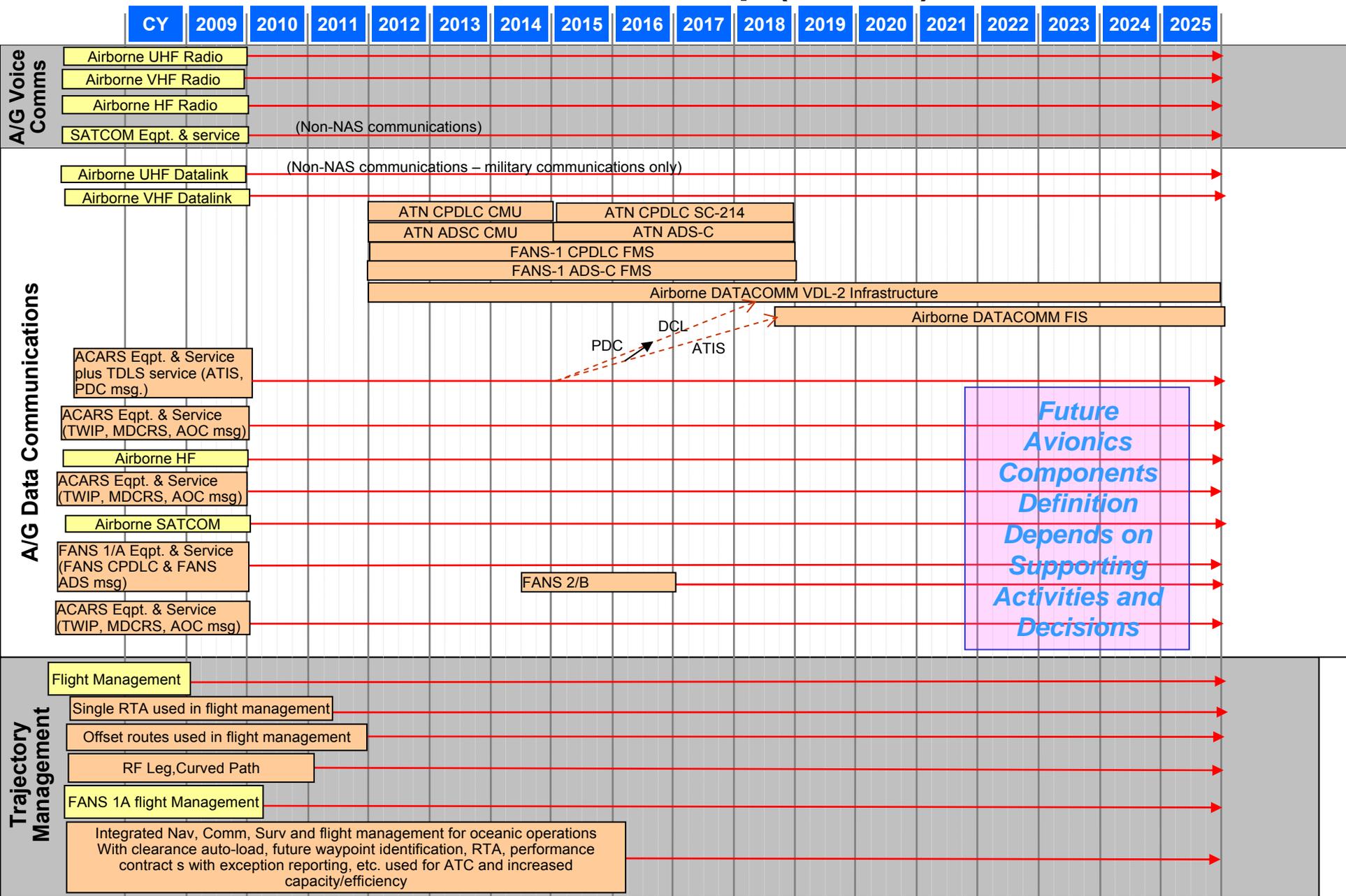
\*\* Applies to any Decision Point fill color type

# Aircraft

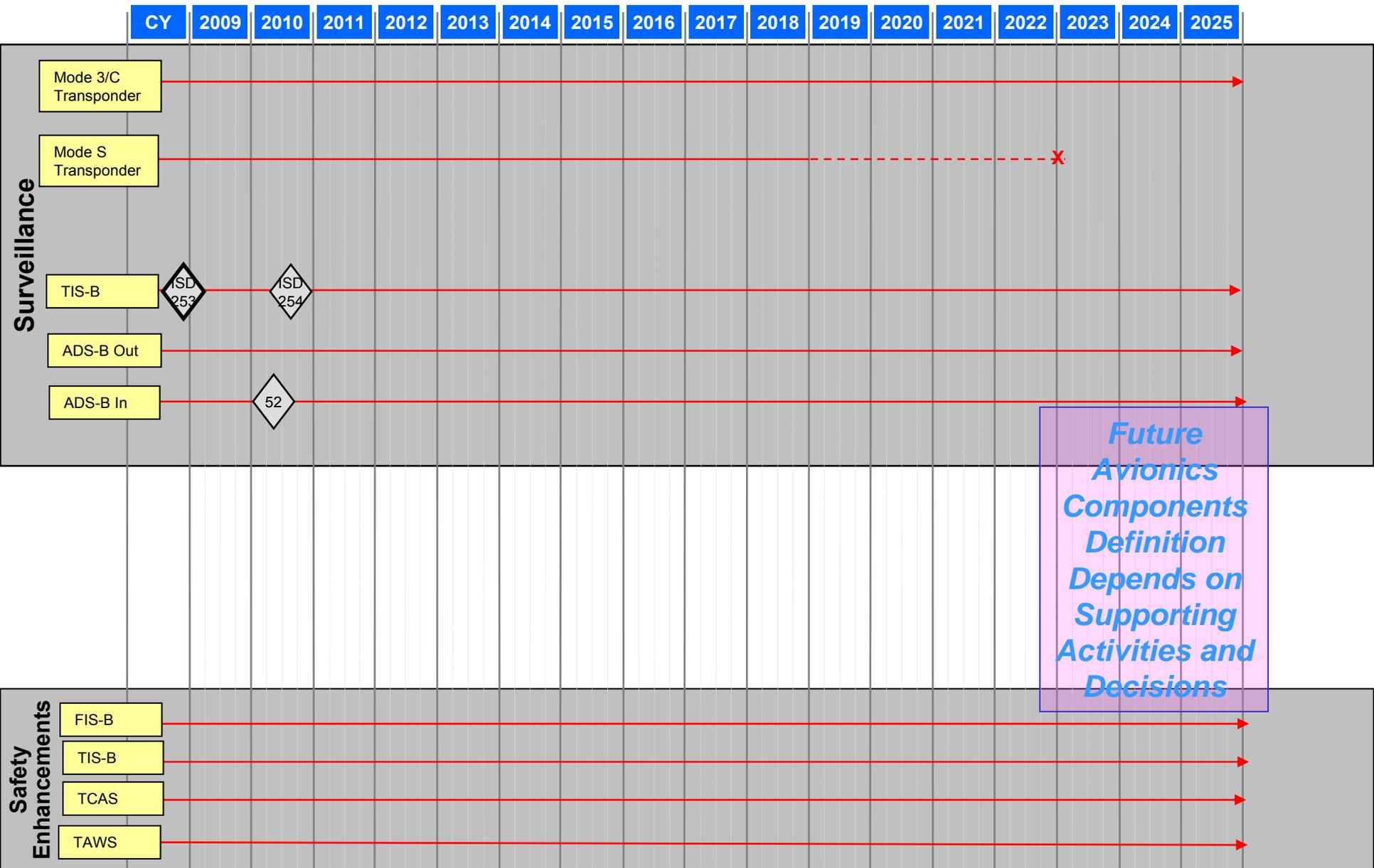
# Aircraft Roadmap (1 of 11)



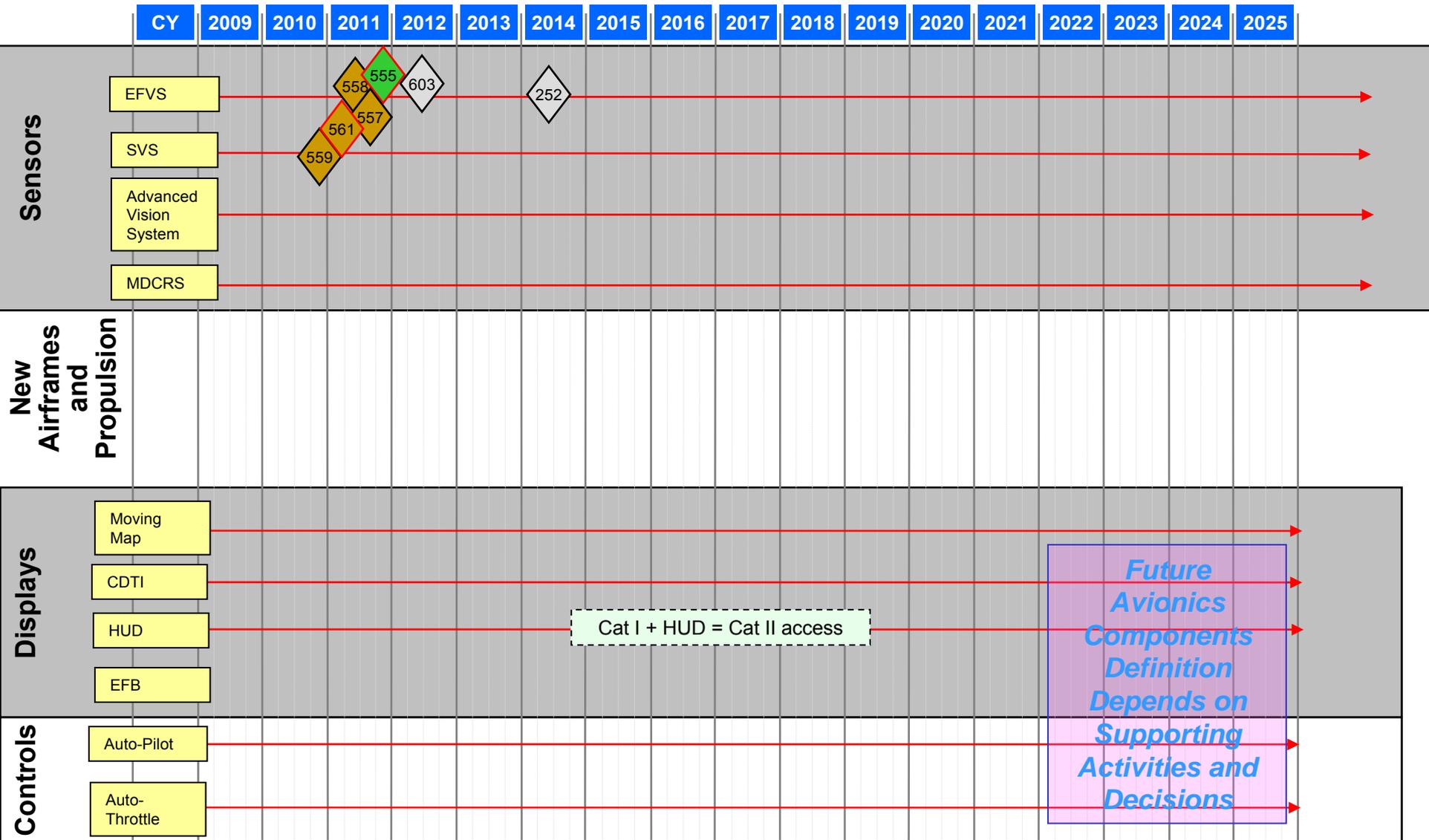
# Aircraft Roadmap (2 of 11)



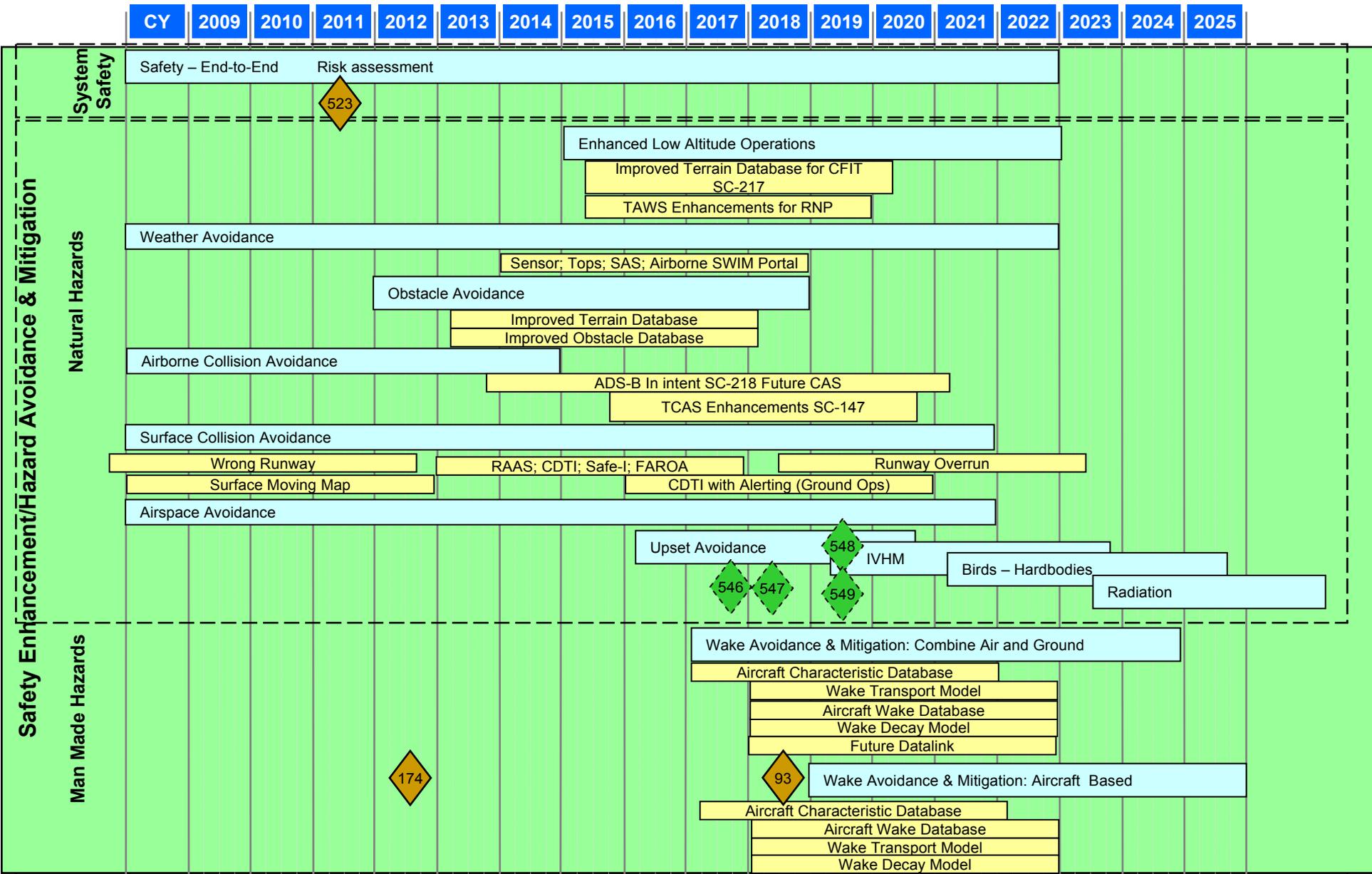
# Aircraft Roadmap (3 of 11)



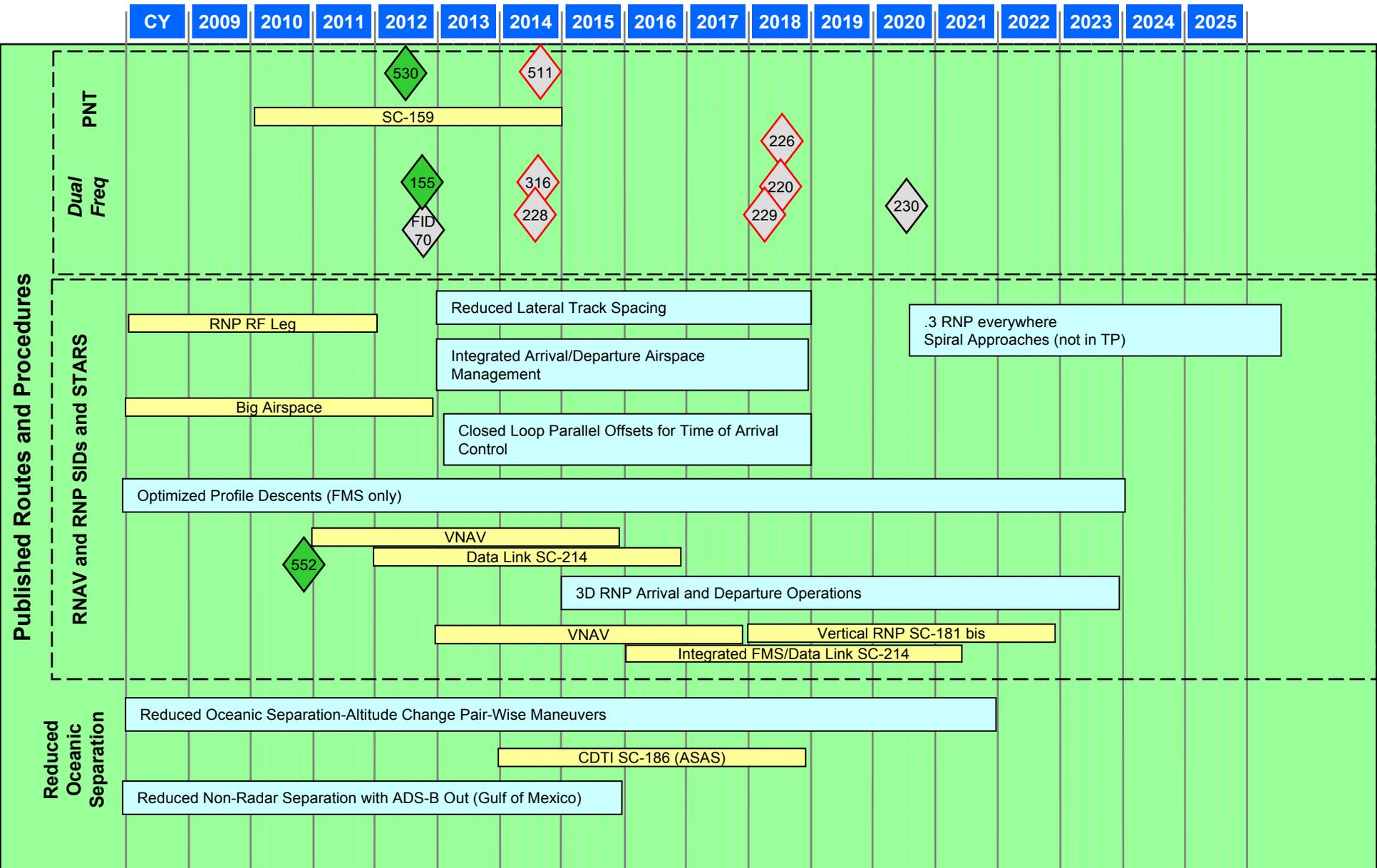
# Aircraft Roadmap (4 of 11)



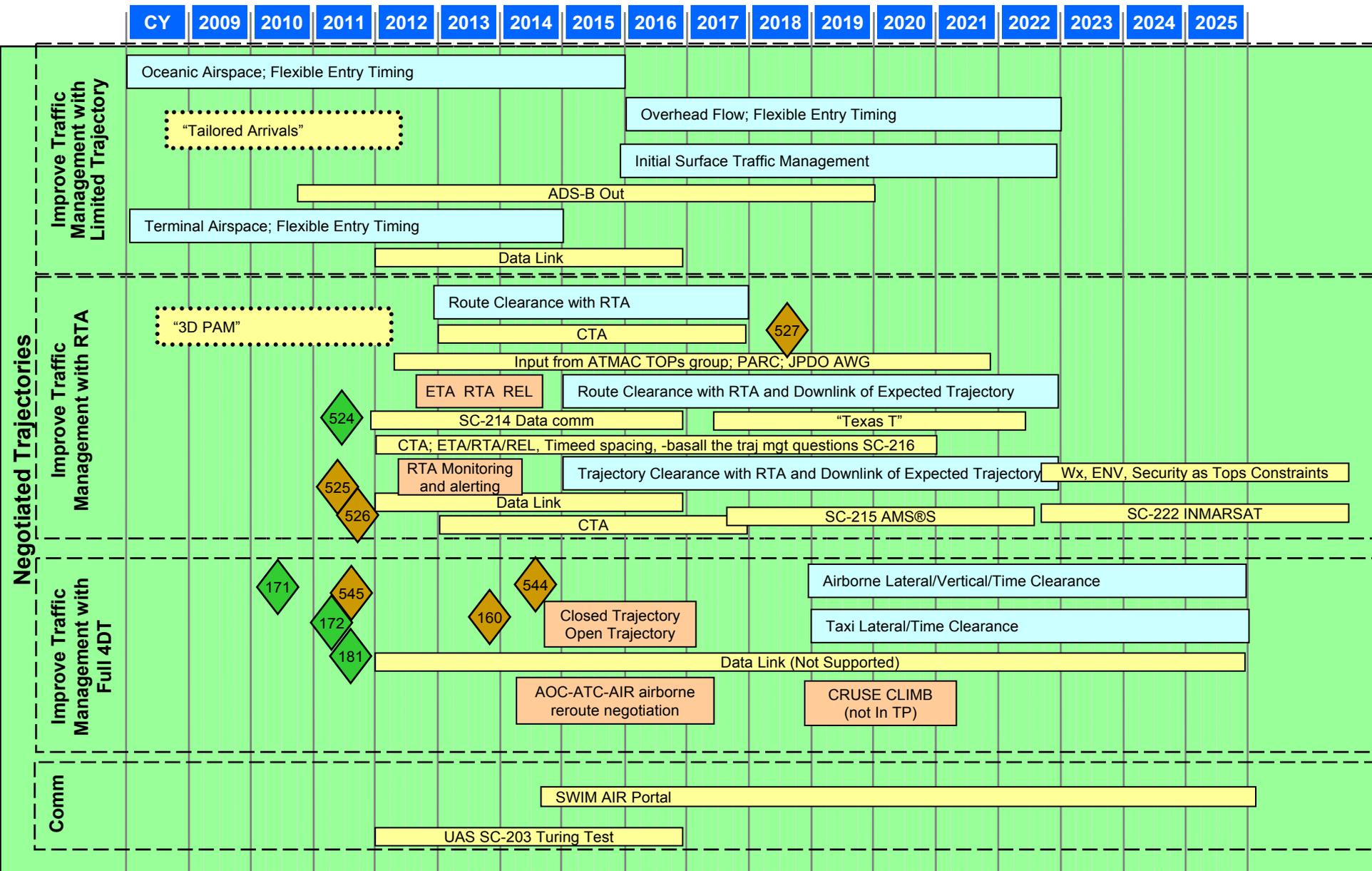
# Aircraft Roadmap (5 of 11)



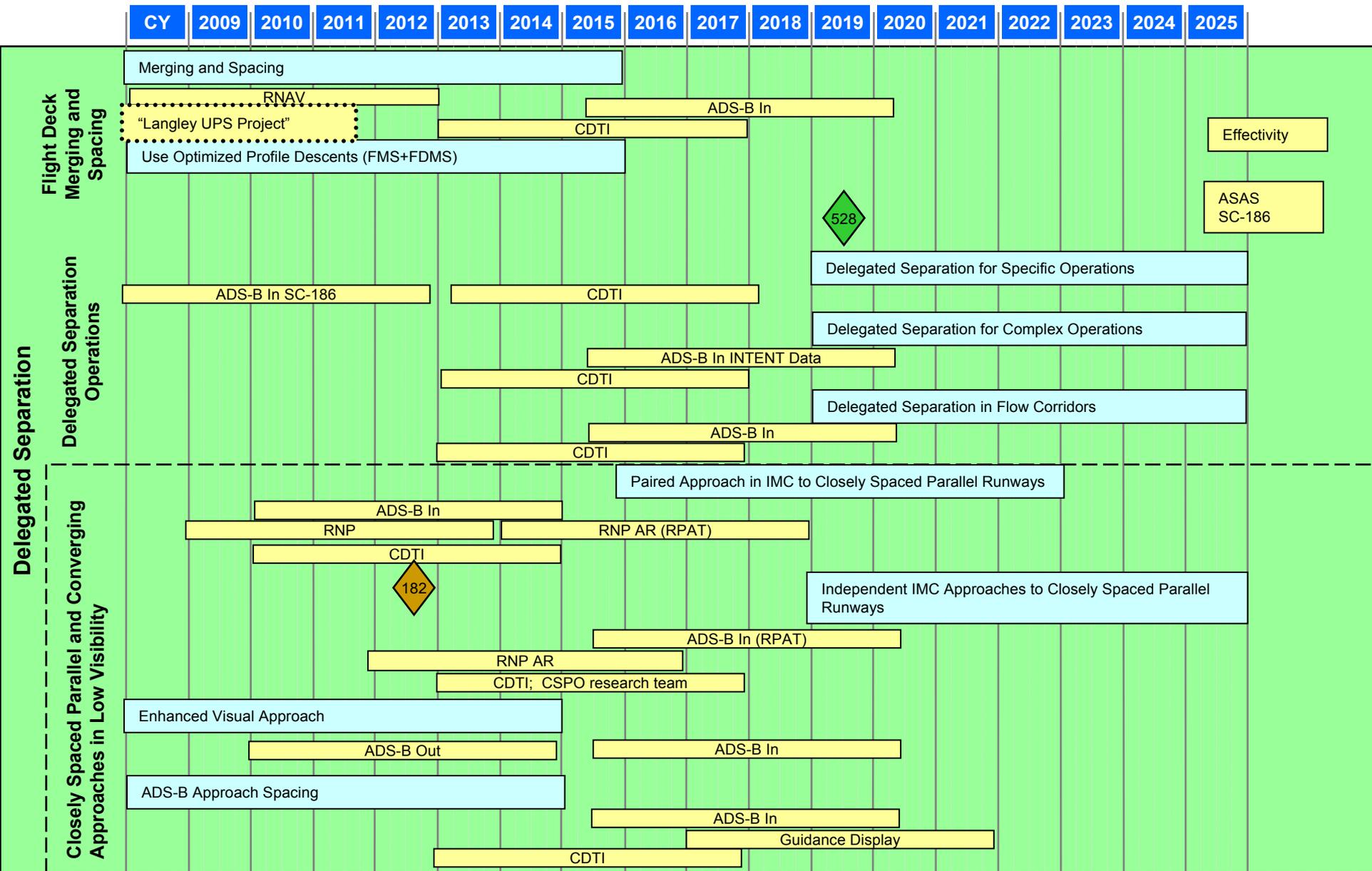
# Aircraft Roadmap (6 of 11)



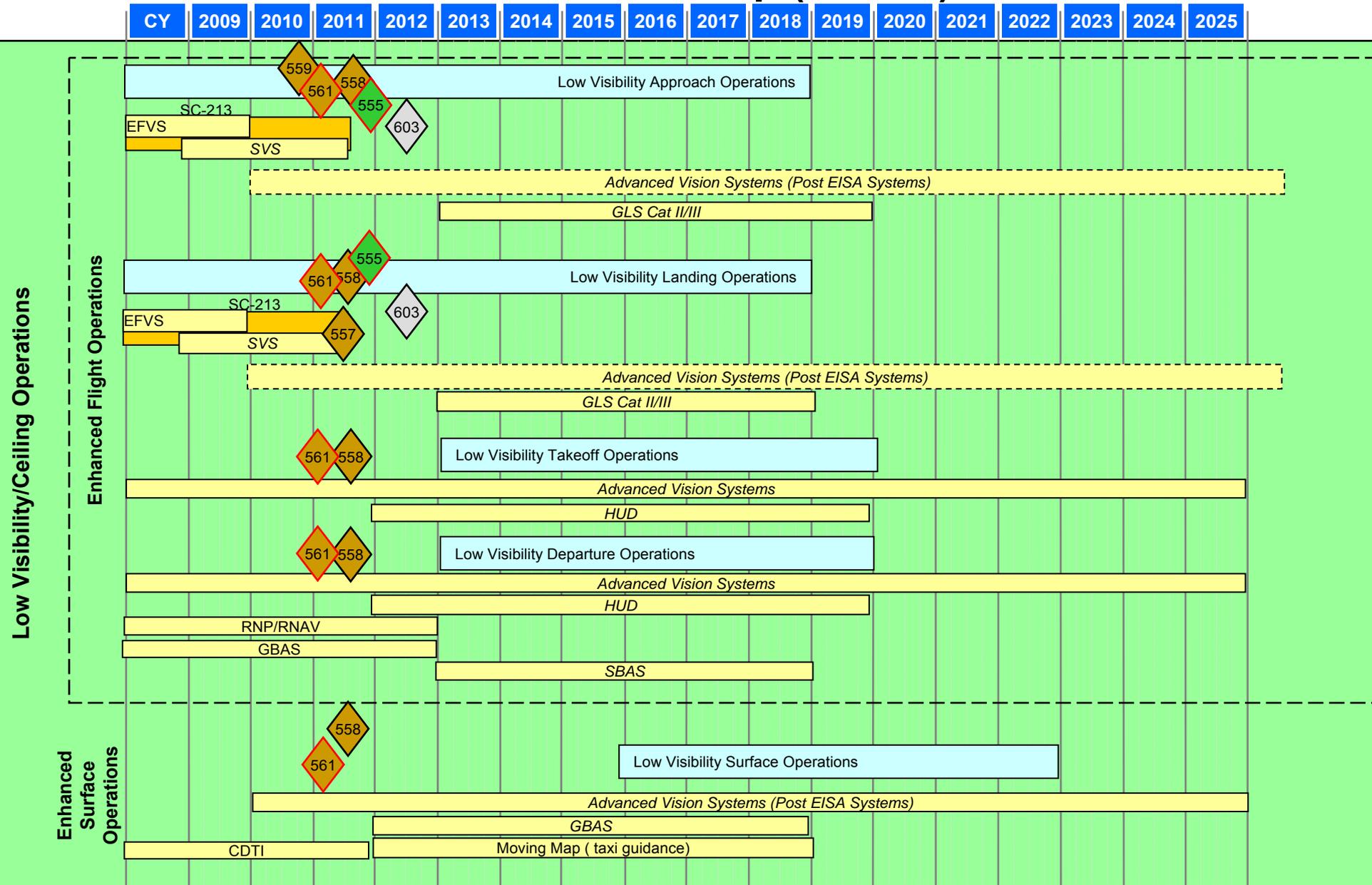
# Aircraft Roadmap (7 of 11)



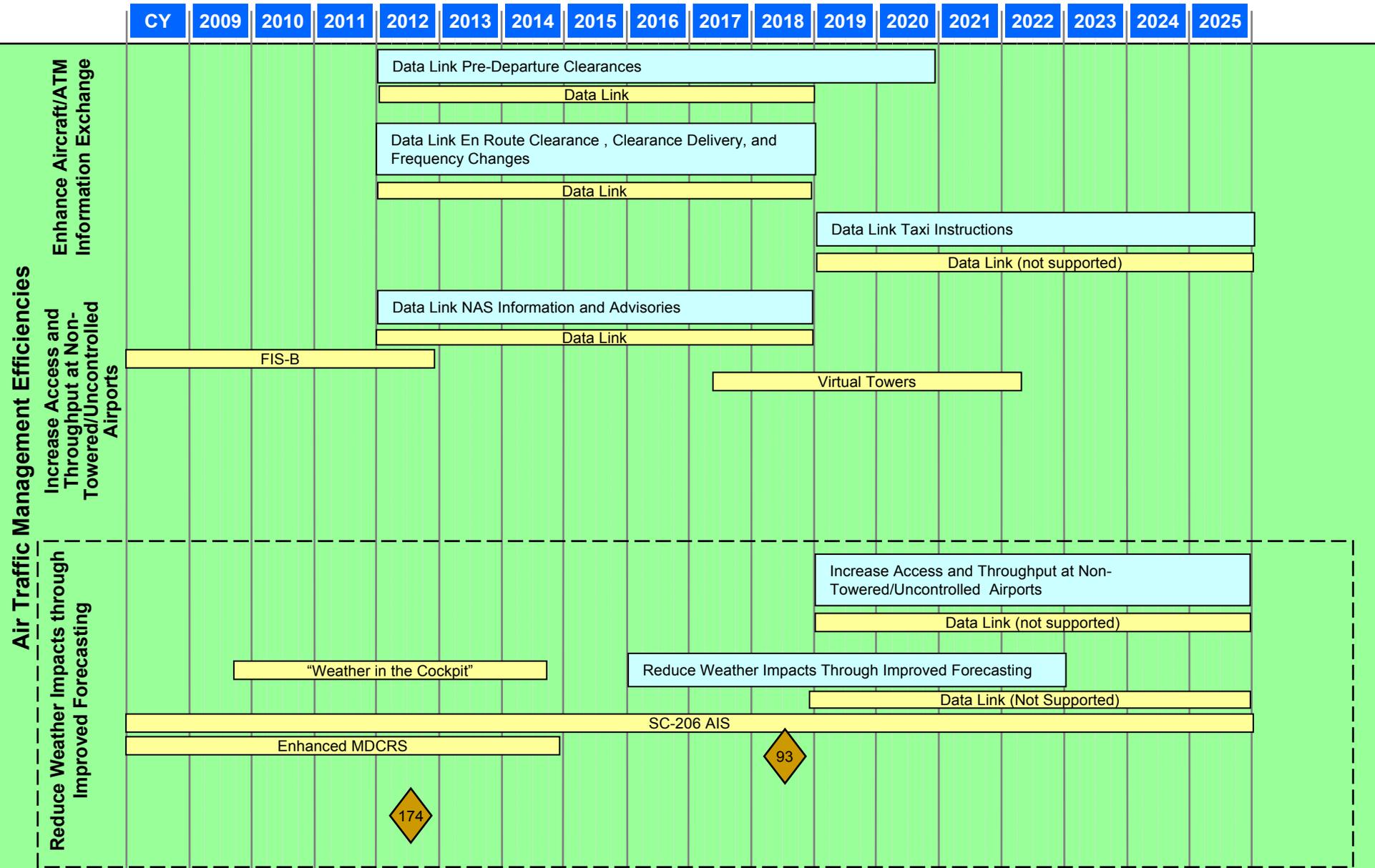
# Aircraft Roadmap (8 of 11)



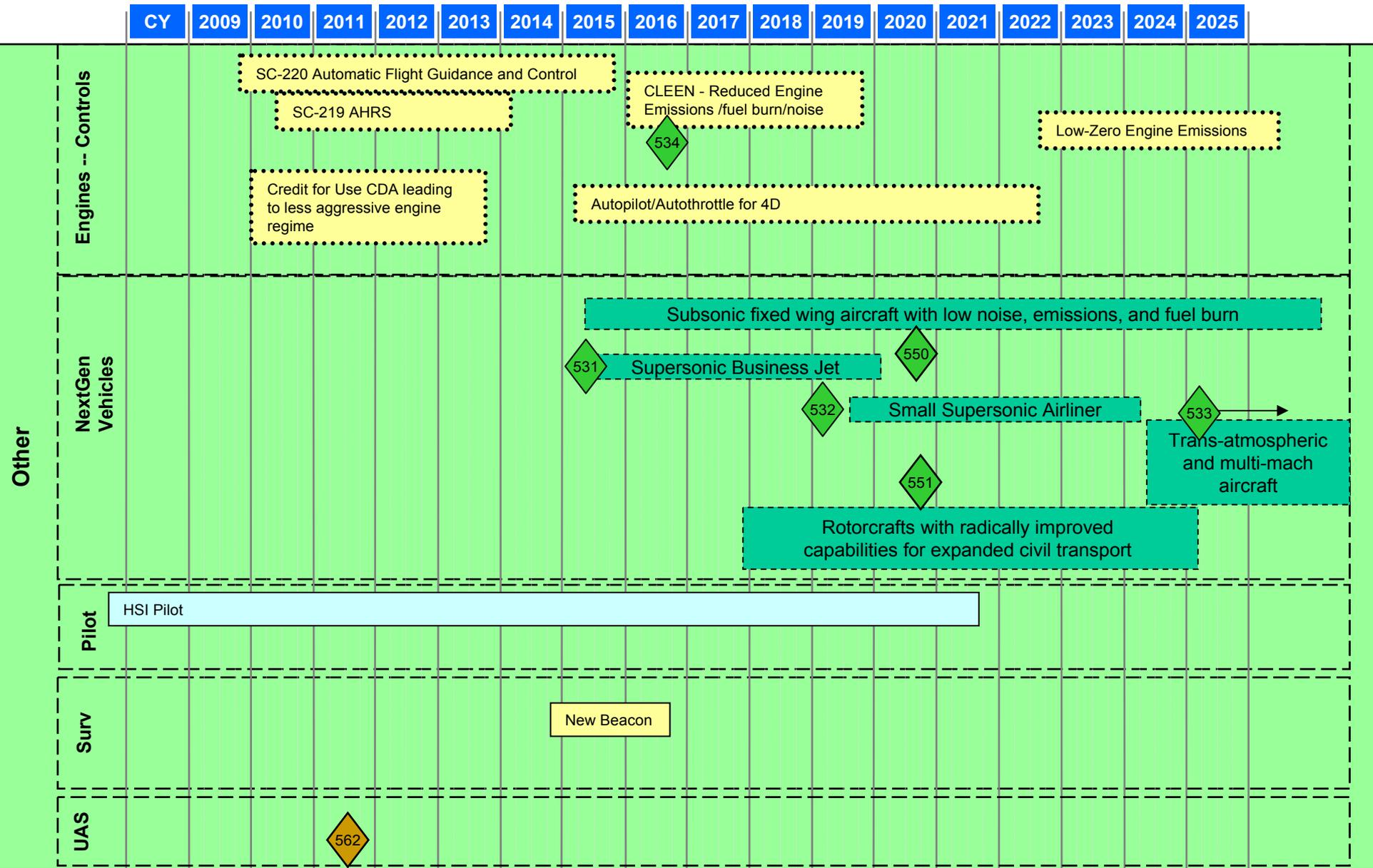
# Aircraft Roadmap (9 of 11)



# Aircraft Roadmap (10 of 11)



# Aircraft Roadmap (11 of 11)



# Aircraft Roadmap: Assumptions

Identifier	Description
AC-01	<p>The roadmap identifies four phases</p> <ul style="list-style-type: none"> <li>a) Conops development and R&amp;D in required areas</li> <li>b) Standards development</li> <li>c) AVS Approval</li> <li>d) Deployment. After the standards process is complete, and manufacturers have developed, integrated, fully tested and made new avionics available, aircraft, engines and fuels available, an additional 7 to 10 years is needed to achieve wide scale equipage of a new capability               <ul style="list-style-type: none"> <li>1. Different aircraft are expected to equip with different equipment. This roadmap does not currently distinguish between aircraft types. (Transport dominates; need to add GA)</li> </ul> </li> </ul>
AC-02	The aircraft roadmap includes environment research areas and assumptions and linkage to Non-NAS EA.
AC-03	Harmonization of Avionics EA with ground systems not complete in areas of Air-Ground Security, Human-System Integration. Trajectory Operations/FMS (2009)
AC-04	Any air vehicle to include any UAS that participate in the NAS must operate in a way that is transparent to the ANSP.

# Aircraft Roadmap: Decision Points (1 of 3)

DP #	Target Date	High Priority	Domain	Name
52	2010 Q2	N	Surveillance	Final Decision for Avionics Mandate/Rulemaking for ADS-B (out)/MODE-S/UAT
53	2010 Q4	N		Agency policy published on Navigation future configuration to be GNSS-based
69	2012	N	Navigation	Approved Cat I Instrument Approach policy Allows Cat I Drawdown
70	2012 Q4	N	Navigation	Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
81	2015	N	Navigation	VOR decision on far-term drawdown
93	2018	N		Rulemaking decision for equipage of Weather Sensors and Wake Turbulence implementation
94	2020	N	Navigation	Decision on complete ILS CAT I drawdown
143	2022	N	Weather	Investment Decision (FID) to Provide 10-Hour Convective Forecast Capability and In-Flight Icing Observation from Airborne Aircraft To NextGen Weather Processor WP3
155	2012	N		First operationally approved GBAS Cat III through proof-of-concept (non-Fed)
160	2013	N		Aircraft standards publication for Segment 2 linked to DataComm
161	2017	N		DataComm Avionics development complete, Forward Fit begins
171	2010 Q2	N		RTCA ATMAC R&P TOPS CONUSE (Define role of aircraft vs AOC vs ATS in trajectory optimization (defining requested trajectory))
172	2011	N		4DT concept complete, including common definition of Flight Object path and constraints. Major agency decision on constrained trajectory, negotiated trajectory, delegated trajectory)
174	2012	N		Agency policy to add ABWTS (Aircraft Based WT Separation) decision support capability to the flight deck
176	2009 Q3	Y	Navigation	DME NextGen Strategy Plan—Decision to procure next generation of DMEs to replace aging systems and expand the network where needed to support RNAV & NextGen (Complete)
181	2011	N		TBO Conformance Monitoring
182	2012	N		Closely Spaced Parallel Offset (CSPO)
220	2018	Y	Navigation	Completion of Dual Frequency (GPS L1 and L5) development & testing for the WAAS ground and space segment hardware, software, and user equipment standards and avionics, required by DoD Mandate, issued September 2008
226	2018	Y	Navigation	Completion of Dual frequency multi-constellation GNSS avionics activities
228	2014	Y	Navigation	Decision to proceed with WAAS dual frequency avionics activities to validate standards and lower risk for avionics development.
229	2018	Y	Navigation	Completion of WAAS Dual frequency avionics activities.
230	2020	Y	Navigation	Cut-over to dual frequency operations
235	2014	N	Navigation	Decision on active drawdown of Cat I ILSs operating in the NAS

# Aircraft Roadmap: Decision Points (2 of 3)

DP #	Target Date	High Priority	Domain	Name
236	2013	N	Navigation	Decision to buy systems for Cat II/III ILSs where necessary
237	2018	N	Navigation	Decision on replacement Cat II/III ILSs operating in the NAS
244	2015	Y	Navigation	Next generation of DMEs available to support RNAV throughout the NAS
245	2010 Q4	N	Navigation	Decision on near-term minimum operational VOR ground network
252	2014	N	Navigation	Semiflush flasher fixtures production system available
253	2008 Q4	N	Surveillance	In-Service Decision for SBS Essential Services (TIS-B/FIS-B) NAS wide implementation (Complete)
254	2010 Q3	N	Surveillance	In-Service Decision for SBS Critical Services (ADS-B) NAS wide implementation, including backup strategy
316	2014	Y	Navigation	GBAS/LAAS ground facilities and single-frequency avionics available for use
318	2015	N	Navigation	All federal NDBs decommissioned from the NAS
511	2014	Y	Navigation	Decision on national backup
523	2011	N		Air-Ground Data Security Requirements
524	2011	N		Air-Ground Comm Issues
525	2011	N		UAS Conformance
526	2011	N		Rule of ADS-B/DataComm Intent Data
527	2018	N		Decision on proposed set of trajectory Management performance levels
528	2019	N		NextGen FMS
530	2012	N		GBAS MOPS
531	2015	N		Supersonic Business Jet (NASA)
532	2019	N		Small Supersonic Airliner (NASA)
533	2025	N		Efficient Multi-Mach aircraft (NASA)
534	2016	N		New Engine
535	2015	N		RNAV above FL 180
536	2015	N		RNP 2 above FL 290
537	2010 Q4	N		Order 8400.12A (50/50 and expanded 30/30 in the Pacific)
538	2010 Q4	N		Order 8400.33 (60 Lat in WATRS)
540	2011	N		RNP 2 Routes
541	2011	N		RNP 4 and 30/30 in WATRS
542	2016	N		RNAV for all of CONUS airspace
543	2016	N		RNAV for all "busy" airspace

# Aircraft Roadmap: Decision Points (3 of 3)

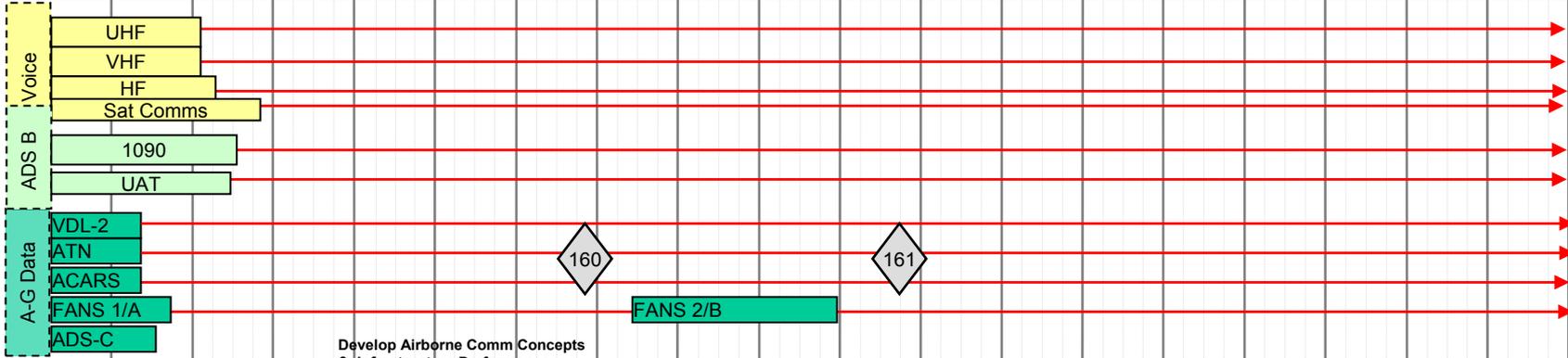
DP #	Target Date	High Priority	Domain	Name
544	2014	N		SC 214 Avionics SC-24 Avionics
545	2011	N		SC-214 MOPS
546	2017	N		Upset Aircraft Recovery-Controls
547	2018	N		Crashworthiness
548	2019	N		Envelope Protection
549	2019	N		Flight Crew Awareness
552	2010 Q4	N		AC 90-101 RNP AR (RNP as a key enabler for Environment)
555	2011	Y		Strategy for transition to LED Airport/Approach Lighting
557	2011	N		MASPS for Advanced Vision Systems for Landing
558	2011	N		LED Approach/Airport Lighting Phase In
559	2010 Q3	N		AC20-VS for Advanced Vision Systems
561	2011	Y		EISA Compliance Policy
562	2011	N		MOPS for UAS pilot to aircraft communications link
603	2012	N	Navigation	LED Prototypes available for testing

# Air-Ground

# Air-Ground Infrastructure Roadmap (1 of 6)

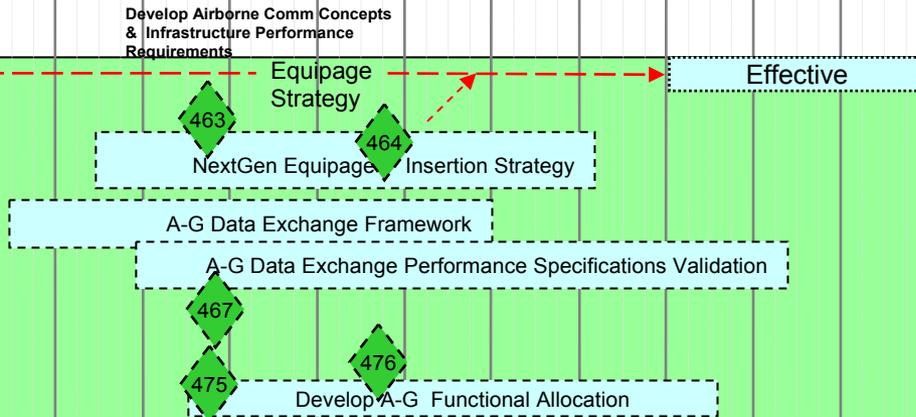
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Aircraft



A-G Integration: Communication

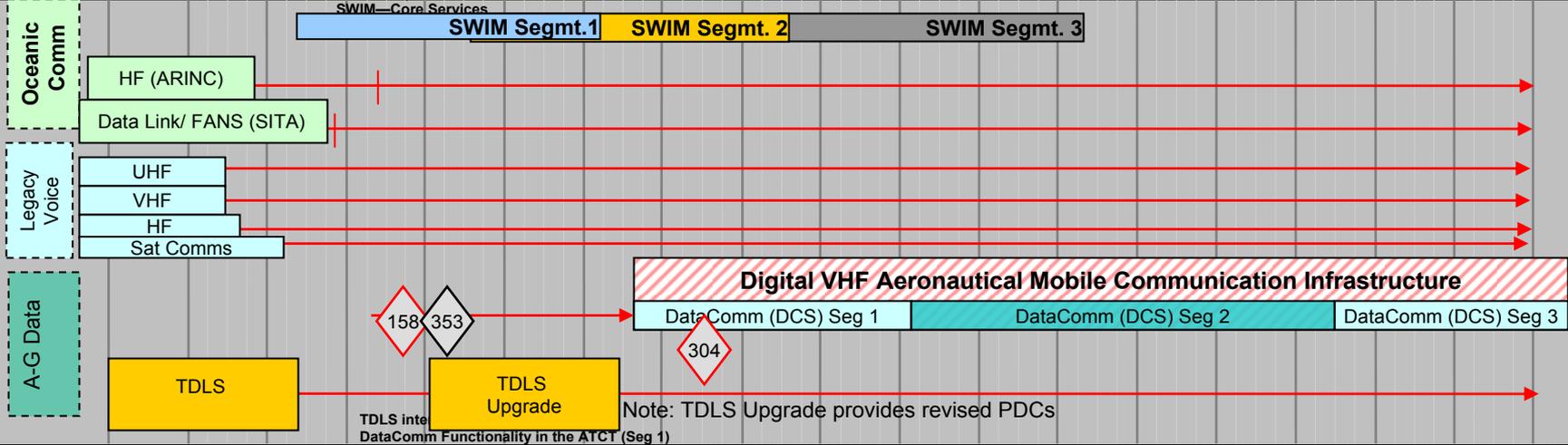
Supporting Activities  
Air Ground



SWIM—Core Services



ANSP Communications

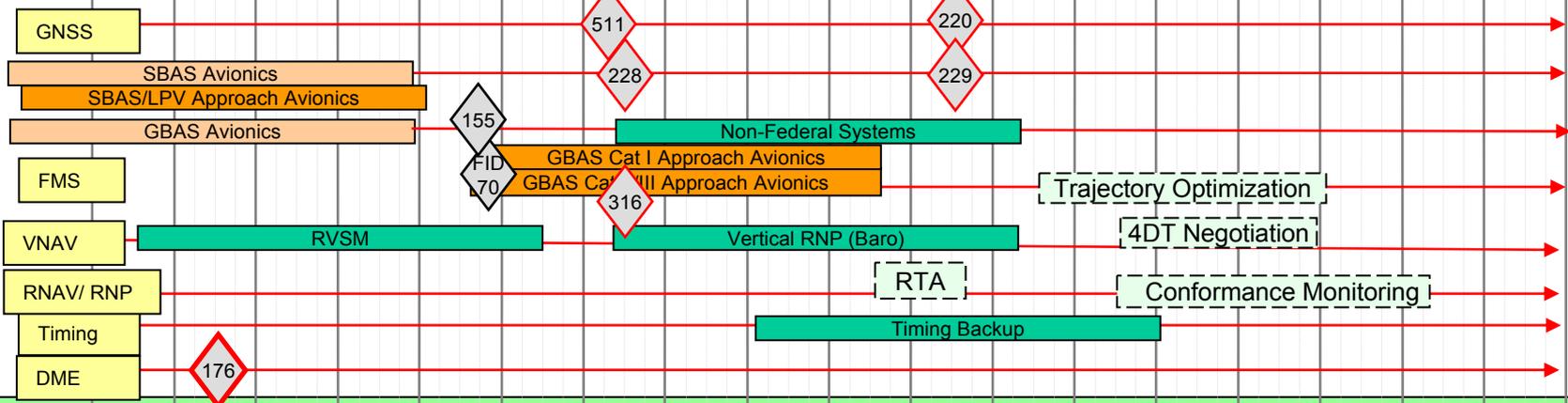


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# Air-Ground Infrastructure Roadmap (2 of 6)

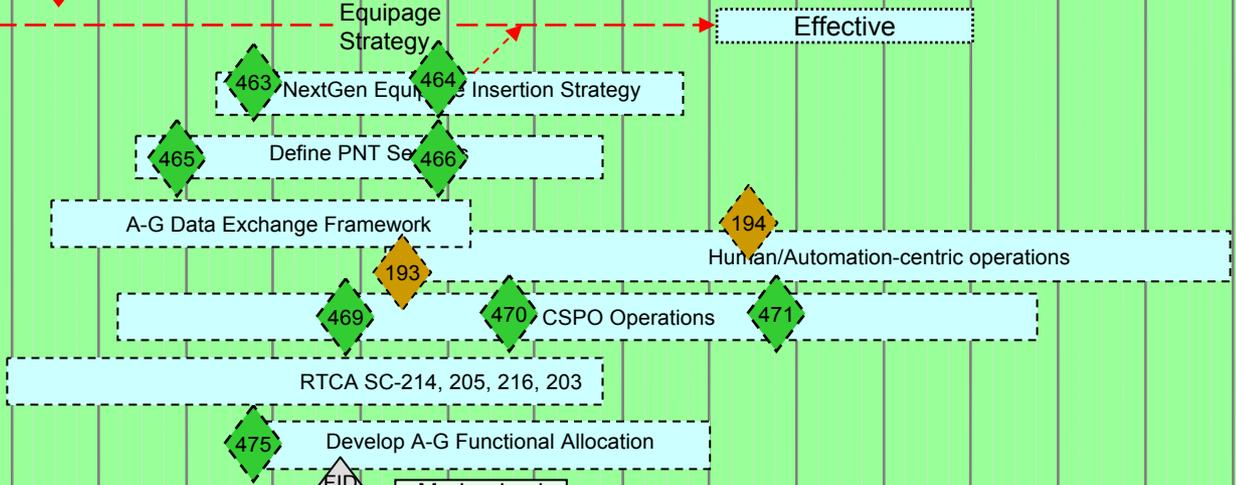
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Aircraft



A-G Integration: Navigation

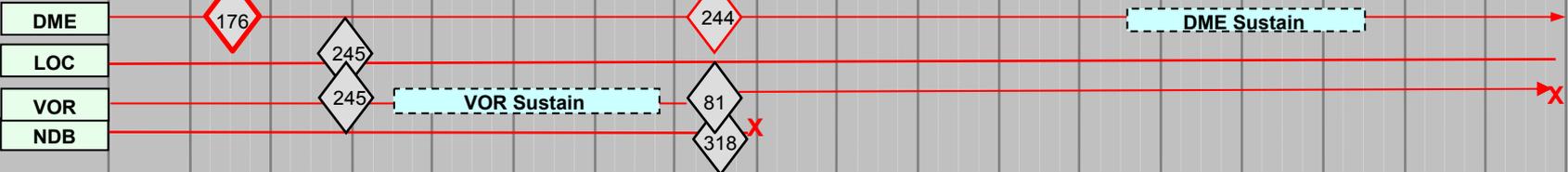
Supporting Activities  
Air Ground



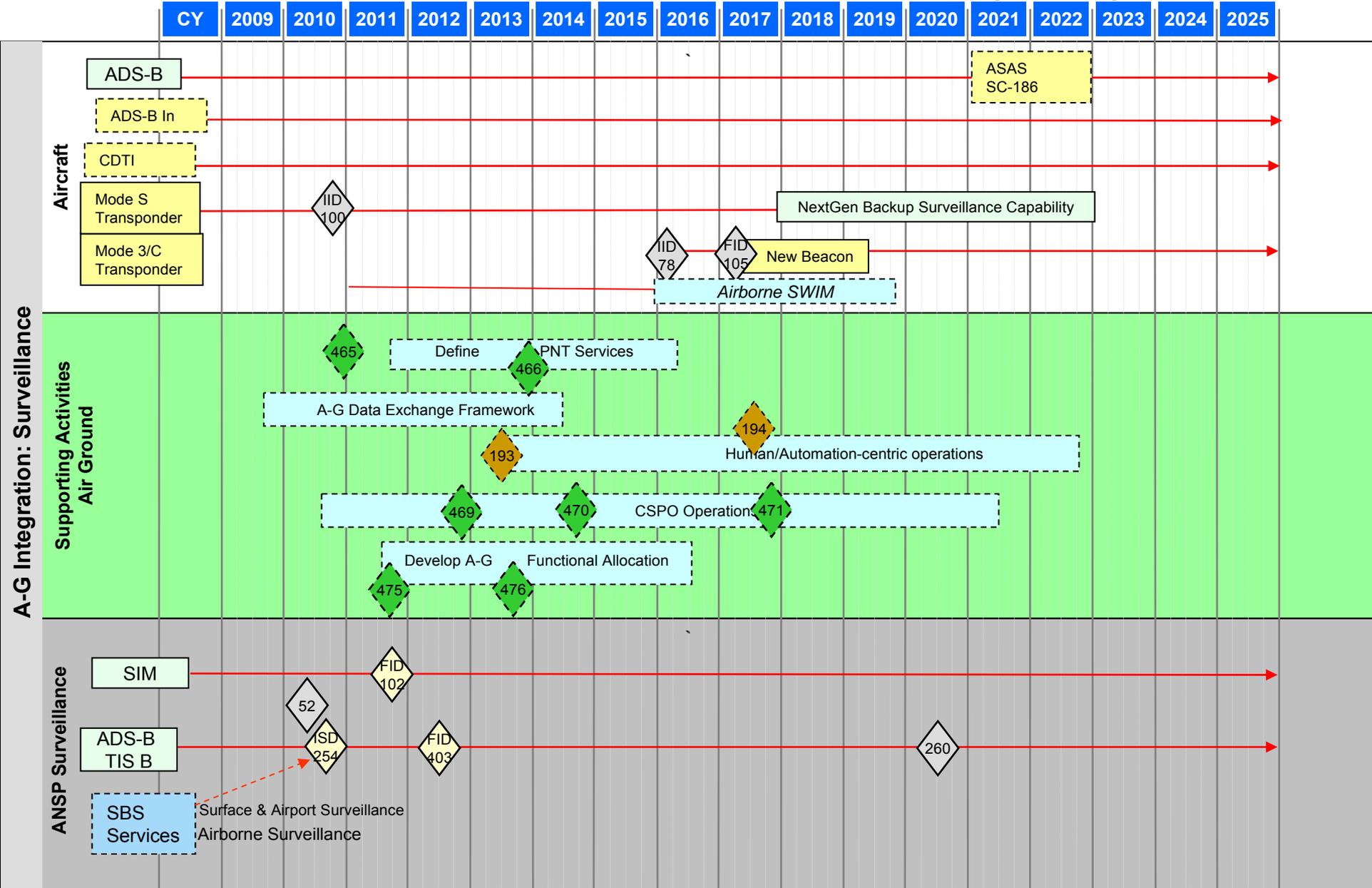
GPS



Legacy



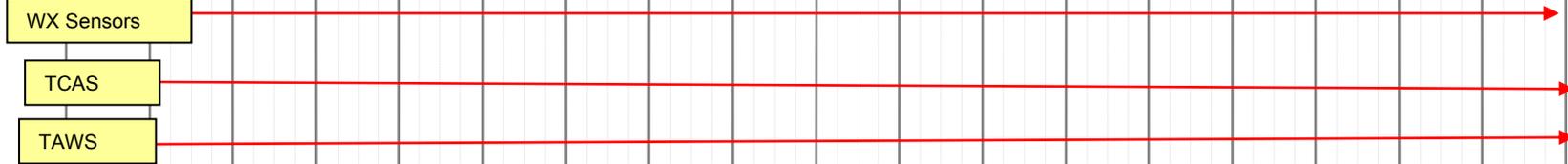
# Air-Ground Infrastructure Roadmap (3 of 6)



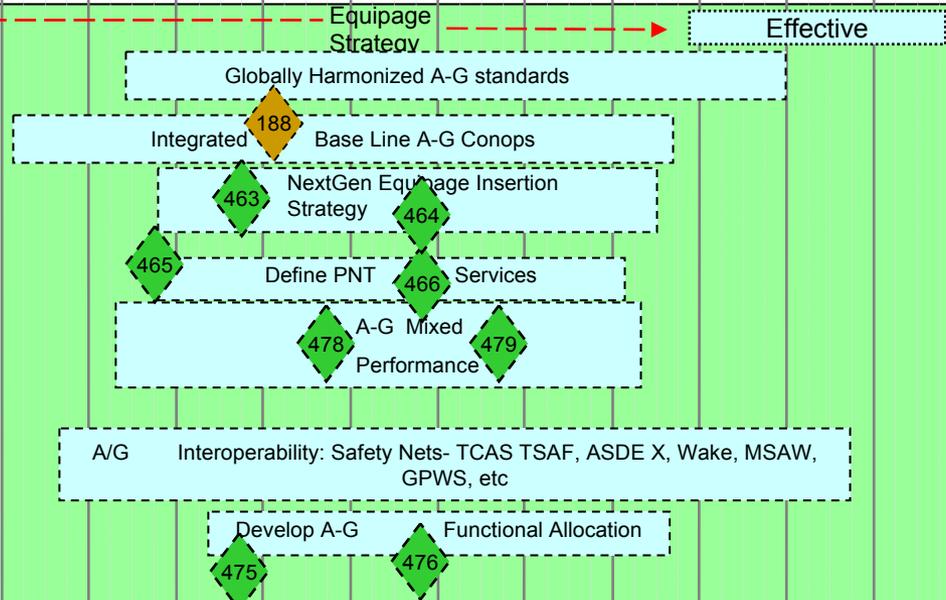
# Air-Ground Infrastructure Roadmap (4 of 6)

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

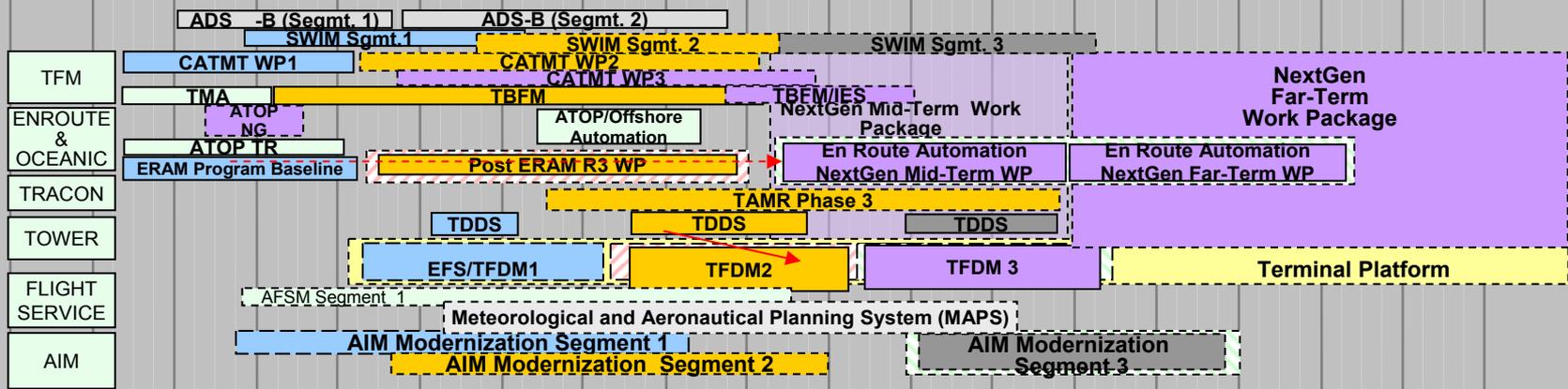
Aircraft



Supporting Activities  
Air Ground

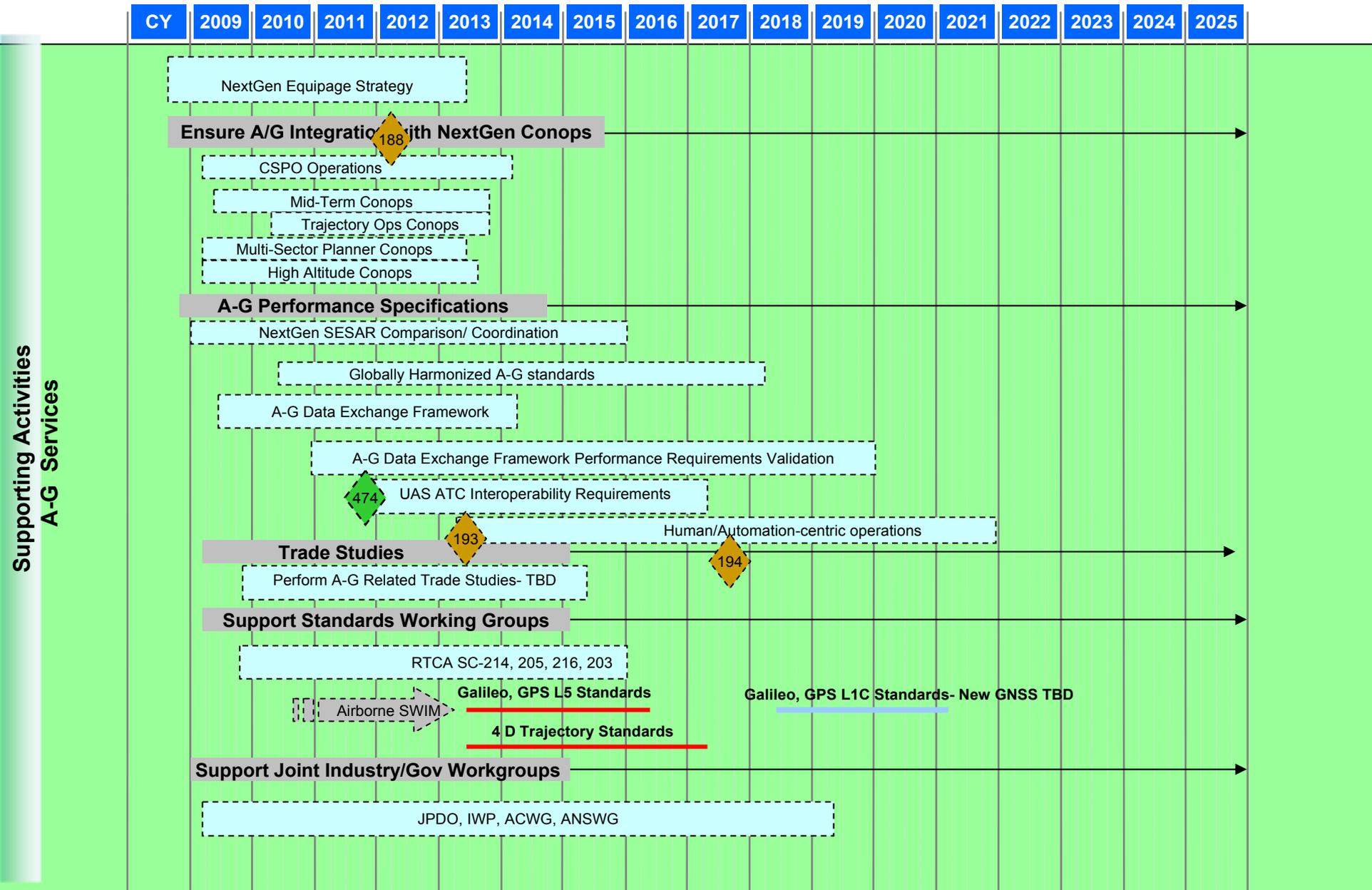


ANSP Automation



Approved

# Air-Ground Infrastructure Roadmap (5 of 6)

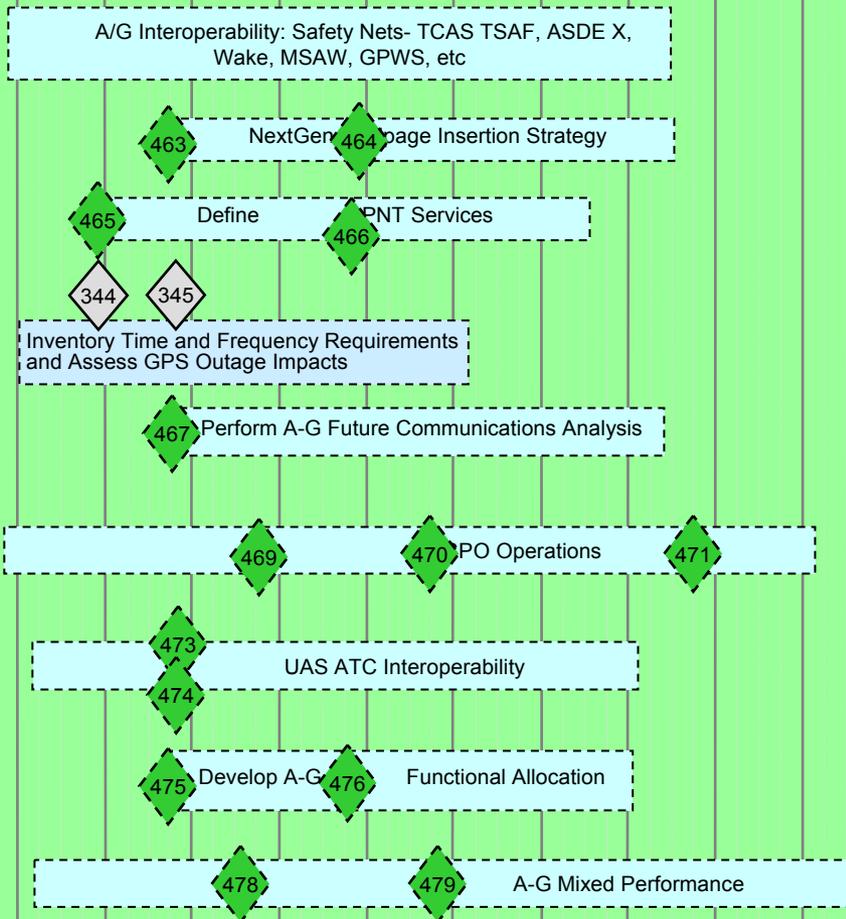


# Air-Ground Infrastructure Roadmap (6 of 6)

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

Supporting Activities

A-G Engineering & Analysis



# Air-Ground Roadmap: Assumptions (1 of 2)

Identifier	Description
AG-01	<p>Harmonization of Air/Ground System functions not complete:</p> <ul style="list-style-type: none"> <li>a) End-to-End concepts, approvals, performance, safety, security are general concerns regarding the NAS</li> <li>b) Any operation or improvement that is dependant on ACAS (TCAS), airborne automation, automatic dependent surveillance in, and addressing (IP) are far term implementations.</li> </ul>
AG-02	<p>Synchronization of airborne and ground capabilities and infrastructure remains open</p> <ul style="list-style-type: none"> <li>a) A minimum of 7 to 10 years is needed to achieve fleet-wide aircraft equipage of a new capability, from the time equipment becomes available.</li> <li>b) Ground systems continue to be developed from a bottoms-up approach resulting in mission gaps and performance mismatch</li> </ul>
AG-03	<p>Air-Ground standards will evolve from a technology-based to an integrated performance-based approach.</p>
AG-04	<p>Functions such as airborne TCAS, Ground Conflict Probe, and ADS-B conflict management are becoming temporally overlapping.</p>
AG-05	<p>Air-Ground Challenges:</p> <ul style="list-style-type: none"> <li>a) Air-Ground Interoperability/ Safety Nets</li> <li>b) NextGen Equipage Insertion Strategy</li> <li>c) PNT Duplicative Services</li> <li>d) Air-Ground Future Communications Analysis</li> <li>e) Closely Spaced Parallel Operations</li> <li>f) UAS ATC Interoperability</li> <li>g) Air-Ground Functional Allocation (Human-Automation Centric Operations)</li> <li>h) Mixed Performance</li> <li>i) Air-Ground DEF Performance Requirements Validation</li> </ul>
AG-06	<p>NAS weather systems are not depicted on the A/G Roadmap. (See Weather Roadmap).</p>
AG-07	<p>The Air-Ground Roadmap interfaces with other NASEA Roadmaps and does not include any stand alone systems.</p>

# Air-Ground Roadmap: Assumptions (2 of 2)

Identifier	Description
AG-08	Synchronize Aircraft Equipage with Ground Infrastructure and Acquisition: Aircraft equipage may include ADS-B (in), GNSS, Beacon Transponder, TCAS, TAWS, navigation requirements, Data Link, Weather Sensors, (temp, wind, humidity, turbulence, icing, and wake) and TIS-B/ FIS-B.
AG-09	<p>SWIM Air Capabilities:</p> <ol style="list-style-type: none"> <li>1) Airborne SWIM supports advisory communications through NNEW and commercial communication services (e.g. Iridium, InmarsatSBB, AirCell, XM Aviator).</li> <li>2) No mandatory equipment envisioned for airborne SWIM capability.</li> </ol>
AG-10	A-G tasks are aligned and compliment NASEA DP's and Air-Ground Evolution Environment. NASEA DP's should address A-G Challenge to support NextGen success.
AG-11	AVS provides advice and guidance on NextGen Concepts that are being developed. AVS supports NextGen from a Regulatory perspective (i.e. findings of compliance), however, their current role does not allow defining specific design requirements for end-to-end system interoperability.

# Air-Ground Roadmap: Decision Points (1 of 2)

DP #	Target Date	High Priority	Domain	Name
52	2010 Q2	N	Surveillance	Final Decision for Avionics Mandate/Rulemaking for ADS-B (out)/MODE-S/UAT
69	2012	N	Navigation	Approved Cat I Instrument Approach policy Allows Cat I Drawdown
70	2012 Q4	N	Navigation	Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
78	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen beacon/backup radar system for ATC
81	2015	N	Navigation	VOR decision on far-term drawdown
100	2010 Q4	N	Surveillance	Initial Investment Decision for legacy beacon (Mode S) SLEP through 2025
102	2011 Q4	N	Surveillance	Final Investment Decision to implement SIM in terminal and en route legacy radar systems
105	2017	N	Surveillance	Final Investment Decision to implement a NextGen beacon/backup radar system for ATC
155	2012	N	Aircraft	First operationally approved GBAS Cat III through proof-of-concept (non-Fed)
158	2011 Q3	Y	Communication	Data Communications Segment 1 FID (part 1 of a split FID)
160	2013	N	Aircraft	Aircraft standards publication for Segment 2 linked to DataComm
161	2017	N	Aircraft	DataComm Avionics development complete, Forward Fit begins
176	2009 Q3	Y	Navigation	DME NextGen Strategy Plan—Decision to procure next generation of DMEs to replace aging systems and expand the network where needed to support RNAV & NextGen (Complete)
188	2012 Q1	N		Planning Decision-Research Transition Integrated and base-lined Air-Ground Concepts
193	2013	N		Planning Decision: Develop Human/Automation design principles to support NextGen infrastructure
194	2017	N		Planning Decision: Incorporate results into future Requirement for NextGen Technology and Human/Automation intensive operations
220	2018	Y	Navigation	Completion of Dual Frequency (GPS L1 and L5) development & testing for the WAAS ground and space segment hardware, software, and user equipment standards and avionics, required by DoD Mandate, issued September 2008
222	2018	Y	Navigation	24 GPS dual frequency satellites with L1 and L5 operating and transmitting useable signals for aviation.
228	2014	Y	Navigation	Decision to proceed with WAAS dual frequency avionics activities to validate standards and lower risk for avionics development.
229	2018	Y	Navigation	Completion of WAAS Dual frequency avionics activities.
244	2015	Y	Navigation	Next generation of DMEs available to support RNAV throughout the NAS
245	2010 Q4	N	Navigation	Decision on near-term minimum operational VOR ground network
254	2010 Q3	N	Surveillance	In-Service Decision for SBS Critical Services (ADS-B) NAS wide implementation, including backup strategy
260	2020	N	Surveillance	Decision on ADS-B Rule Compliance

# Air-Ground Roadmap: Decision Points (2 of 2)

DP #	Target Date	High Priority	Domain	Name
304	2015	Y	Communication	Data Communications Segment 2 FID
316	2014	Y	Navigation	GBAS/LAAS ground facilities and single-frequency avionics available for use
318	2015	N	Navigation	All federal NDBs decommissioned from the NAS
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
353	2012 Q1	Y	Communications	Data Communications Segment 1 FID (part 2 of a split FID)
403	2012	N	Surveillance	Final Investment Decision for SBS Implementation of Advanced ADS-B Applications
463	2011 Q3	N		Planning Decision: Develop NextGen Equipage Insertion Strategy
464	2013 Q4	N		Implementation Decision: Apply Equipage Insertion Plan- Output Boeing OTA
465	2010 Q4	N		Strategy Decision: Define PNT Duplicative Services
466	2013	N		Planning Decision: Develop A-G PNT Requirements
467	2011 Q4	N		Planning Decision: A-G Future Communications Analysis
469	2012 Q4	N		Planning Decision: Develop Requirements to Implement Independent Operations Below 4300' w/ Dual ILS
470	2014 Q4	N		Planning Decision: Develop Requirements for Independent Operations below 4300' using PBN
471	2017 Q4	N		Planning Decision: Develop Requirements to Implement Independent Operations Applying Advanced Concepts
473	2011 Q4	N		Planning Decision: Develop Requirements for UAS Performance Envelope for UAS Fleets
474	2011 Q4	N		Planning Decision: Develop UAS ATC Interoperability Performance Requirements
475	2011	N		Planning Decision: Develop A-G Functional Allocation Trade Space
476	2013 Q4	N		Planning Decision: Apply A-G Functional Allocation Trade Space to NASEA Requirements
478	2012 Q4	N		Planning Decision: Develop Best Equipped Best Served Strategy to Support Operational Benefits to Equipped Aircraft
479	2014 Q4	N		Policy Decision: Best Equipped Best Served Strategy
511	2014	Y	Navigation	Decision on national backup

# Air-Ground Roadmap: Related Decision Points

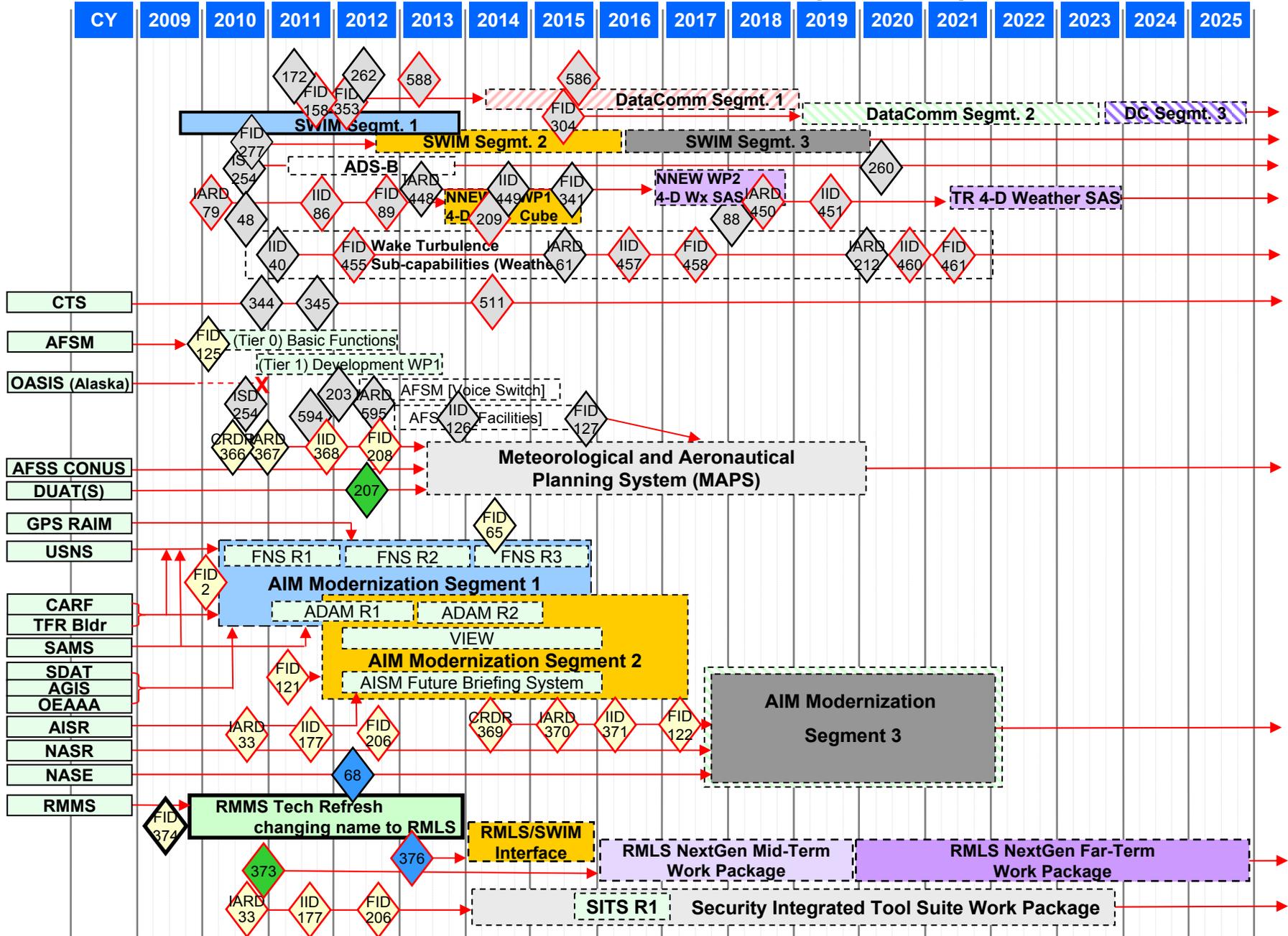
The A-G roadmap decisions may have an impact on the following DP's:

Infrastructure Roadmaps	FY 09	FY 10	FY 11	FY 12 +
Aircraft			172	155, 174, 182,
Automation	45	31,107		275
Weather				61
Communication			158	47, 304, 218
Navigation	176, 224			225, 222, 226
Surveillance		52		
Airspace & Procedures				
Enterprise Services				
Facilities				
Human Systems Integration			315	280
Information Security				
Safety				

# Automation



# Automation Roadmap (2 of 17)



Approved

# Automation Roadmap (3 of 17)

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

Oceanic In-trail Climb and Descent 102108

ADS-C Oceanic  
In-Trail Procedure Demonstration

ADS-B In Trail Procedures Activity

Delegated Responsibility for Separation 102118

SBS Aircraft to Aircraft Horizontal separation  
Cockpit Display of Traffic Information (CDTI) Assisted Visual System (CAVS) future application research activity

CRDR  
360

IARD  
361

IID  
75

FID  
111

Automation Support for Mixed Environments 102137

Separation Management  
Modern Procedures

FID  
31

CRDR  
360

IARD  
361

IID  
75

FID  
111

Unmanned Aircraft Systems (UAS) 4D Trajectory-based demonstration

CRDR  
360

IARD  
361

IID  
75

FID  
111

ADS-B Separation 102123

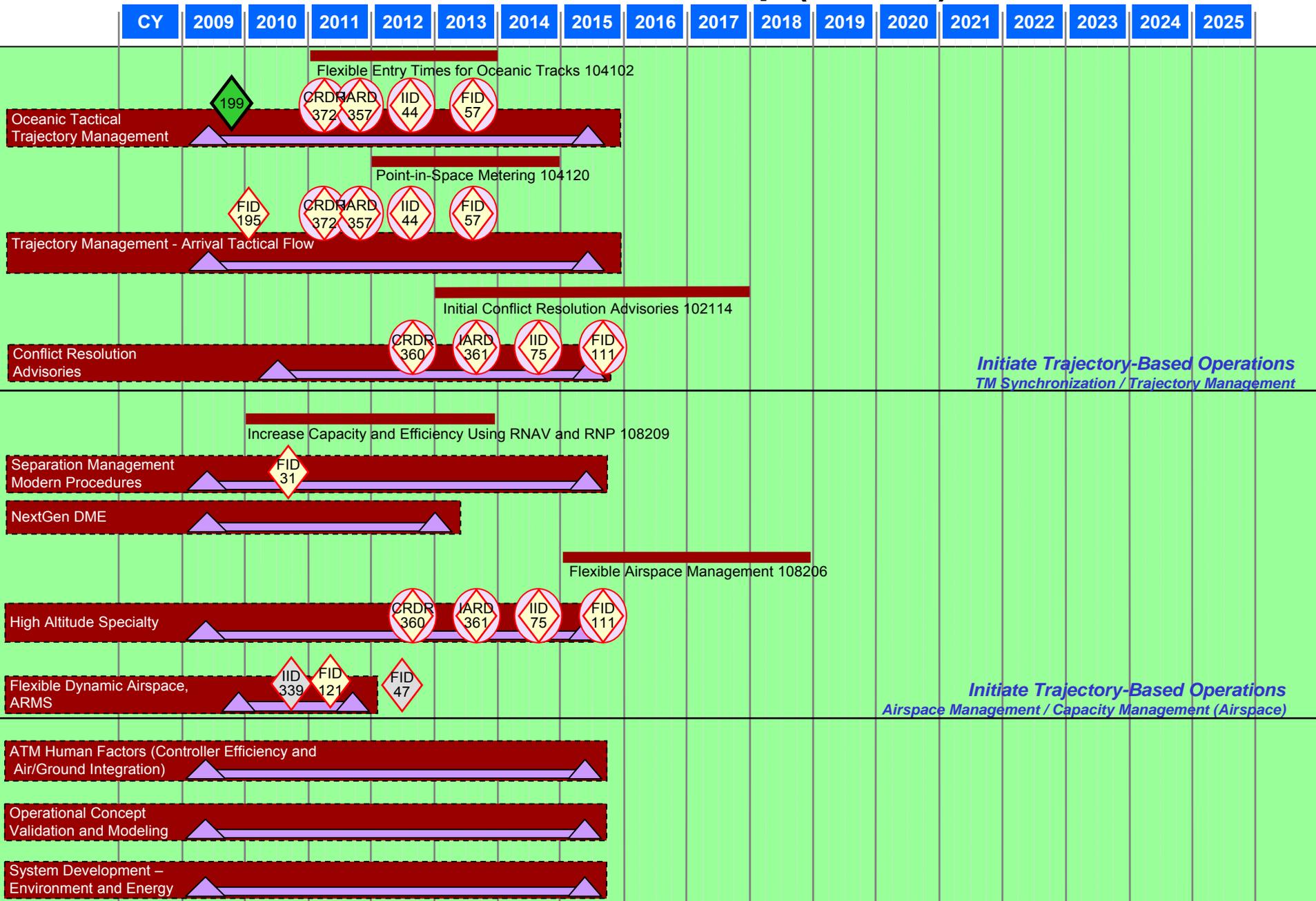
ADS-B: Develop Phase III  
Rulemaking Project  
Record for approval

ADS-B in  
Gulf Of Mexico

Initiate Trajectory-Based Operations  
ATC Separation Assurance / Separation Management

Approved

# Automation Roadmap (4 of 17)



*Initiate Trajectory-Based Operations  
TM Synchronization / Trajectory Management*

*Initiate Trajectory-Based Operations  
Airspace Management / Capacity Management (Airspace)*

# Automation Roadmap (5 of 17)

CY	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
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NASA Trajectory Prediction, Synthesis, and Uncertainty (TPSU)  
Research Focus Area (RFA)

SBS 3-mile Separation for En Route  
future application research activity

NASA Trajectory Prediction, Synthesis, and Uncertainty (TPSU)  
Research Focus Area (RFA)

Reduce Horizontal Separation  
Standards, En Route - 3 Miles 102117

Automated Negotiation/Separation Management 104121

*Initiate Trajectory-Based Operations  
ATC Separation Assurance / Separation Management*

Activity for "beyond 3DPAM"

NASA Trajectory Prediction, Synthesis, and Uncertainty (TPSU)  
Research Focus Area (RFA)

Advanced Separation Management

Automation-Assisted Trajectory Negotiation and Conflict Resolution 104105

RTT Flow Contingency Management/Multisector Planner Research

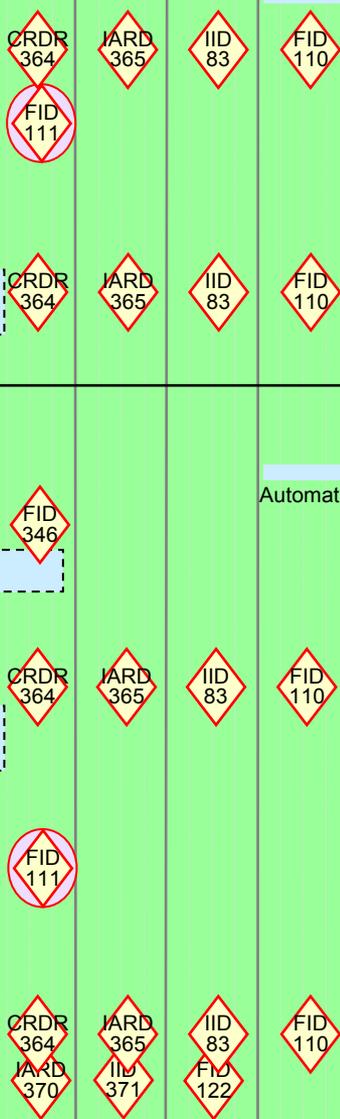
RTT Efficient Flow into Congested Airspace (EFICA), (formerly TBO) Research

Trajectory-OPS (TOPS) Working Group

Multisector Planner (MSP) R&D

Trajectory Based Management Gate-to-Gate 104126

*Initiate Trajectory-Based Operations  
TM Synchronization / Trajectory Management*



# Automation Roadmap (6 of 17)

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

RTT Efficient Flow into Congested Airspace (EFICA), (former TBO) Research  
 Trajectory-OPS (TOPS) Working Group  
 RTT Flow Contingency Management/Multisector Planner Research  
 Multisector Planner (MSP) R&D

CRDR 364 IARD 365 IID 83 FID 110

Flow Corridors - Level 1 Static 108105

RTT Flow Contingency Management/Multisector Planner Research  
 RTT Efficient Flow into Congested Airspace (EFICA), (formerly TBO) Research  
 Trajectory-OPS (TOPS) Working Group  
 Multisector Planner (MSP) R&D

CRDR 364 IARD 365 IID 83 FID 110  
 CRDR 369 IARD 370 IARD 371 IARD 122

Flow Corridors - Level 2 Dynamic 108106

Dynamic Airspace Performance Designation 108213

NASA Dynamic Airspace Configuration (DAC)  
 Research Focus Area (RFA)  
 RTT Flow Contingency Management/Multisector Planner Research  
 RTT Dynamic Airspace Configuration Research  
 RTT Efficient Flow into Congested Airspace (EFICA), (formerly TBO) Research  
 Trajectory-OPS (TOPS) Working Group  
 Multisector Planner (MSP) R&D

CRDR 364 IARD 365 IID 83 FID 110

*Initiate Trajectory-Based Operations  
 Airspace Management / Capacity Management (Airspace)*

CRDR 372 IARD 357 IID 44 FID 57

Provide Interactive Flight Planning from Anywhere 101103

NASA Trajectory Prediction, Synthesis, and Uncertainty (TPSU)  
 Research Focus Area (RFA)  
 NASA Dynamic Airspace Configuration (DAC)  
 Research Focus Area (RFA)

CRDR 364 IARD 365 IID 83 FID 110

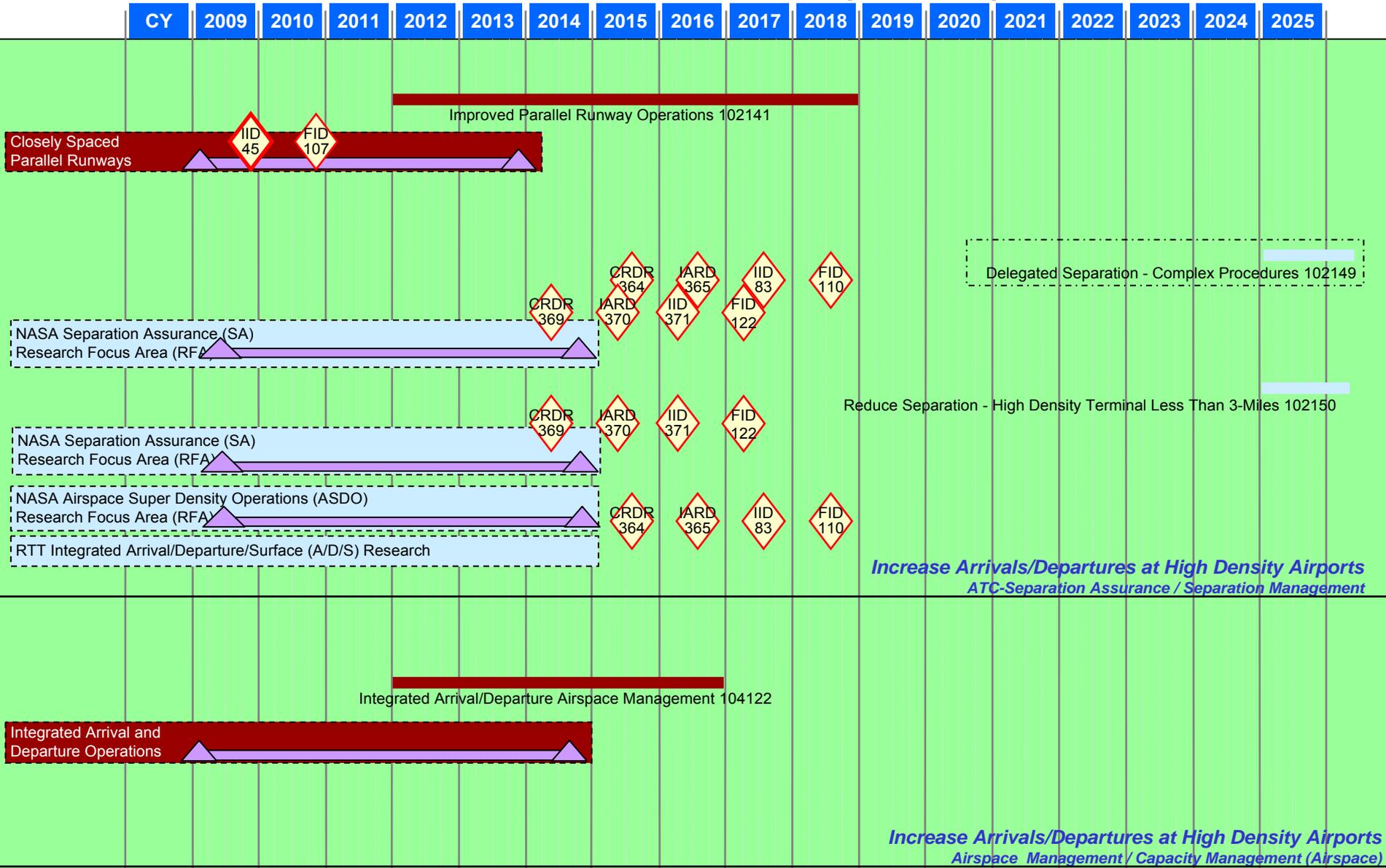
RTT Dynamic Airspace Configuration Research

CRDR 369 IARD 370 IID 371 FID 122

*Initiate Trajectory-Based Operations  
 ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-  
 Information Management / Flight and State Data Management*

Approved

# Automation Roadmap (7 of 17)

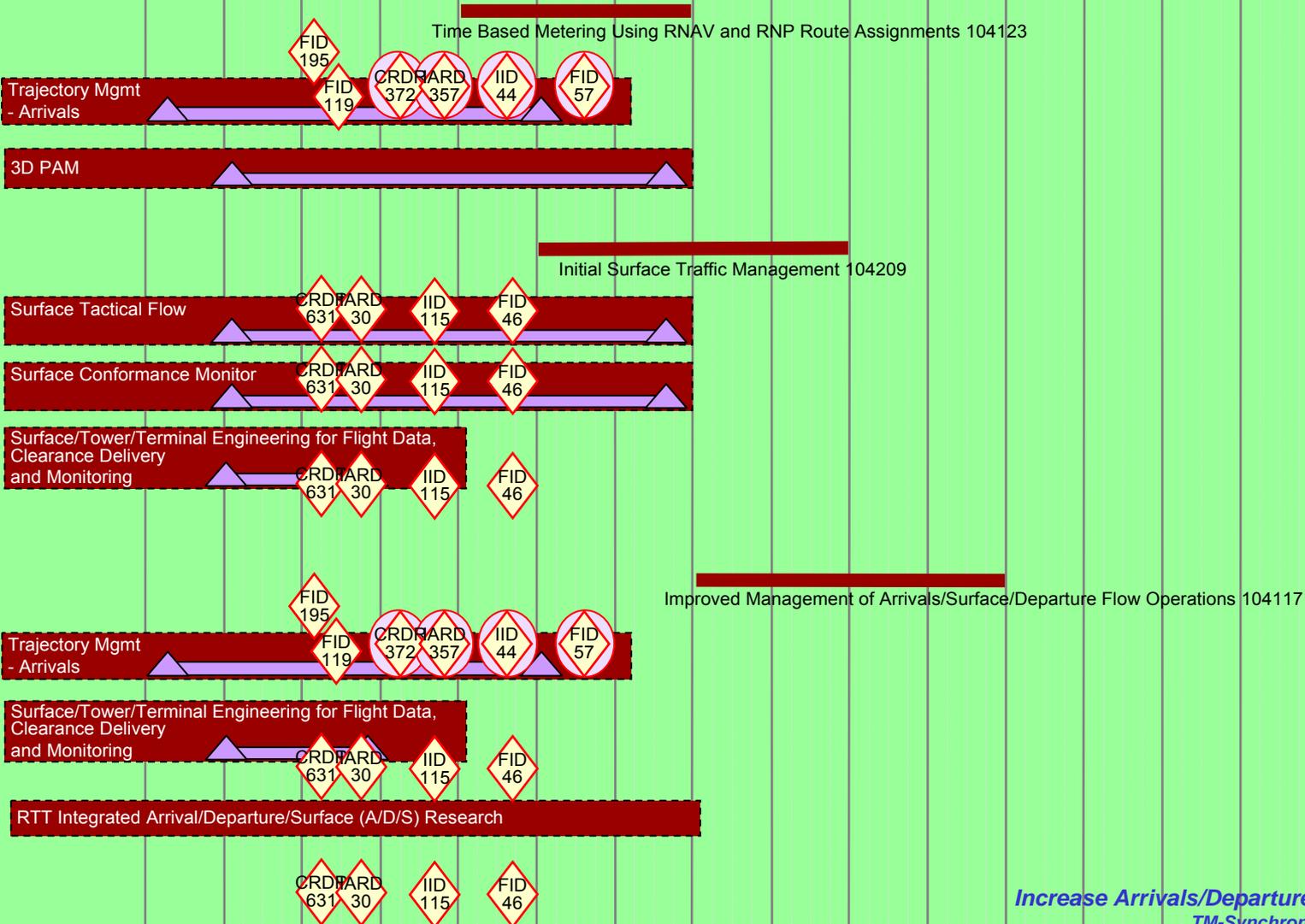


*Increase Arrivals/Departures at High Density Airports  
ATC-Separation Assurance / Separation Management*

*Increase Arrivals/Departures at High Density Airports  
Airspace Management / Capacity Management (Airspace)*

# Automation Roadmap (8 of 17)

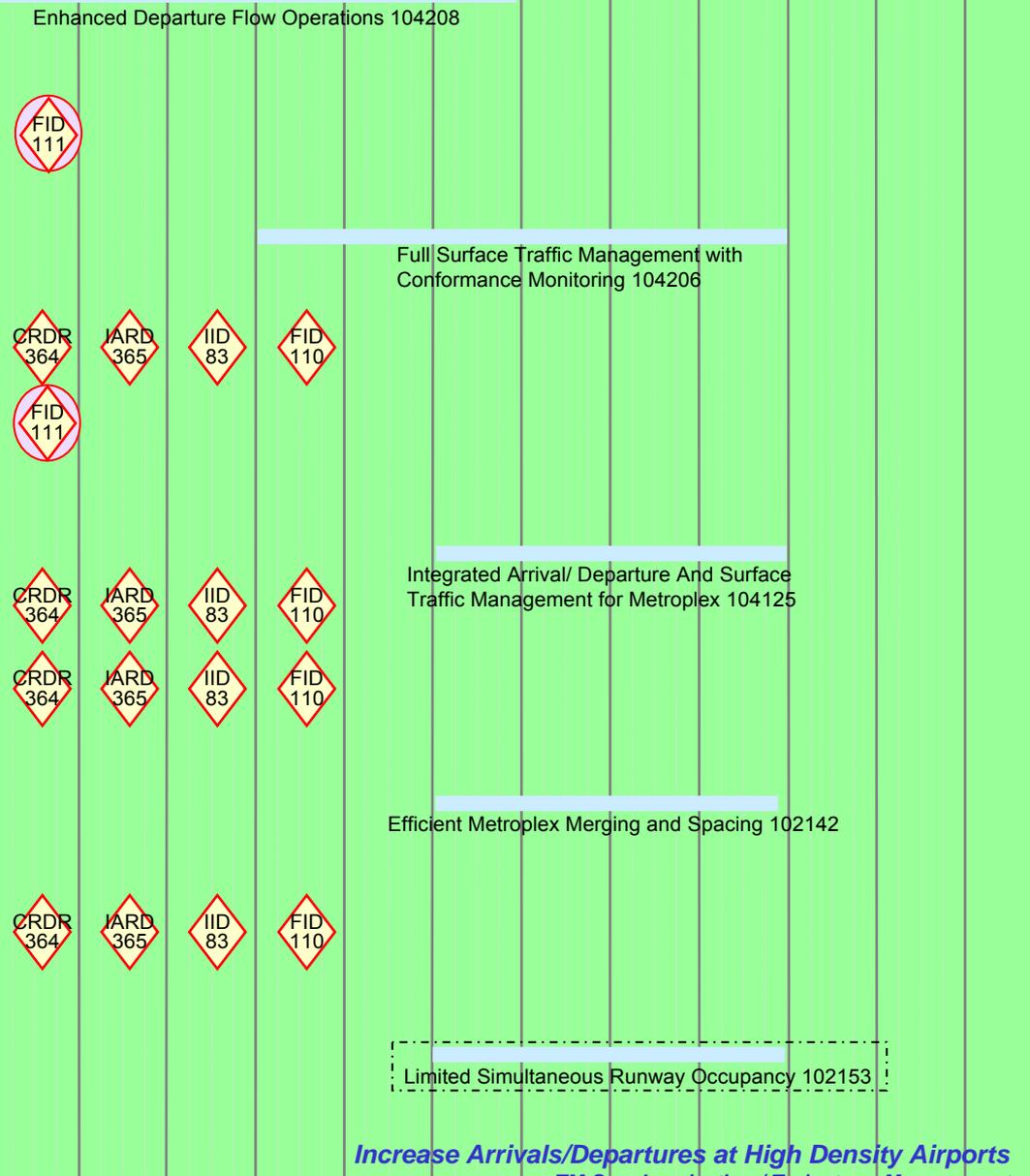
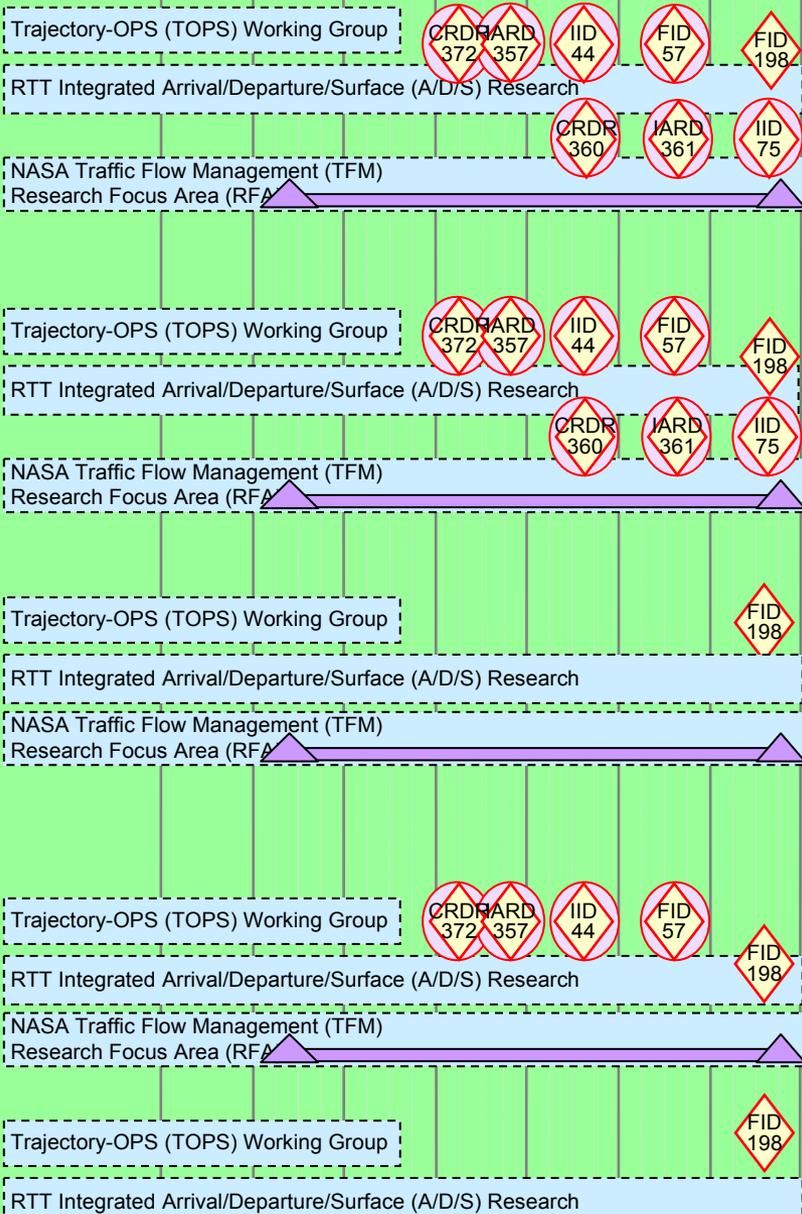
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*Increase Arrivals/Departures at High Density Airports  
TM-Synchronization / Trajectory Management*

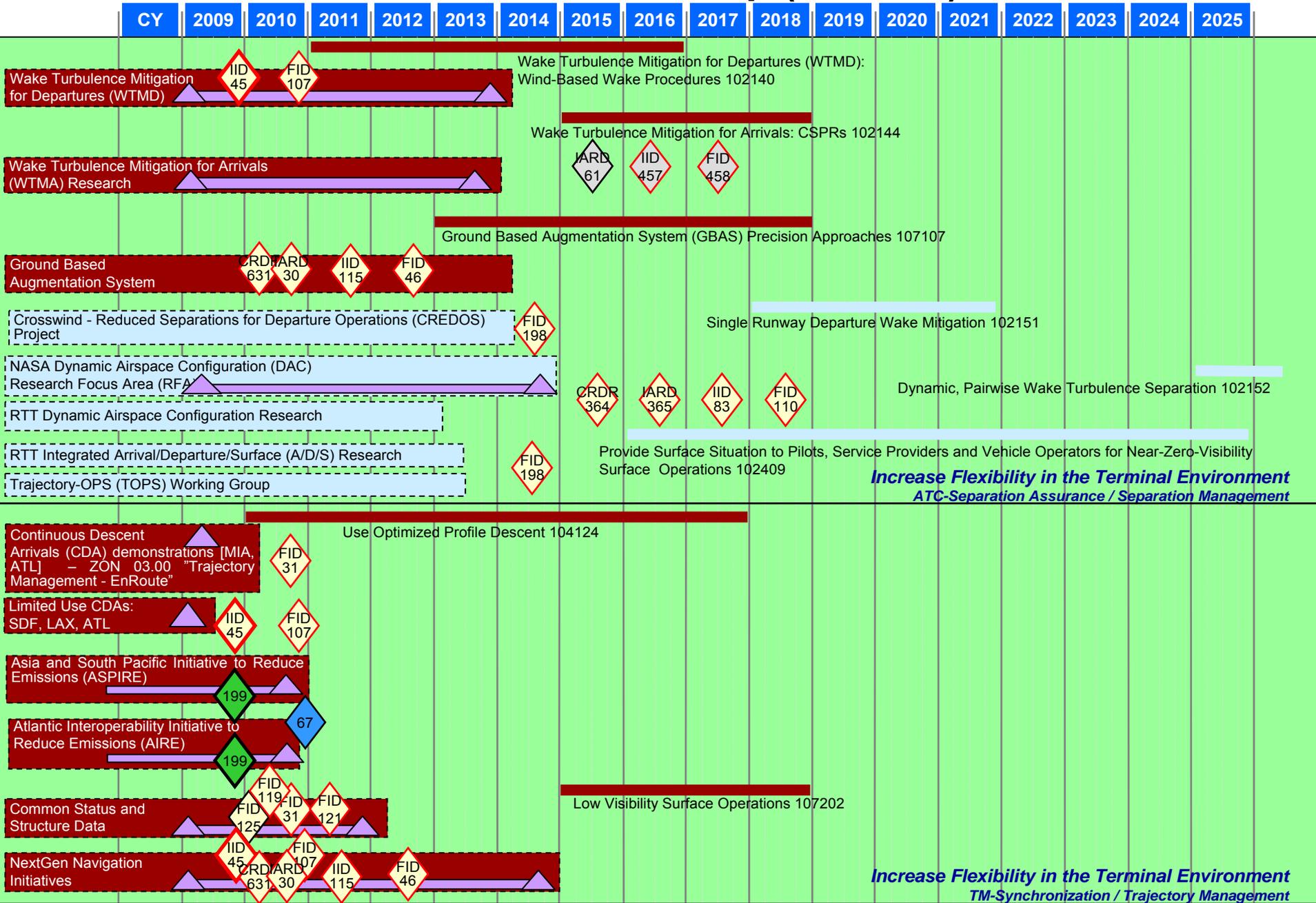
# Automation Roadmap (9 of 17)

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

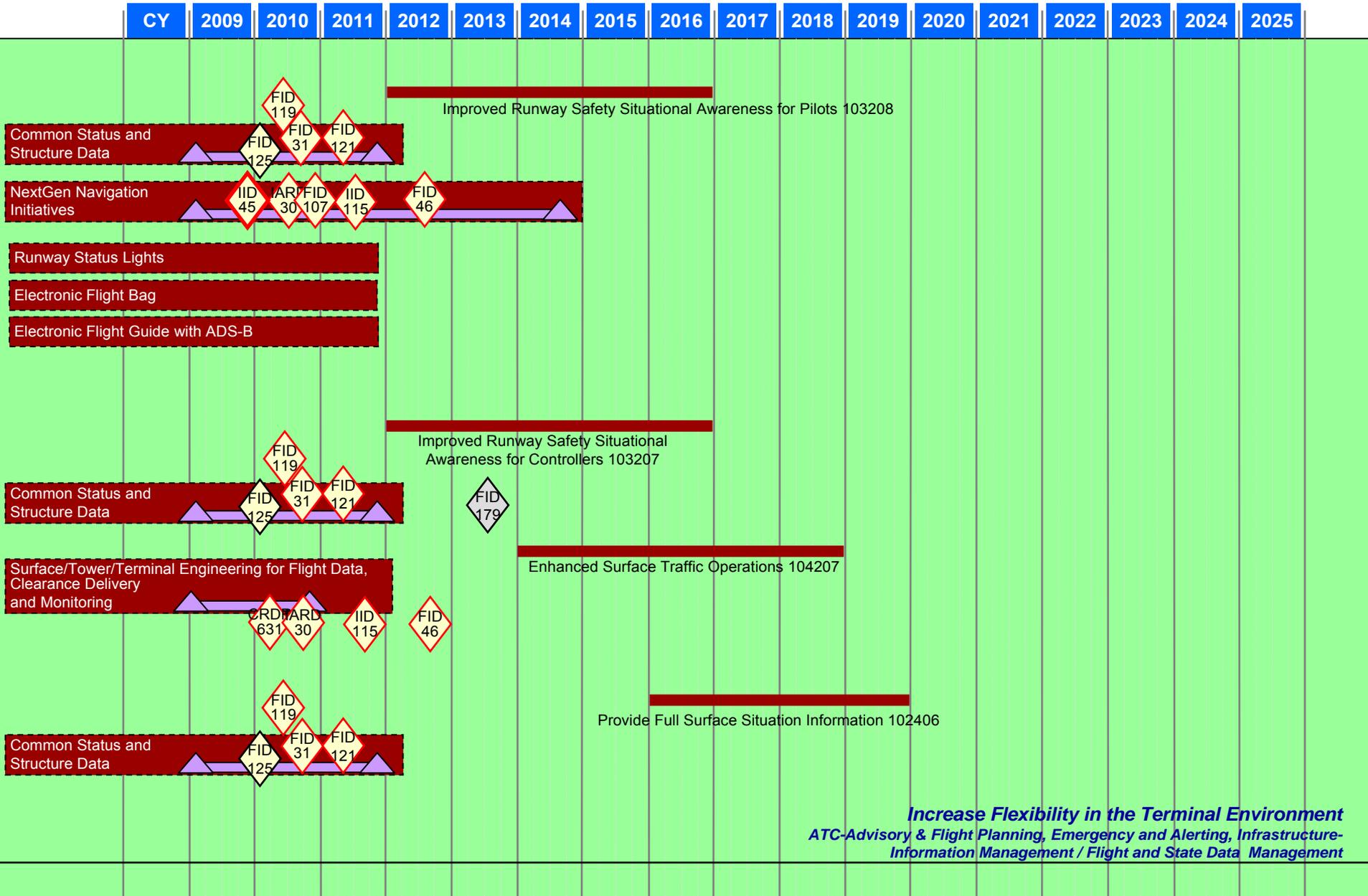


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# Automation Roadmap (10 of 17)



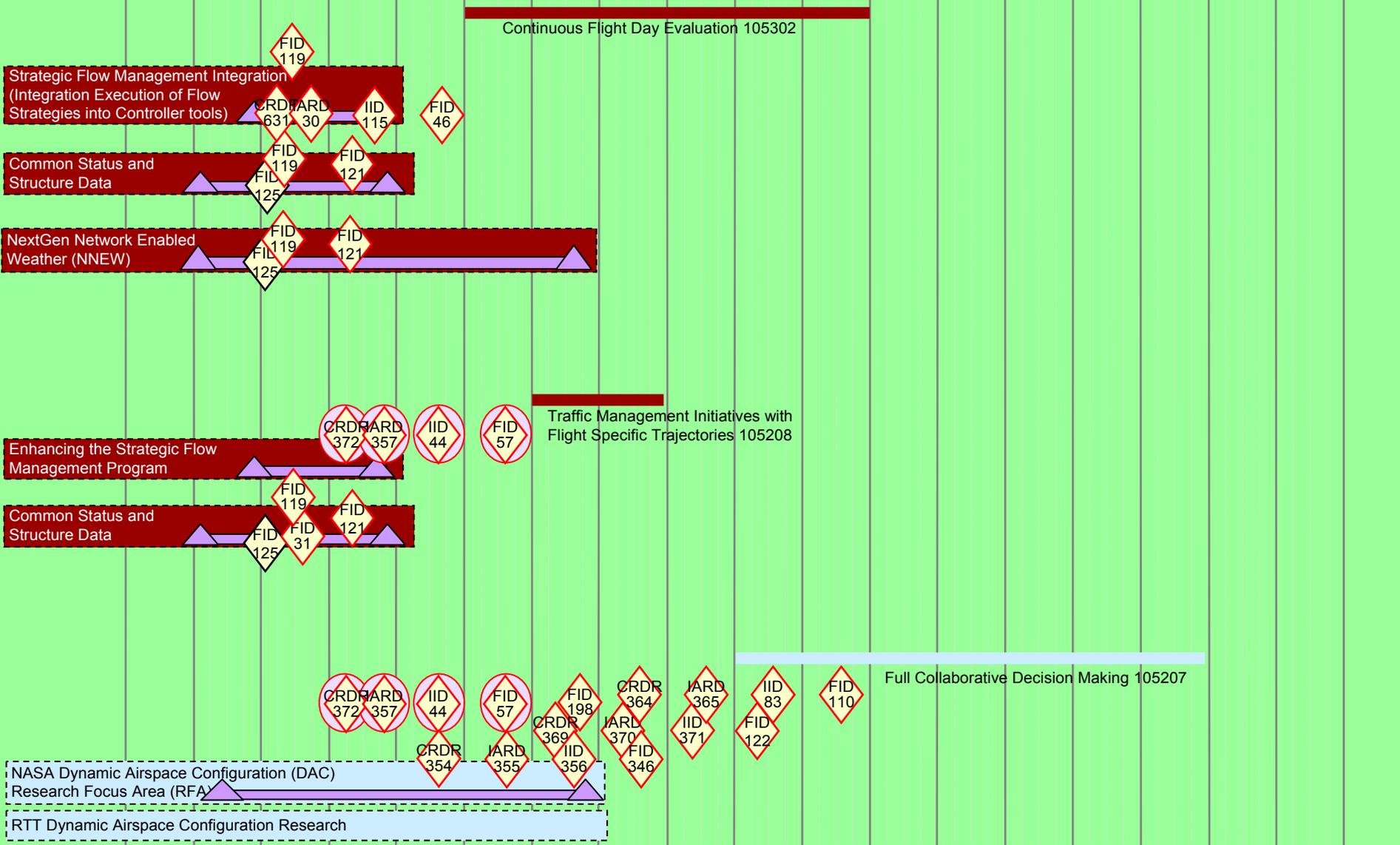
# Automation Roadmap (11 of 17)



**Increase Flexibility in the Terminal Environment**  
 ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-  
 Information Management / Flight and State Data Management

# Automation Roadmap (12 of 17)

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



*Improve Collaborative ATM*

*TM-Strategic Flow / Flow Contingency Management (Strategic Flow)*

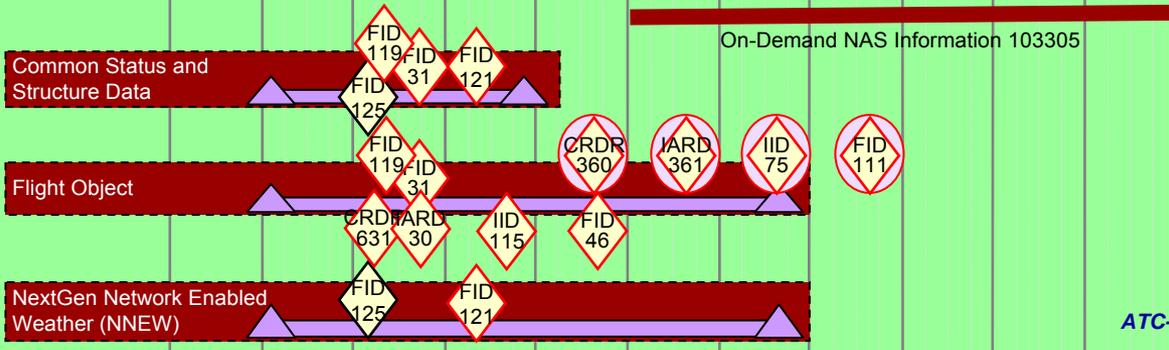
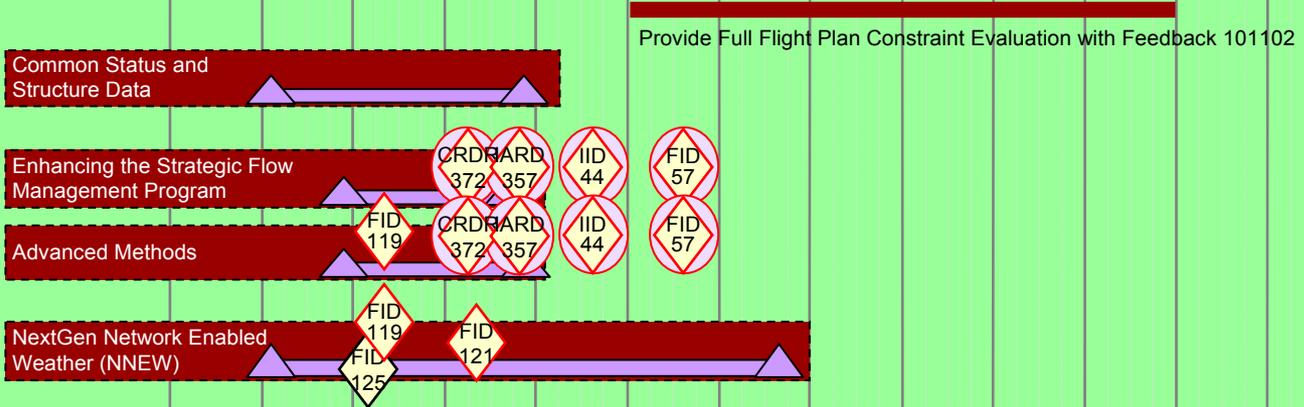
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# Automation Roadmap (13 of 17)

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



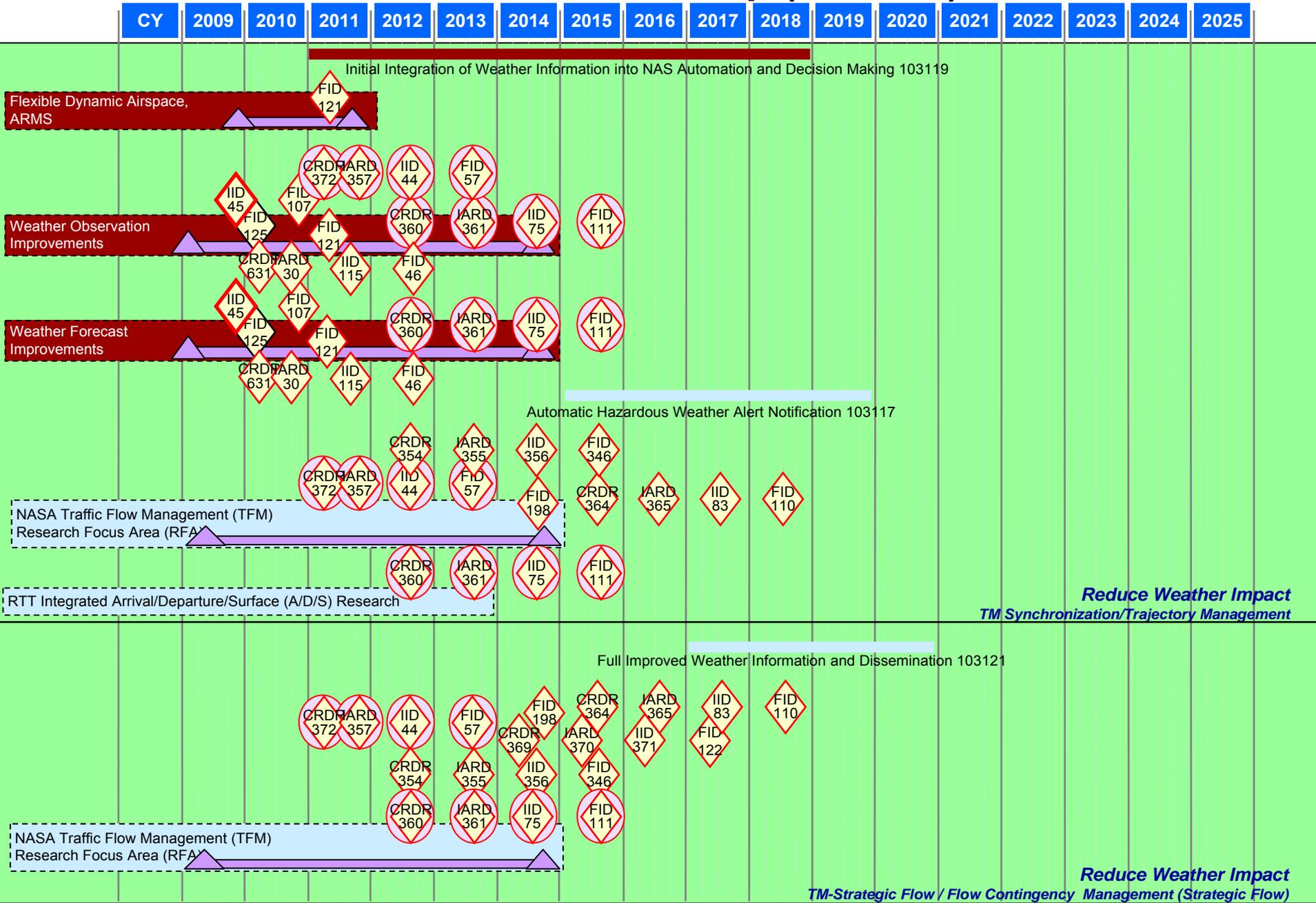
*Improve Collaborative ATM  
Airspace Management / Capacity Management (Airspace)*



*Improve Collaborative ATM  
ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-Information Management / Flight and State Data Management*

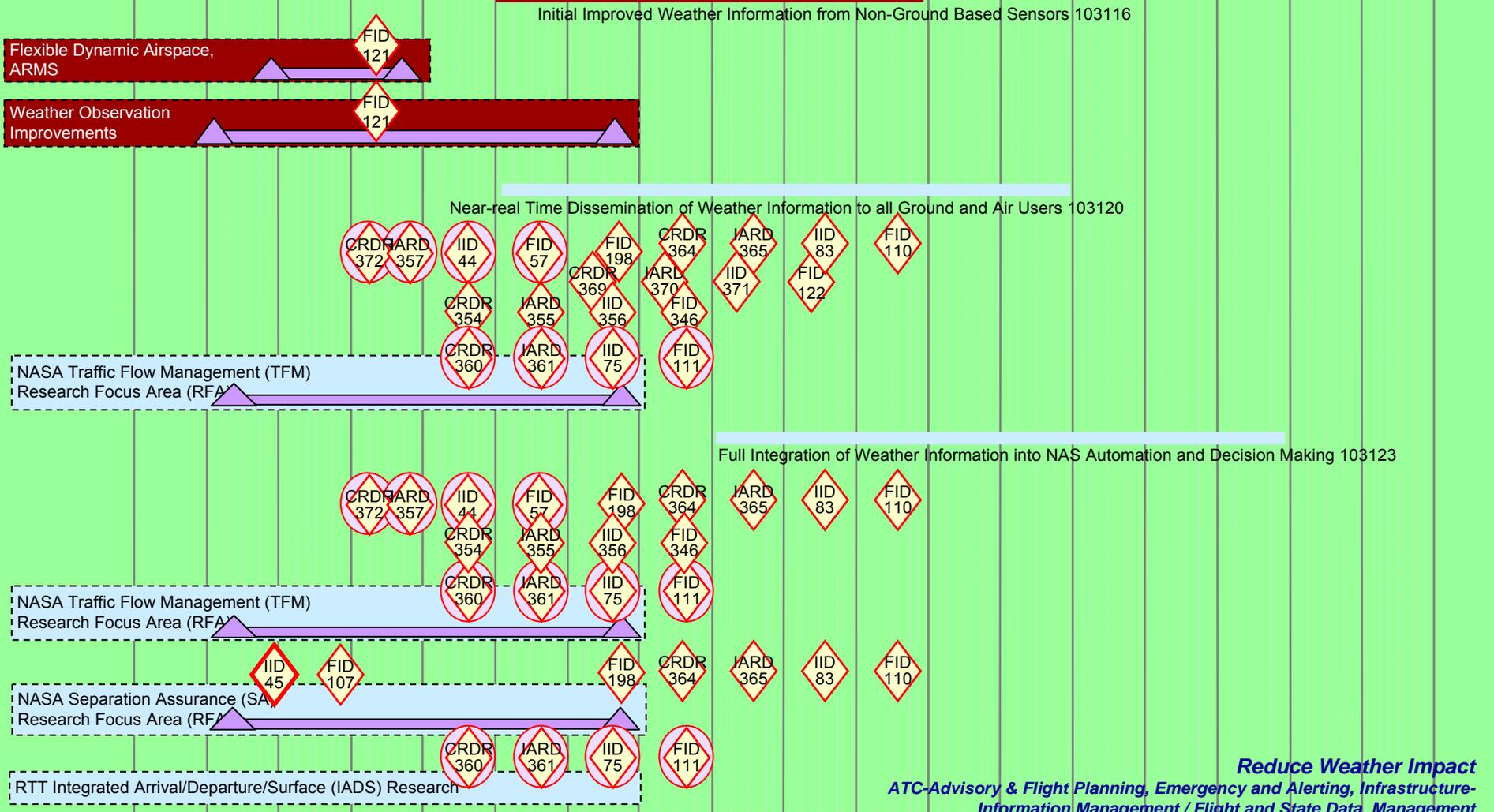
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# Automation Roadmap (14 of 17)



# Automation Roadmap (15 of 17)

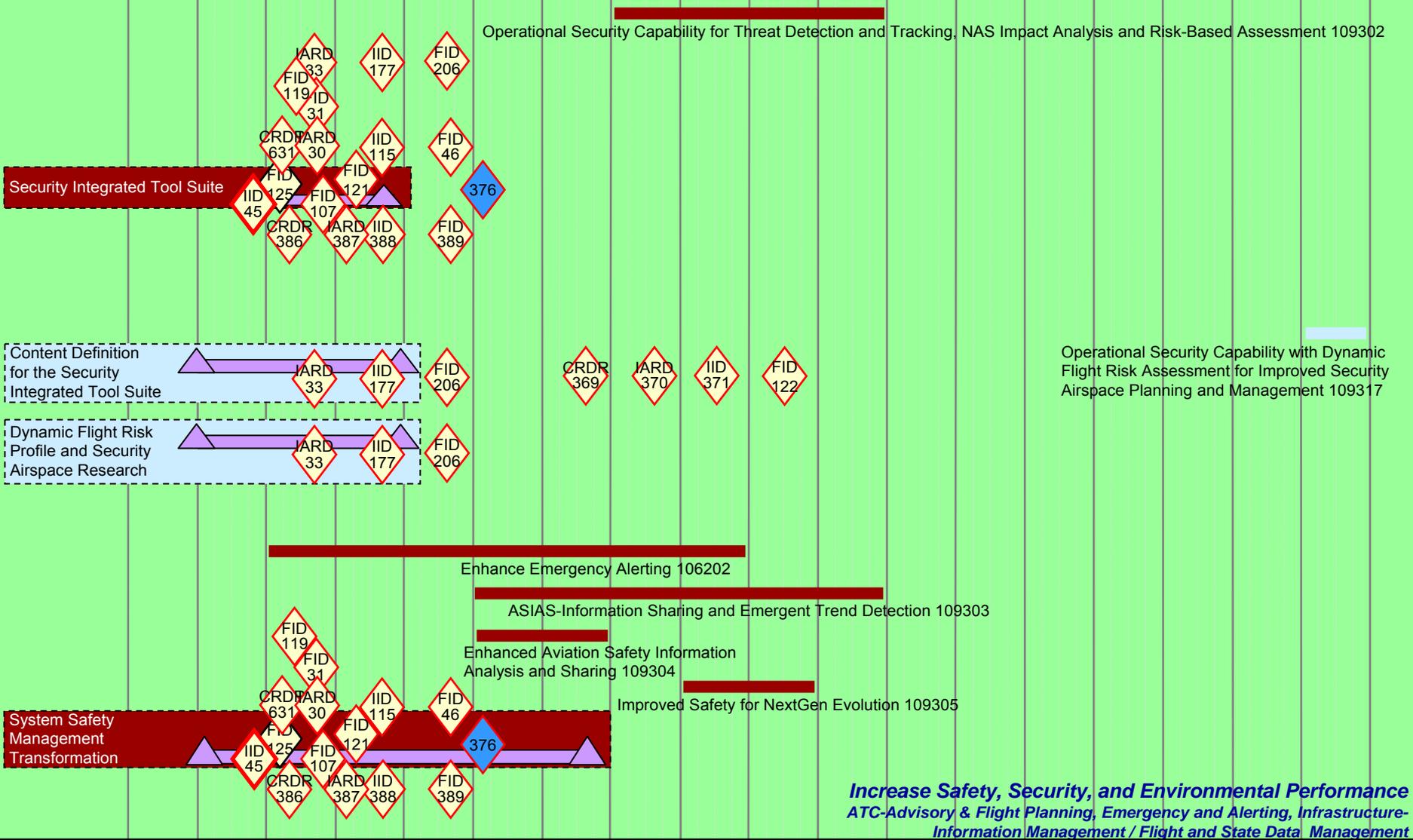
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025



*Reduce Weather Impact  
ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-  
Information Management / Flight and State Data Management*

# Automation Roadmap (16 of 17)

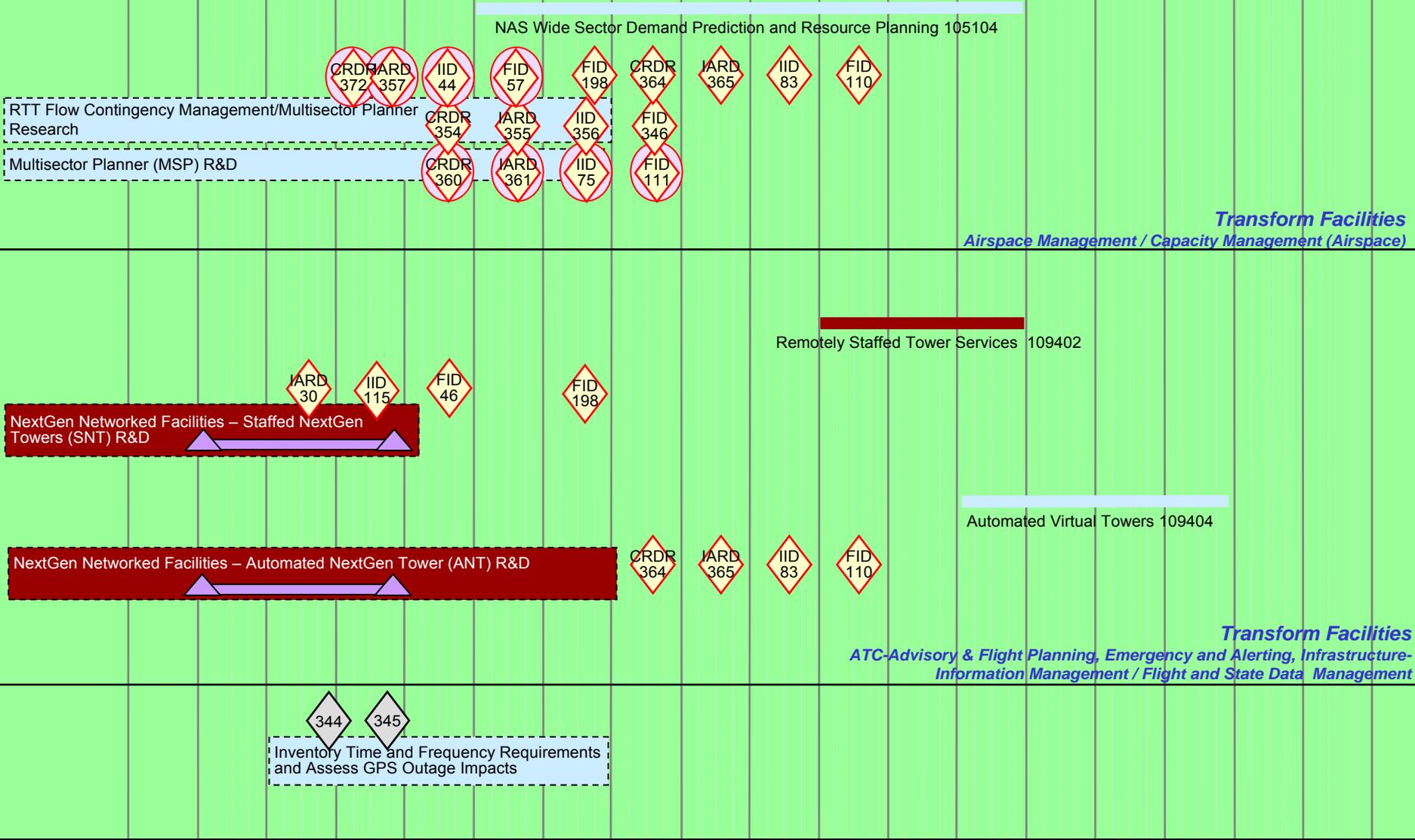
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025



**Increase Safety, Security, and Environmental Performance**  
 ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-  
 Information Management / Flight and State Data Management

# Automation Roadmap (17 of 17)

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



*Transform Facilities  
Airspace Management / Capacity Management (Airspace)*

*Transform Facilities  
ATC-Advisory & Flight Planning, Emergency and Alerting, Infrastructure-Information Management / Flight and State Data Management*

# Automation Roadmap: Assumptions

Identifier	Description
AUTO-01	Net-centric Enterprise Services will replace designated existing point to point interfaces with a system based on a Service Oriented Architecture providing enhanced data exchange, enhanced flexibility, and enhanced security for FAA Operations Personnel, and airspace users within a common information environment to support NextGen Operational Improvements.
AUTO-02	ADS-B is a necessary infrastructure element to support Trajectory Based Operations, Flexible Terminal, and High Density Terminal solution sets.
AUTO-03	Data Communication is a necessary infrastructure element to support Trajectory Based Operations, Flexible Terminal, and High Density Terminal solution sets.
AUTO-04	Existing automation platforms will provide the basis for the Next Generation capabilities through the mid-term.
AUTO-05	New platforms will only be added to augment existing automation systems when necessary.
AUTO-06	Operational Service Units will be responsible for JRC Final Investment Decisions.
AUTO-07	Policy and standards decisions prescribing the use of hand-held devices for data messaging by General Aviation pilots and aircraft are established.
AUTO-08	Consistent security management across Data Communication, Automation and SWIM support the evolution.
AUTO-09	Human-system integration will be conducted during analysis, design, development, and testing of Automation programs.
AUTO-10	Safety analysis and considerations will be included in all applicable phases of Automation analysis, design, development, and testing and platforms will provide data as required for safety monitoring and analysis.
AUTO-11	Automation platform designs will support environmental and energy saving initiatives.

# Automation Roadmap: Decision Points (1 of 5)

DP #	Target Date	High Priority	Domain	Name
2	2010 Q1	Y		AIM Modernization Segment 1 Final Investment Decision
30	2010 Q3	Y		Investment Analysis Readiness Decision for Tower Flight Data Manager 1 (TFDM1)
31	2010 Q3	Y		Final Investment Decision for Post ERAM R3 Work Package
33	2010 Q3	Y		Investment Analysis Readiness Decision for Security Integrated Tool Suite (SITS)
40	2011 Q1	N	Weather	Initial Investment Decision to acquire & deploy initial phase of Wake Turbulence capability for Mitigation for Departures (WTMD) from Closely Spaced Parallel Runways (CSPR)
44	2012	Y		Time Based Flow Management (TBFM)/Integrated Enterprise Solution (IES) Initial Investment Decision
45	2009 Q4	Y		Terminal Automation Modernization and Replacement (TAMR) Phase 3 Initial Investment Decision (Complete)
46	2012 Q3	Y		Tower Flight Data Manager 1 (TFDM1) Final Investment Decision
47	2012	Y	Communications	Final Investment Decision for NAS Voice Switch
48	2010 Q3	N	Weather	Strategy to Fund FAA Portion of NextGen 4-D Weather Cube
55	2009 Q2	N		Assess common front end display components for Radar Display (i.e., R-side) monitor (Complete)
57	2013	Y		TBFM/IES Final Investment Decision
61	2015	N	Weather	Investment Decision to add WT for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
65	2014	N		Common Information Display Systems (IDS) capability in En Route and Terminal Final Investment Decision
67	2010 Q4	N		Approval of offshore implementation long term plan
68	2012	N		Decision to support NASE integration with AIM
75	2014	Y		En Route Automation NextGen Mid-Term Work Package Initial Investment Decision
79	2010 Q1	Y	Weather	Investment Analysis Readiness Decision (IARD) for NextGen Wx Processor WP1 and NNEW WP1 to enter IA
83	2017	Y		Transition to NextGen Far Term automation platforms and display subsystem through convergence Initial Investment Decision
86	2011 Q4	Y	Weather	Investment Decision (IID) for NextGen Wx Processor WP1 (includes CIWS functionality, NG WARP functionality & NNEW WP1 functionality (includes WARP WINS & FBWTG))
88	2018	N	Weather	Executive Level Decision to move ADAS/ALDARS functionality to NNEW WP2
89	2012 Q4	Y	Weather	Final Investment Decision for NextGen Wx Processor WP1
102	2011 Q4	N	Surveillance	Final Investment Decision to implement SIM in terminal and en route legacy radar systems
107	2010 Q4	Y		TAMR Phase 3 Final Investment Decision

# Automation Roadmap: Decision Points (2 of 5)

DP #	Target Date	High Priority	Domain	Name
109	2010 Q3	N		Architectural Decision to Pursue a Common Information Display System (IDS)
110	2018	Y		Approve final investment for transition to NextGen automation platforms and display subsystem through convergence
111	2015	Y		En Route Automation NextGen Mid-Term Work Package Final Investment Decision
115	2011 Q3	Y		Approve Tower Flight Data Manager 1 Initial Investment Decision
117	2015	N		Decision to decommission FDIO systems
119	2010 Q2	Y		Final Investment Decision for CATMT Work Package 3 contents
121	2011	Y		AIM Modernization Segment 2 Final Investment Decision
122	2017	Y		AIM Modernization Segment 3 Final Investment Decision
125	2010 Q1	N		Alaska Flight Service Modernization (AFSM) Segment 1 Final Investment Decision
126	2013 Q4	N	Facilities	Initial Investment Decision (IID) Flight Services Facilities
127	2015 Q4	N	Facilities	Final Investment Decision (FID) Flight Services Facilities
128	2009 Q2	N	Enterprise Services	Final Investment Decision for SWIM Segment 1B (Baseline for FY 11 - 13) (Complete)
158	2011 Q3	Y	Communications	Data Communications Segment 1 FID (part 1 of a split FID)
172	2011	N	Aircraft	4DT concept complete, including common definition of Flight Object path and constraints. Major agency decision on constrained trajectory, negotiated trajectory, delegated trajectory)
177	2011 Q3	Y		Initial Investment Decision for SITS Air Domain Security Architectures
179	2013	N	Surveillance	Final Investment Decision for LCGS
195	2010 Q1	Y		Time Based Flow Management (TBFM) Final Investment Decision
198	2014	Y		Tower Flight Data Manager 2 (TFDM2) Final Investment Decision
199	2009 Q3	N		DOTS Sustainment/Integration Decision (Complete)
200	2017	N		En Route/Oceanic Integration Assessment
201	2017	Y		En Route /Oceanic IES NextGen WP Initial Investment Decision
202	2018	Y		En Route /Oceanic IES NextGen WP Final Investment Decision
203	2012 Q1	N	Communications	Flight Service, AFSM Voice System Provisioning Coordination with NVS
206	2012 Q3	Y		Final Investment Decision for SITS Air Domain Security Architecture
207	2012 Q3	N		DUAT Continuation decision
208	2012 Q3	Y		Meteorological and Aeronautical Planning System (MAPS) Final Investment Decision

# Automation Roadmap: Decision Points (3 of 5)

DP #	Target Date	High Priority	Domain	Name
209	2014	Y	Weather	Executive Level Decision to fund FAA portion of NextGen 4-D Weather Single Authoritative Source (4-D Wx SAS)
212	2020	N	Weather	Investment Decision (IARD) to add WT Mitigation for Single Runway (WTSR) decision support capability
254	2010 Q3	N	Surveillance	In-Service Decision for SBS Critical Services (ADS-B) NAS wide implementation, including backup strategy
260	2020	N	Surveillance	Decision on ADS-B Rule Compliance
262	2012	N	Airspace and Procedures	Decision to implement Big Airspace at candidate areas
275	2014	Y		Terminal Automation NextGen Mid-Term Work Package Initial Investment Decision
276	2015	Y		Terminal Automation NextGen Mid-Term Work Package Final Investment Decision
277	2010 Q3	N	Enterprise Services	Final Investment Decision for SWIM Segment 2 (Baseline FY12 - 16)
304	2015	Y	Communications	Data Communications Segment 2 FID
339	2010 Q3	Y	Communications	Initial Investment Decision for NAS Voice System
341	2015	N	Weather	Final Investment Decision to transition WMSCR Comms functionality to web access via SWIM Seg 3 & ALDARS Comms to NNEW WP2
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
346	2015	Y		Final Investment Decision for CATMT Work Package 4
353	2012 Q1	Y	Communications	Data Communications Segment 1 FID (part 2 of a split FID)
354	2012	Y		CATMT Work Package 4 Concept and Requirements Definition Readiness Decision
355	2013	Y		CATMT Work Package 4 Investment Analysis Readiness Decision
356	2014	Y		CATMT Work Package 4 Initial Investment Decision
357	2011 Q4	Y		TBFM/IES Investment Analysis Readiness Decision
358	2015	Y		En Route /Oceanic IES NextGen WP Concept and Requirements Definition Readiness Decision
359	2016	Y		En Route /Oceanic IES NextGen WP Investment Analysis Readiness Decision
360	2012	Y		En Route Automation NextGen Mid-Term Work Package Concept and Requirements Definition Readiness Decision

# Automation Roadmap: Decision Points (4 of 5)

DP #	Target Date	High Priority	Domain	Name
361	2013	Y		En Route Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
362	2012	Y		Terminal Automation NextGen Mid-Term Work Package Concept and Requirements Definition Readiness Decision
363	2013	Y		Terminal Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
364	2015	Y		Transition to NextGen Far Term automation platforms and display subsystem through convergence Concept and Requirements Definition Readiness Decision
365	2016	Y		Transition to NextGen Far Term automation platforms and display subsystem through convergence Investment Analysis Readiness Decision
366	2010 Q2	N		Meteorological and Aeronautical Planning System (MAPS) Concept and Requirements Definition Readiness Decision
367	2010 Q4	N		Meteorological and Aeronautical Planning System (MAPS) Investment Analysis Readiness Decision
368	2011 Q4	Y		Meteorological and Aeronautical Planning System (MAPS) Initial Investment Decision
369	2014	Y		AIM Modernization Segment 3 Concept and Requirements Definition Readiness Decision
370	2015	Y		AIM Modernization Segment 3 Investment Analysis Readiness Decision
371	2016	Y		AIM Modernization Segment 3 Initial Investment Decision
372	2011	Y		TBFM/IES Concept and Requirements Definition Readiness Decision
373	2010 Q4	Y		RMMS CONOPS for NextGen Integration Strategy Decision
374	2009 Q2	Y		RMMS Technology Refresh Final Investment Decision (Complete)
376	2013 Q1	Y		Interface RMLS with SWIM Segment 2 Executive Level Decision
385	2013	N		Initial Investment Decision of common Information Display Systems (IDS) capability in En Route and Terminal
386	2010 Q2	Y		NextGen ATOP/Offshore Automation Concept and Requirements Definition Readiness Decision
387	2011 Q1	Y		NextGen ATOP/Offshore Automation Investment Analysis Readiness Decision
388	2011 Q3	Y		NextGen ATOP/Offshore Automation Initial Investment Decision
389	2012 Q3	Y		NextGen ATOP/Offshore Automation Final Investment Decision
437	2010 Q2	Y		Flight Data Interface Modernization Concept and Requirements Definition Readiness Decision
438	2011 Q1	Y		Flight Data Interface Modernization Investment Analysis Readiness Decision
439	2011 Q4	Y		Flight Data Interface Modernization Initial Investment Decision
440	2012 Q4	Y		Flight Data Interface Modernization Final Investment Decision
448	2013	N	Weather	IARD to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS to Comms to NNEW WP

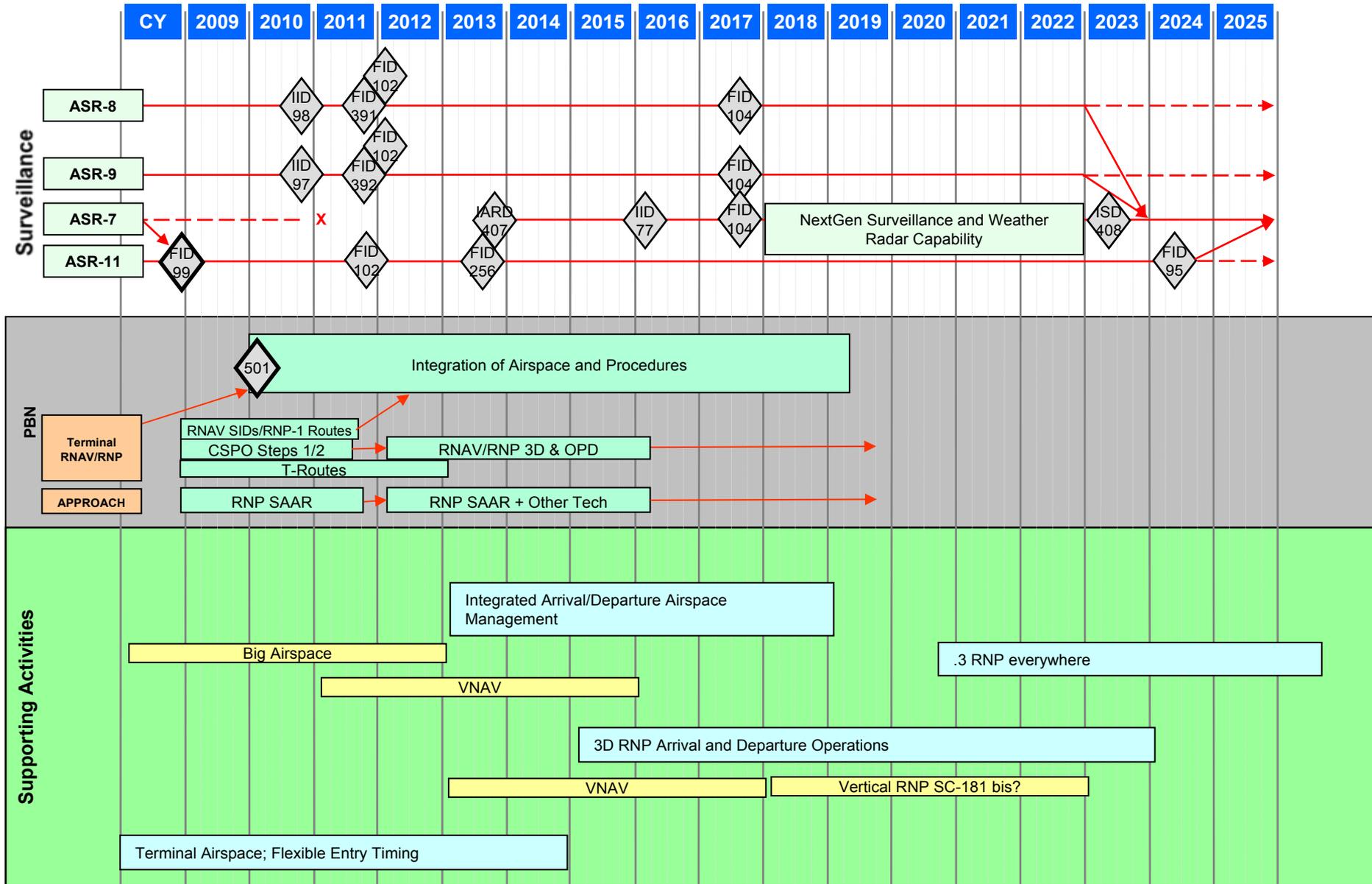
# Automation Roadmap: Decision Points (5 of 5)

DP #	Target Date	High Priority	Domain	Name
449	2014	Y	Weather	IID to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS Comms to NNEW WP2
450	2018	Y	Weather	IARD to fund FAA portion of 4-D Weather SAS Tech Refresh
451	2019	Y	Weather	IID to fund FAA portion of 4-D Weather SAS Tech Refresh
455	2012 Q2	Y	Weather	FID to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
457	2016	Y	Weather	IID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
458	2017	Y	Weather	FID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
460	2020	Y	Weather	IID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
461	2021	Y	Weather	FID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
511	2014	Y	Navigation	Decision on national backup
586	2015 Q3	Y	Information System Security	Transition plan for NAS Programs to use the Certified Software Management capability completed
588	2013 Q2	Y	Information System Security	Transition plan for NAS Programs to use the Internal Policy Enforcement capability completed
594	2011 Q3	N	Facilities	Strategy Decision for Flight Services Facilities
595	2012 Q3	N	Facilities	IARD for Continuation of Flight Services
596	2010 Q1	N		Traffic Flow Management Sustainment Final Investment Decision
605	2012	N		Investment Analysis Readiness Decision of common Information Display Systems (IDS) capability in En Route and Terminal
630	2012 Q4	N		Policy Decision on Data Rights and Release Policies For Sharing Surface and Arrival Data
631	2010 Q2	Y		Concept and Requirements Definition Readiness Decision (CRDR) for Tower Flight Data Manager 1 (TFDM1)

# Airport

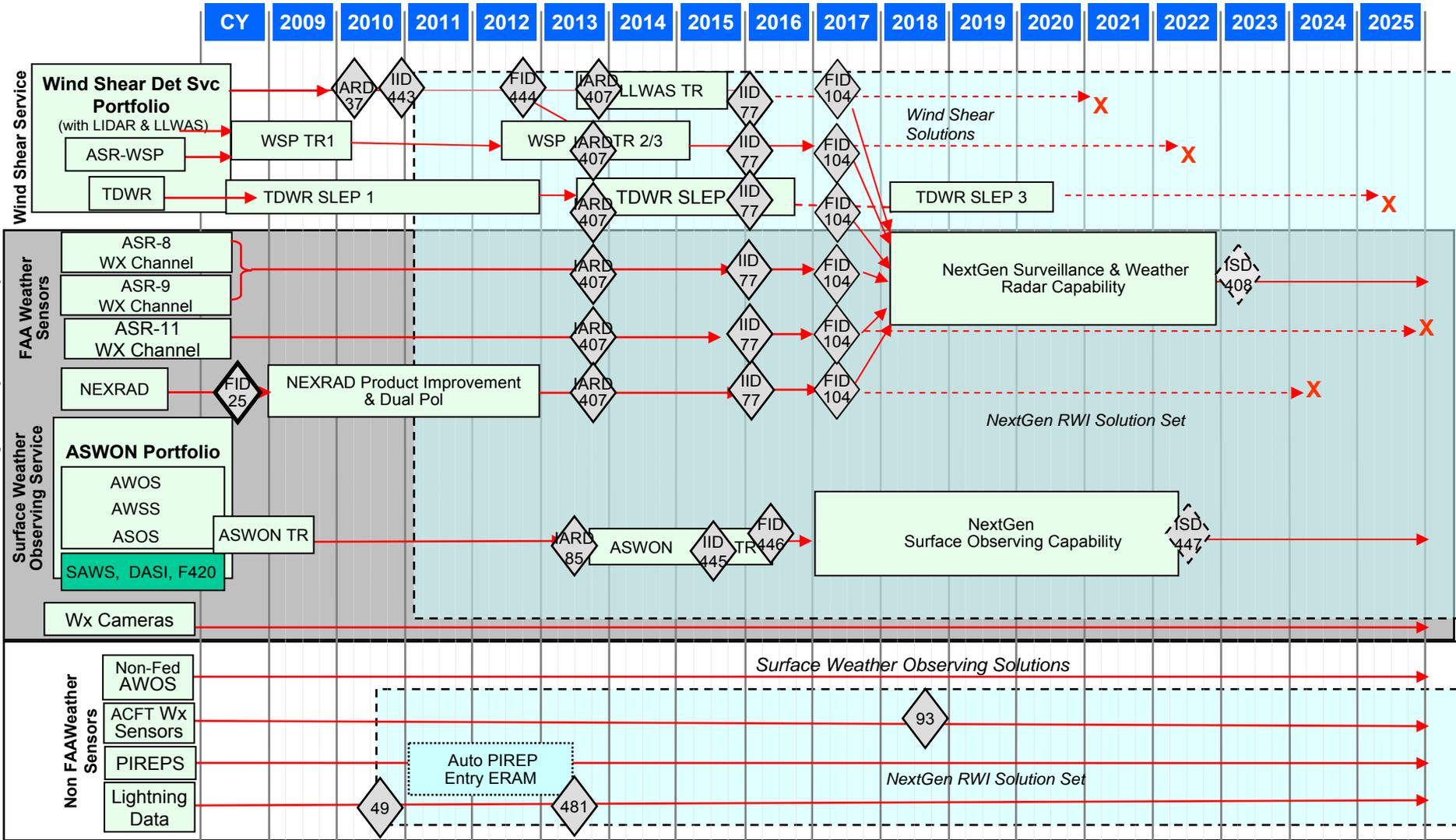
# Airport Roadmap (1 of 9)

Terminal Airspace (Arrivals and Departures)



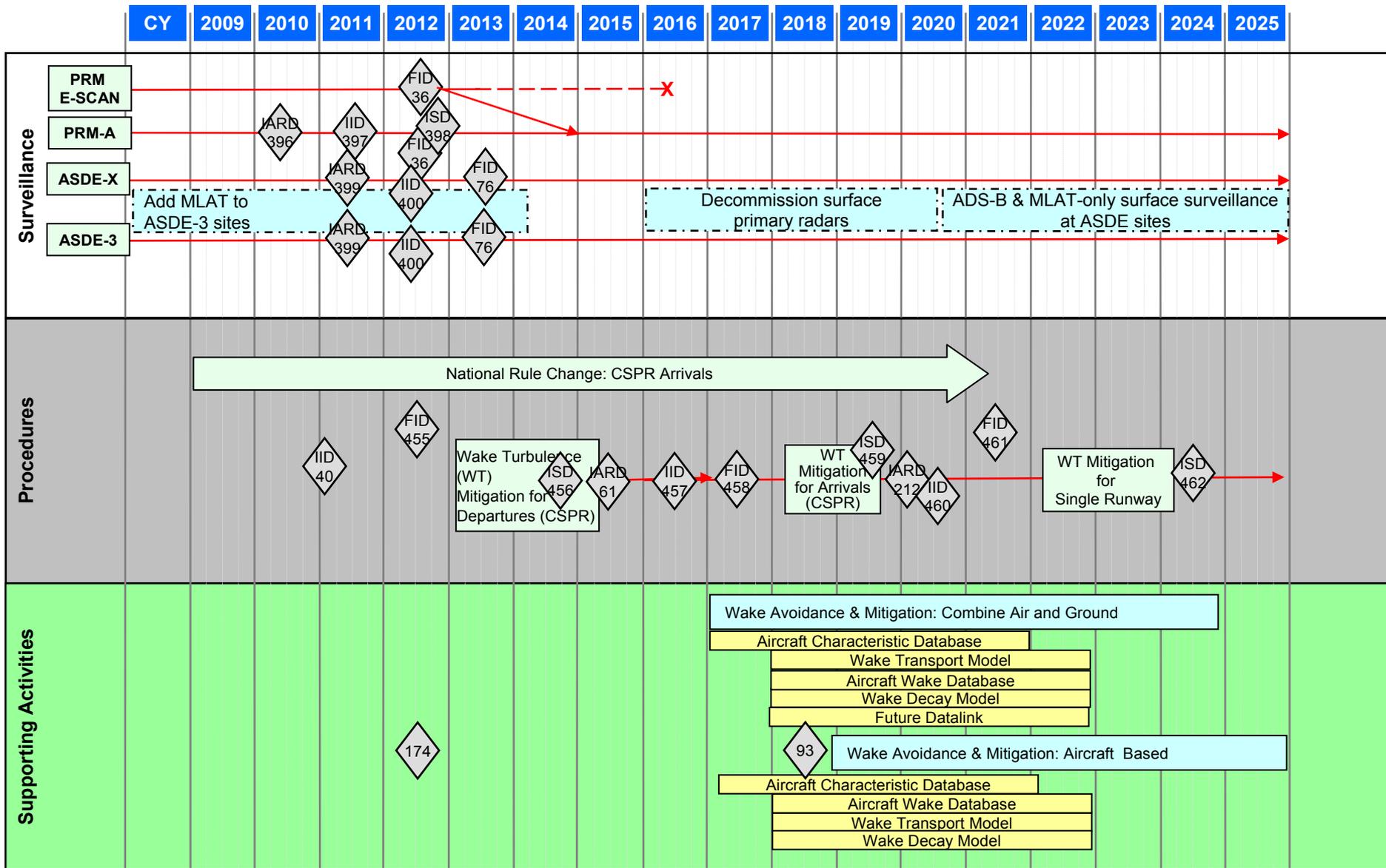
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# Airport Roadmap (2 of 9)



# Airport Roadmap (3 of 9)

Approach and Landing/Takeoff

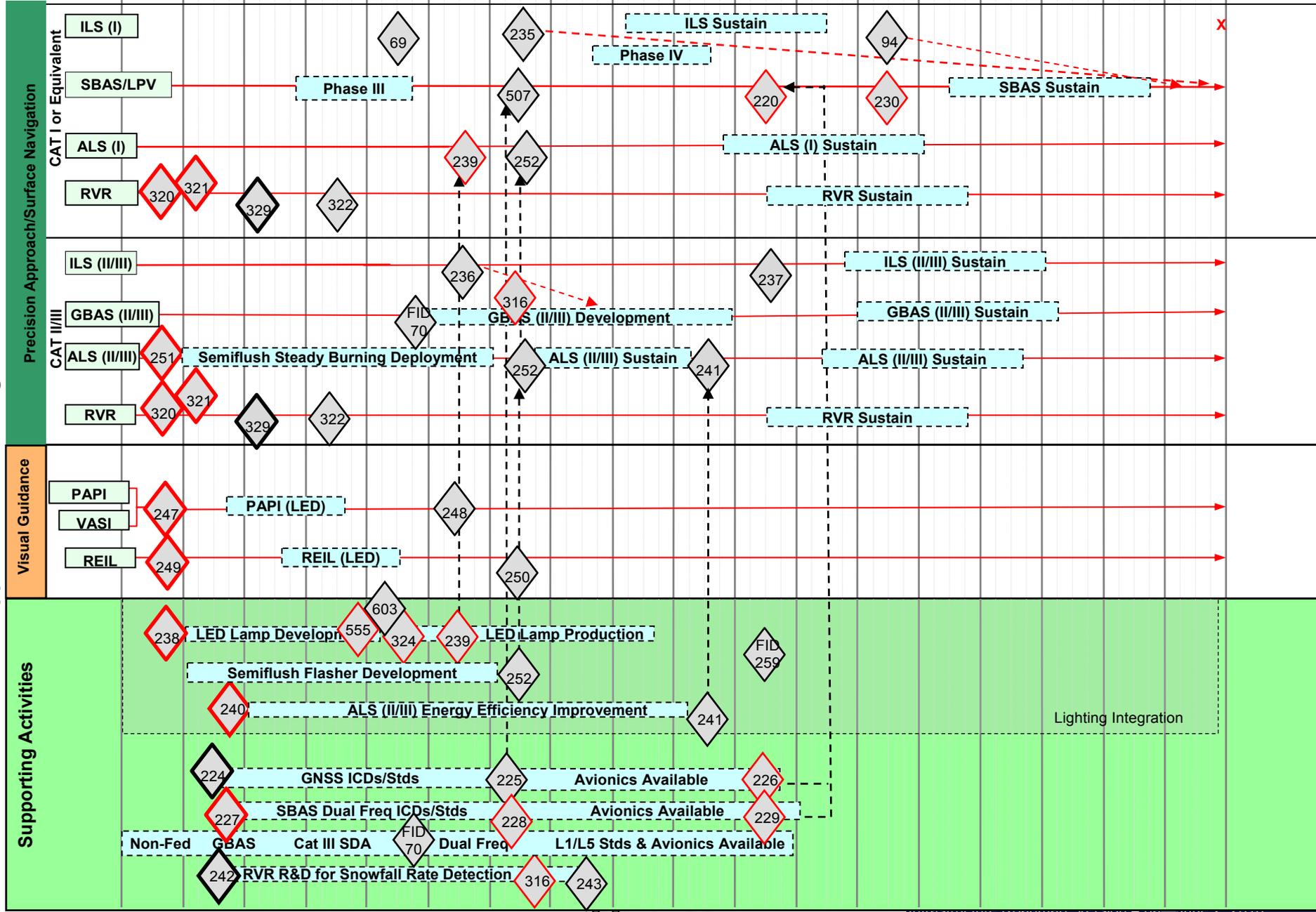


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# Airport Roadmap (4 of 9)

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

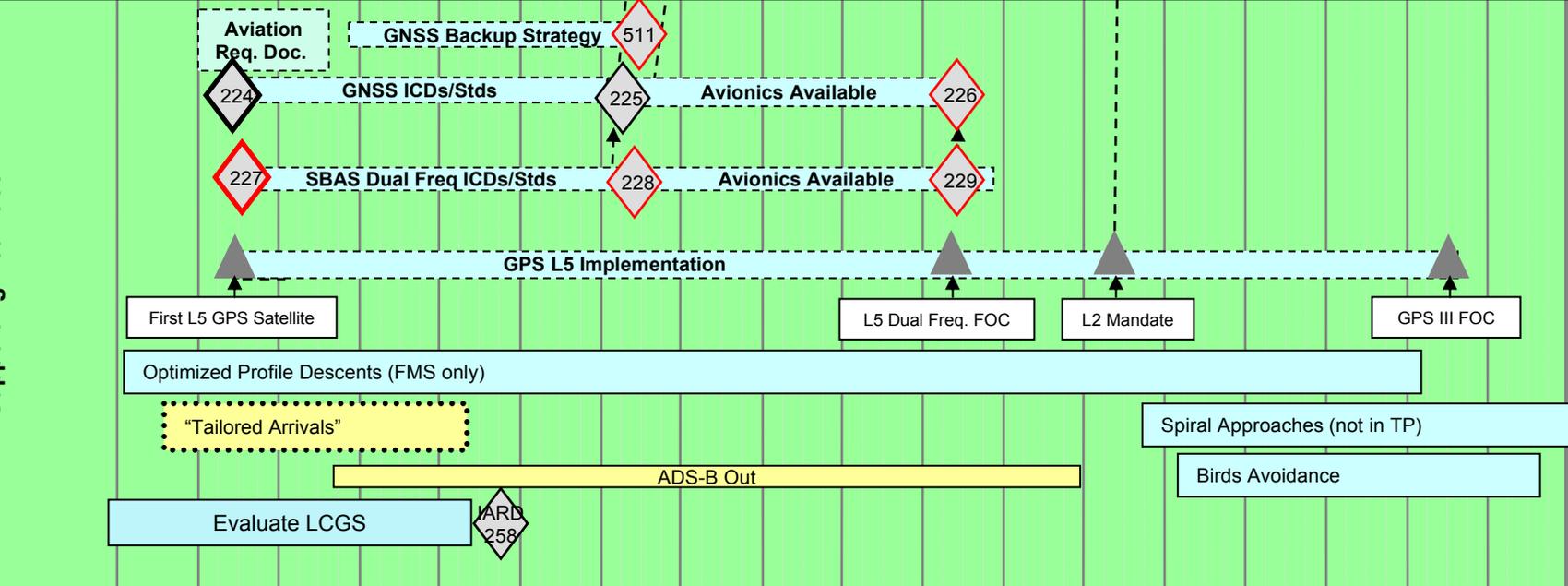
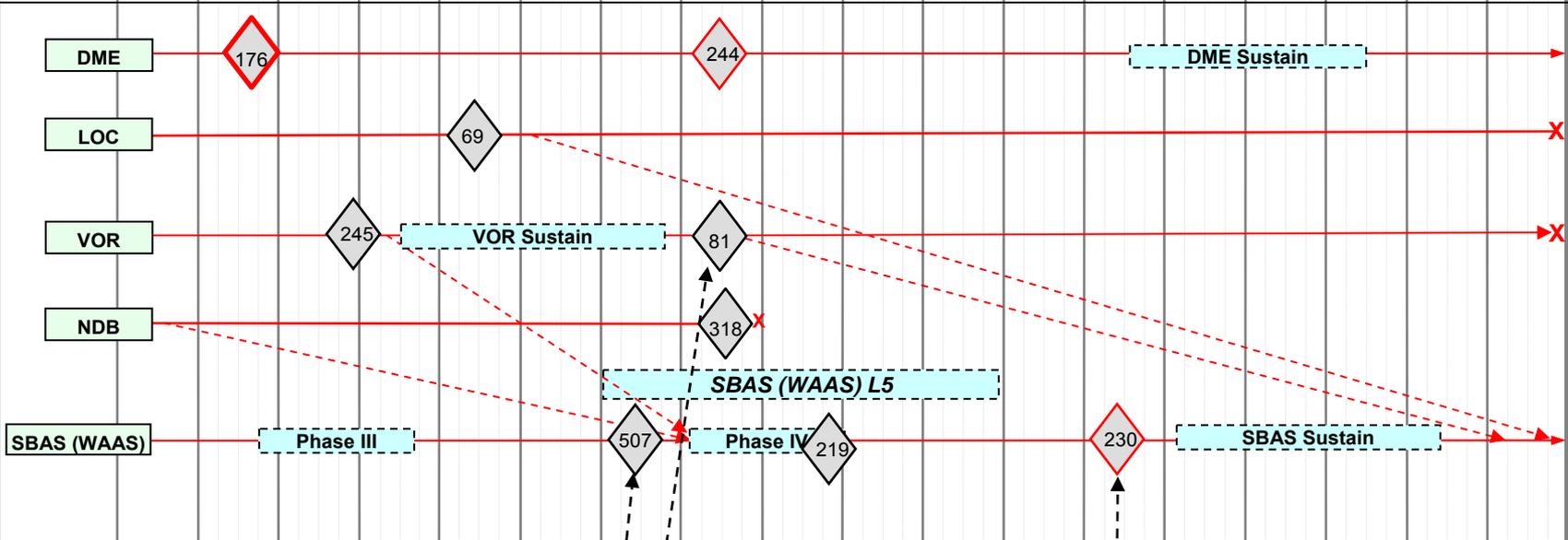
Approach and Landing/Takeoff



# Airport Roadmap (5 of 9)

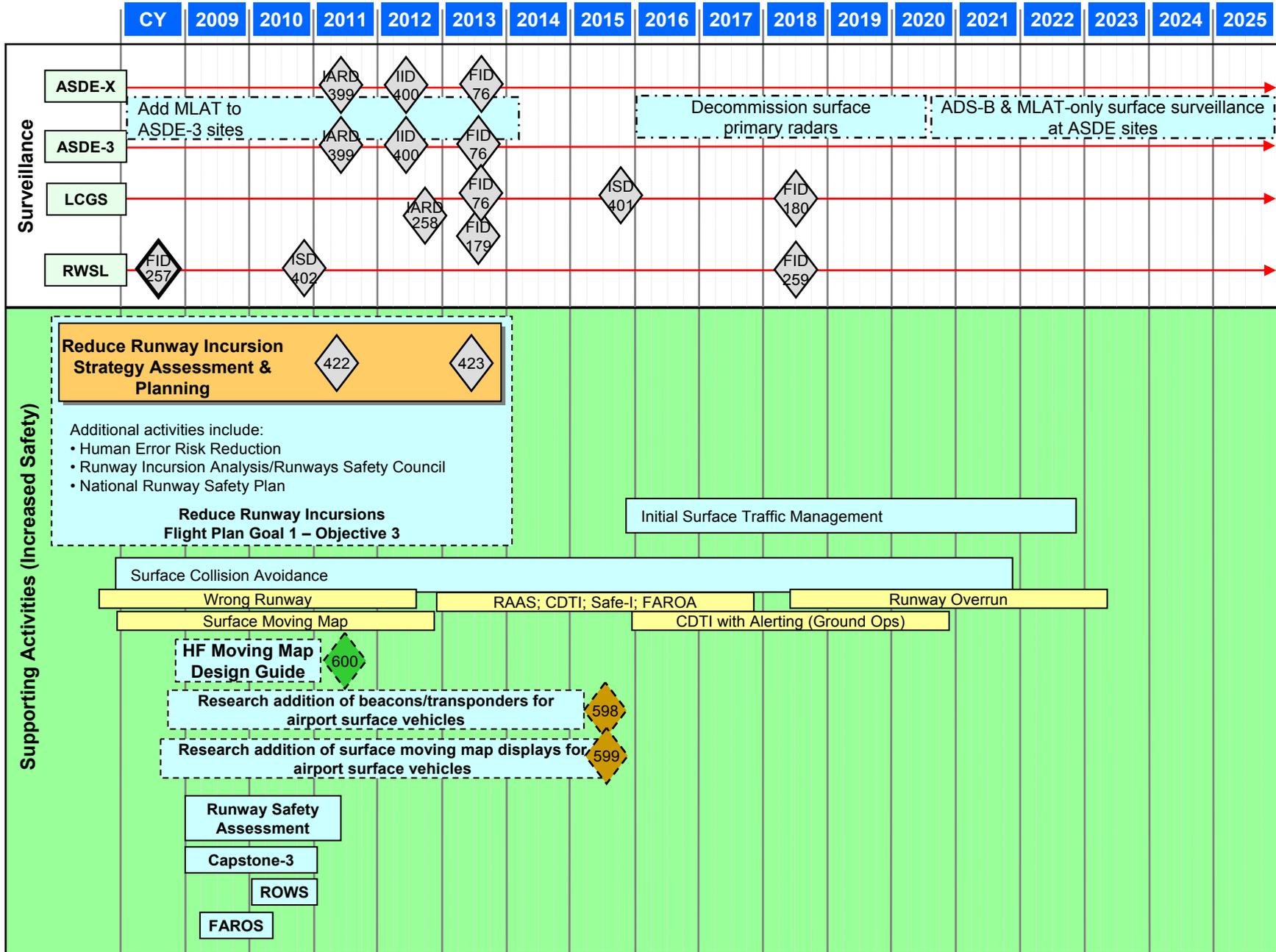
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Non-Precision Approach  
Approach and Landing/Takeoff  
Supporting Activities



Approved

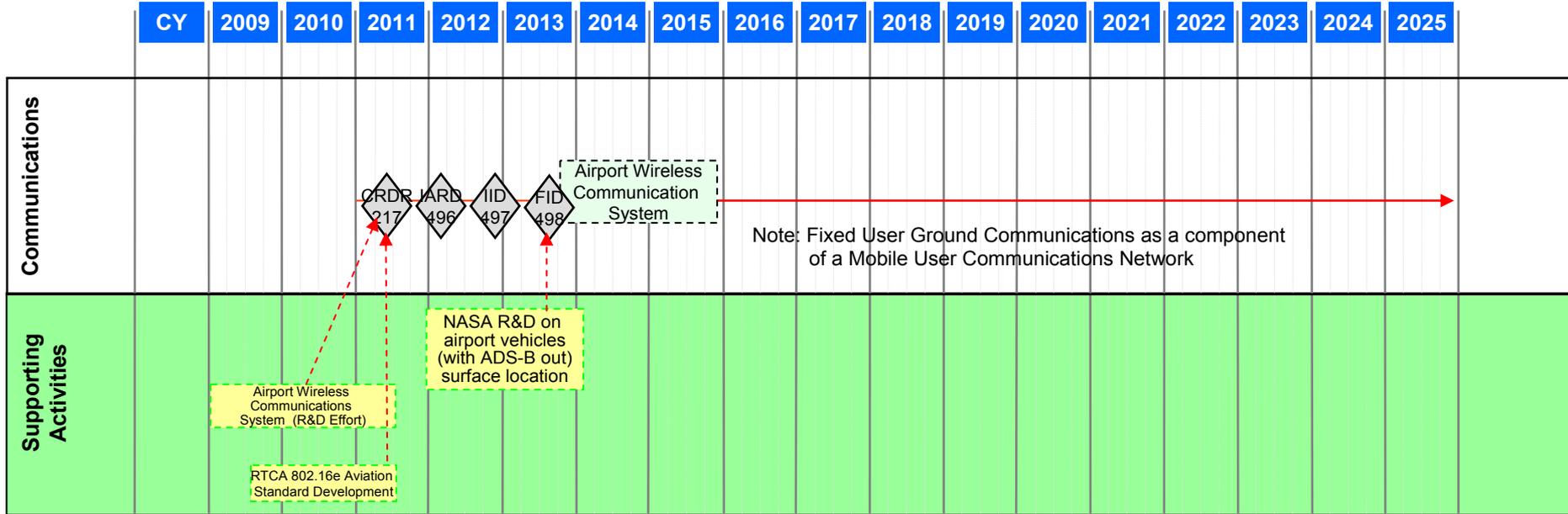
# Airport Roadmap (6 of 9)



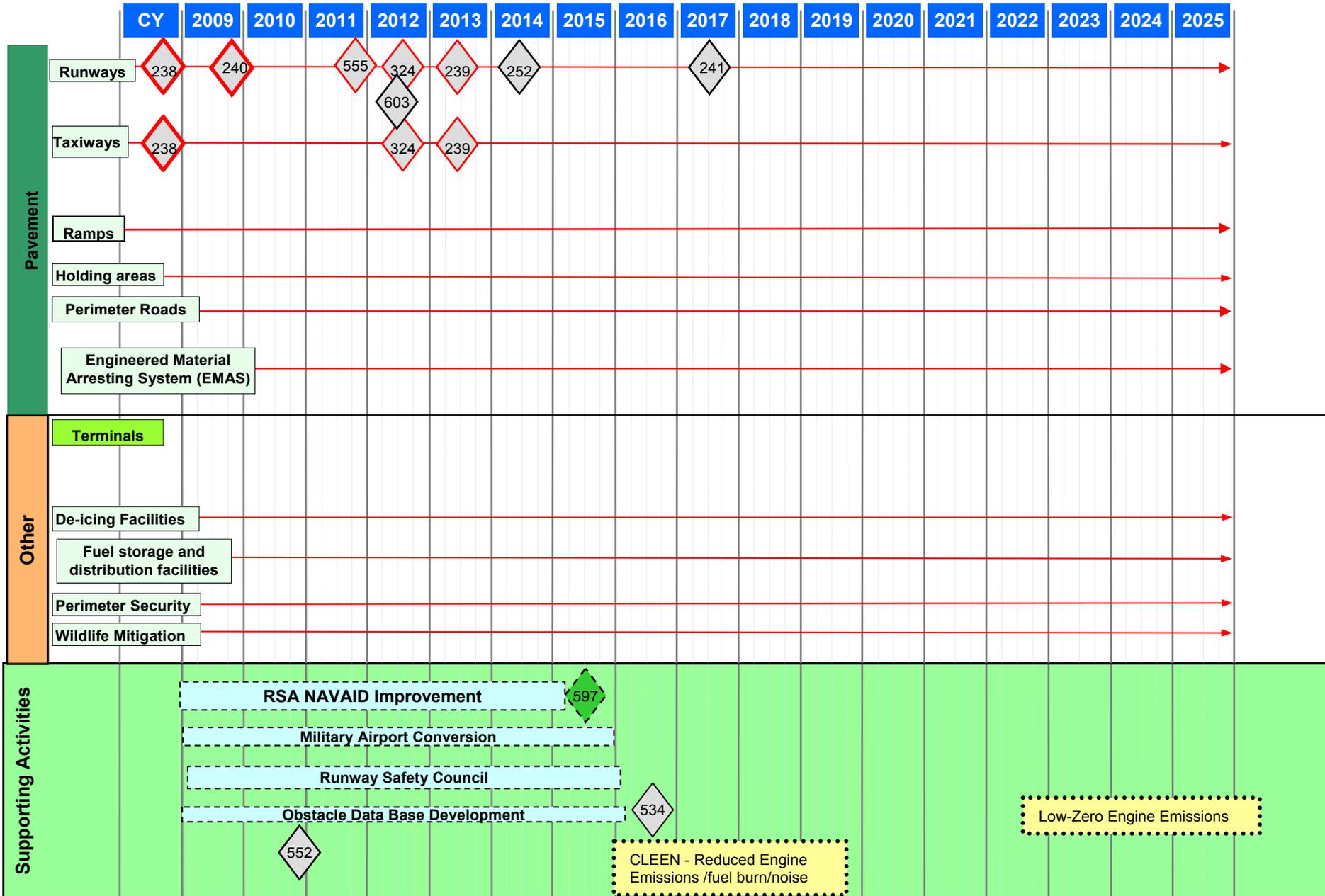
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# Airport Roadmap (7 of 9)

Surface

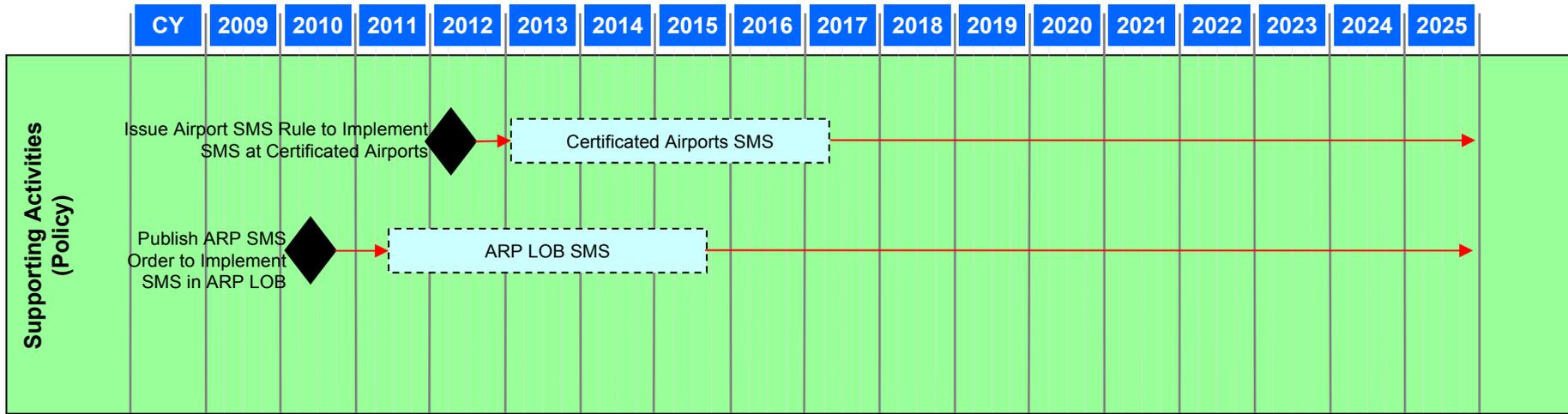


# Airport Roadmap (8 of 9)



# Airport Roadmap (9 of 9)

Infrastructure



Approved

# Airport Roadmap: Assumptions

Identifier	Description
APT-01	This roadmap will initially focus on the airport airside activities of aircraft out to about 5 miles. Hooks will be provided to allow other portions of the airport to be included in the future.
APT-02	Airports are covered in general; specific airports are not described.
APT-03	Initial work covers OEP-35 caliber airports; other types are subsets or will be covered later (eg. seaplane ports, heliports, space ports, grass field airports, etc.)
APT-04	Key decisions are pulled from other roadmaps.
APT-05	This is an initial roadmap that connects FAA infrastructure elements to airport airside infrastructure elements, and provides a basis for future tracking of the boundary and boundary issues.

# Airport Roadmap: Decision Points (1 of 5)

DP #	Target Date	High Priority	Domain	Name
25	2008 Q4	N	Weather	Final Investment Decision to baseline NEXRAD and fund science evolution on NEXRAD, including Dual Polarization (Complete)
36	2012	N	Surveillance	Final Investment Decision for migration of PRM to PRM-A (based on multilateration)
37	2010 Q1	N	Weather	IARD to Tech Refresh/SLEP wind shear detection services capability of all WS systems (to address wind shear study & technologies)
40	2011	N	Weather	Initial Investment Decision to acquire & deploy initial phase of Wake Turbulence capability for Mitigation for Departures (WTMD) from Closely Spaced Parallel Runways (CSPR)
49	2010 Q3	N	Weather	Strategy to Obtain and Disseminate Total Lightning Data
61	2015	N	Weather	Investment Decision to add WT for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
69	2012	N	Navigation	Approved Cat I Instrument Approach policy Allows Cat I Drawdown
70	2012 Q4	N	Navigation	Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
76	2013	N	Surveillance	Final Investment Decision for removal or SLEP/replace ASDE surface primary radars (evolving requirements for safety and security may impact decision)
77	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
81	2015	N	Navigation	VOR decision on far-term drawdown
85	2013	N	Weather	Investment Decision (IARD) to Consolidate & Replace Automated Surface Observing Systems
93	2018	N	Aircraft	Rulemaking decision for equipage of Weather Sensors and Wake Turbulence implementation
94	2020	N	Navigation	Decision on complete ILS CAT I drawdown
95	2024 Q2	N	Surveillance	Decision for replacement of terminal primary radars (ASR-11 PSR) and removal of terminal beacons (ASR-11 MSSR)
97	2010 Q4	N	Surveillance	Initial Investment Decision for legacy radar (ASR-9) SLEP, through 2025
98	2010 Q4	N	Surveillance	Initial Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
99	2008 Q4	N	Surveillance	Decision for ASR-11 Technology Refresh Segment 1 Final Investment Decision (Complete)
102	2011 Q4	N	Surveillance	Final Investment Decision to implement SIM in terminal and en route legacy radar systems
104	2017	N	Surveillance	Final Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
174	2012	N	Navigation	Agency policy to add ABWTS (Aircraft Based WT Separation) decision support capability to the flight deck

# Airport Roadmap : Decision Points (2 of 5)

DP #	Target Date	High Priority	Domain	Name
176	2009 Q3	Y	Navigation	DME NextGen Strategy Plan—Decision to procure next generation of DMEs to replace aging systems and expand the network where needed to support RNAV & NextGen (Complete)
179	2013	N	Surveillance	Final Investment Decision for LCGS
180	2018	N	Surveillance	Final Investment Decision for ADS-B to assume LCGS function, or approve a Technology Refresh for LCGS
212	2020	N	Weather	Investment Decision (IARD) to add WT Mitigation for Single Runway (WTSR) decision support capability
217	2011	N	Communication	Airport Wireless Communication System CRDR
219	2016	N	Navigation	Completion of all WAAS instrument approach procedures (LPV and LP) for all qualifying runways in the National Airspace System (NAS), estimated to be 5500 runway ends. Original date of 2018 was accelerated to 2016.
220	2018	Y	Navigation	Completion of Dual Frequency (GPS L1 and L5) development & testing for the WAAS ground and space segment hardware, software, and user equipment standards and avionics, required by DoD Mandate, issued September 2008
222	2018	Y	Navigation	24 GPS dual frequency satellites with L1 and L5 operating and transmitting useable signals for aviation.
224	2009 Q2	N	Navigation	Decision to develop dual frequency multi-constellation GNSS avionics (Complete)
225	2014	N	Navigation	Decision to proceed with dual frequency multi-constellation GNSS avionics activities to validate standards and lower risk for avionics development
226	2018	Y	Navigation	Completion of Dual frequency multi-constellation GNSS avionics activities
227	2009 Q2	Y	Navigation	Decision to develop dual frequency SBAS/WAAS avionics (Complete)
228	2014	Y	Navigation	Decision to proceed with WAAS dual frequency avionics activities to validate standards and lower risk for avionics development.
229	2018	Y	Navigation	Completion of WAAS Dual frequency avionics activities.
230	2020	Y	Navigation	Cut-over to dual frequency operations
235	2014	N	Navigation	Decision on active drawdown of Cat I ILSs operating in the NAS
236	2013	N	Navigation	Decision to buy systems for Cat II/III ILSs where necessary
237	2018	N	Navigation	Decision on replacement Cat II/III ILSs operating in the NAS
238	2008 Q4	Y	Navigation	ALS (I) - Decision to develop and implement replacements for PAR 38 & 56 lamps (Complete)
239	2013	Y	Navigation	ALS I LED Lamps are available
240	2009 Q4	Y	Navigation	ALS (II/III) - Decision to improve energy efficiency of lighting systems (Complete)
241	2017	N	Navigation	Energy efficient ALSF-2 production systems available

# Airport Roadmap : Decision Points (3 of 5)

DP #	Target Date	High Priority	Domain	Name
242	2009 Q3	N	Navigation	Decision to conduct R & D to explore RVR for prediction of precipitation (Complete)
243	2015	N	Navigation	Decision to implement enhanced capability based on results of RVR research
244	2015	Y	Navigation	Next generation of DMEs available to support RNAV throughout the NAS
245	2010 Q4	N	Navigation	Decision on near-term minimum operational VOR ground network
247	2008 Q4	Y	Navigation	Decision to develop and implement replacements for PAPI lamps with LEDs (Complete)
248	2013	N	Navigation	Next generation of LED PAPI systems available
249	2008 Q4	Y	Navigation	Decision to develop and implement replacements for REIL lamps with LEDs (Complete)
250	2014	N	Navigation	Next generation of LED REIL systems available
251	2008 Q4	Y	Navigation	Decision to deploy semiflush fixtures for existing sites and new establishments (Complete)
252	2014	N	Navigation	Semiflush flasher fixtures production system available
256	2013	N	Surveillance	Final Investment Decision for ASR-11 Technology Refresh Segment 2 (through 2025)
257	2008 Q4	N	Surveillance	JRC FID (JRC 2B) Decision for acquisition of RWSL systems (Complete)
258	2012 Q4	N	Surveillance	Investment Analysis Readiness Decision for LCGS
259	2018	N	Surveillance	Final Investment Decision for RWSL Technology Refresh
316	2014	Y	Navigation	GBAS/LAAS ground facilities and single-frequency avionics available for use
318	2015	N	Navigation	All federal NDBs decommissioned from the NAS
320	2008 Q4	Y	Navigation	Decision to implement RVR 1800 at OEP Airports (Complete)
321	2009 Q1	Y	Navigation	Increased capacity at ILS/RVR equipped runways during IMC (Complete)
322	2011	N	Navigation	Enhanced low visibility operations supported by navigation infrastructure
324	2012	Y	Navigation	ALS (I) - Design and development of PAR 38 and PAR 56 LED replacement lamps is completed
329	2010 Q1	N	Navigation	RVR Sustainment: ISD for PC-RVR for use within the NAS (Complete)
391	2011 Q4	N	Surveillance	Final Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
392	2011 Q4	N	Surveillance	Final Investment Decision for legacy radar (ASR-9) SLEP through 2025
396	2010 Q2	N	Surveillance	Investment Analysis Readiness Decision for Precision Runway Monitor-Alternate
397	2011	N	Surveillance	Initial Investment Decision for migration of PRM to PRM-A (based on multilateralation)
398	2012 Q4	N	Surveillance	In-Service Decision for PRM-A (based on multilateralation)
399	2011	N	Surveillance	Investment Analysis Readiness Decision for removal or SLEP/replace ASDE surface primary radars
400	2012	N	Surveillance	Initial Investment Decision for removal or SLEP/replace ASDE surface primary radars
401	2015	N	Surveillance	In-Service Decision for Low Cost Ground Surveillance system

# Airport Roadmap : Decision Points (4 of 5)

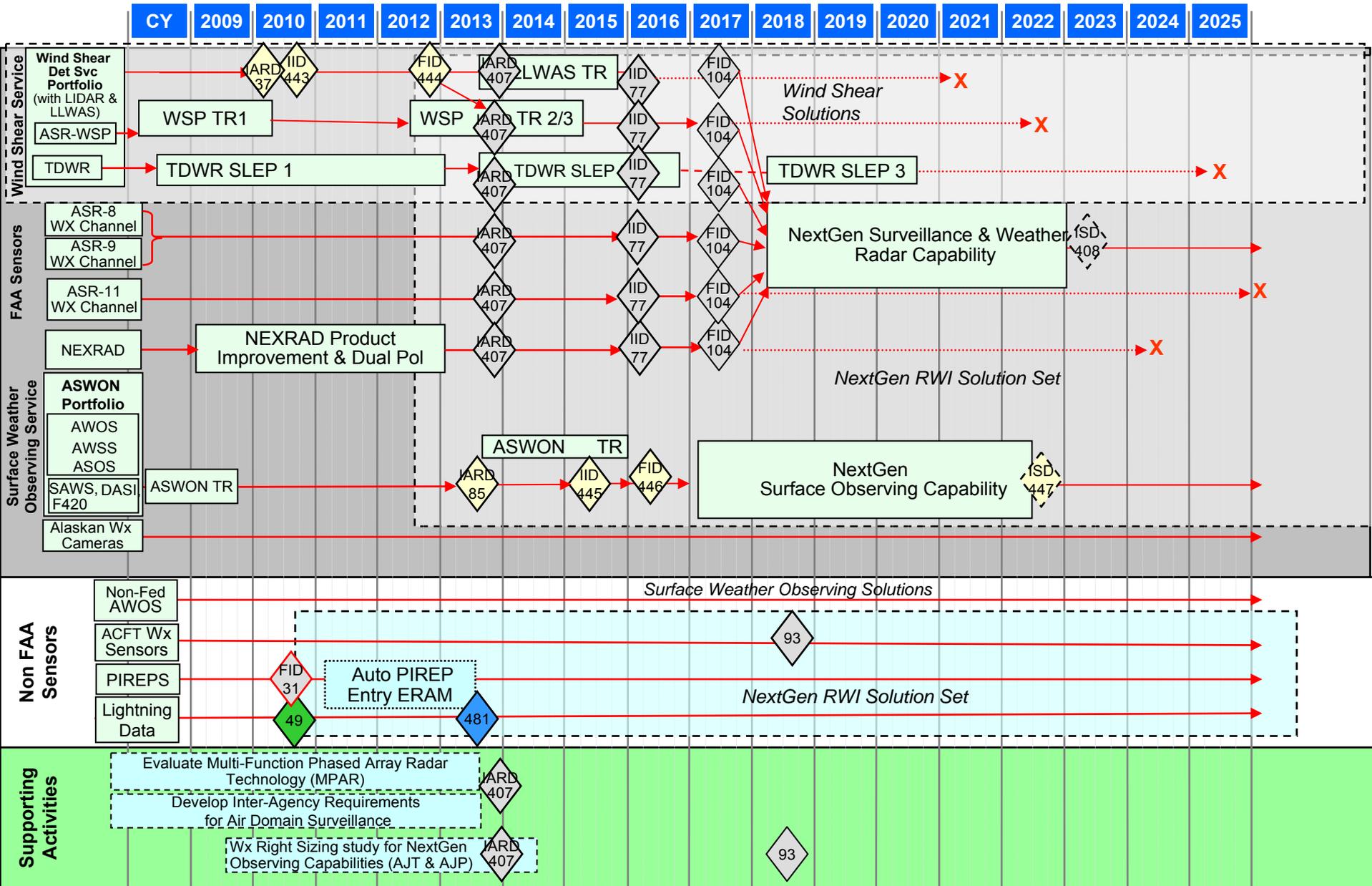
DP #	Target Date	High Priority	Domain	Name
402	2010 Q4	N	Surveillance	In-Service Decision for Runway Status Light system
407	2013 Q4	N	Surveillance	Investment Analysis Readiness Decision for NextGen Surveillance and Weather Radar Capability
408	2023	N	Surveillance	In-Service Decision for NextGen Surveillance and Weather Radar Capability
422	2011	N	Safety	Assess Strategy to Reduce Runway Incursions
423	2013	N	Safety	Develop Strategy to Further Reduce Runway Incursions
443	2010 Q3	N	Weather	IID to Tech Refresh/SLEP wind shear detection services of all WS systems
444	2012	N	Weather	FID to Tech Refresh/SLEP all low-level wind shear detection systems as part of wind shear detection service
445	2015	N	Weather	IID to consolidate and replace automated surface observing capability with multi-agency NextGen Surface Observing capability
446	2016	N	Weather	FID to consolidate and replace automated surface observing capability
447	2022	N	Weather	ISD to replace all automated surface observing systems with NextGen Surface Observing capability
455	2012 Q2	Y	Weather	FID to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
456	2014	Y	Weather	ISD to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
457	2016	Y	Weather	IID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
458	2017	Y	Weather	FID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
459	2019	Y	Weather	ISD to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
460	2020	Y	Weather	IID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
461	2021	Y	Weather	FID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
462	2024	Y	Weather	ISD to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
481	2013	N	Weather	Executive Level decisions to move access to Lightning data to NNEW
496	2012 Q1	N	Communication	Airport Wireless Communication System IARD
498	2013 Q3	N	Communication	Airport Wireless Communication System FID
501	2010 Q1	N	Airspace & Procedures	Determine Implementation Plan and initial Demonstration Site(s) for IOP (Complete)
507	2014	N	Navigation	WAAS moves from Phase III to Phase IV

# Airport Roadmap : Decision Points (5 of 5)

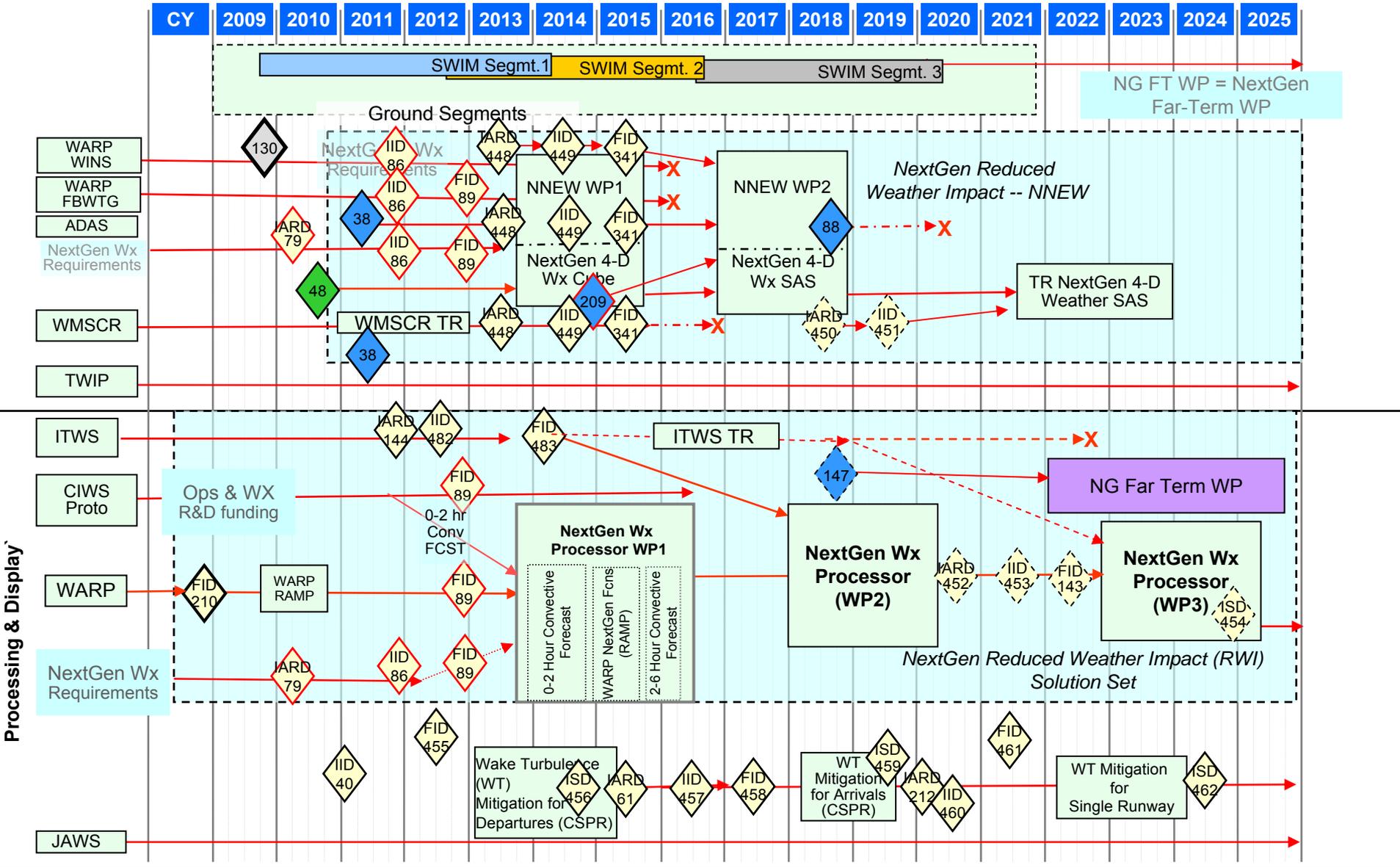
DP #	Target Date	High Priority	Domain	Name
511	2014	Y	Navigation	Decision on national backup
534	2016	N	Aircraft	New Engine
552	2010 Q4	N	Aircraft	AC 90-101 RNP AR (RNP as a key enabler for Environment)
555	2011	Y	Aircraft	Strategy for transition to LED Airport/Approach Lighting
597	2015	N		RSA NAVAID Improvements (Complete)
598	2015	N		Decision on Requirements/Policy for of beacon/transponders for airport surface vehicles
599	2015	N		Decision on Requirements/Policy for Surface Moving Maps on Airport Surface Vehicles
600	2011	N		HF Moving Map Design Guide
603	2012	N	Navigation	LED Prototypes available for testing

# Weather

# Weather Roadmap (1 of 4)

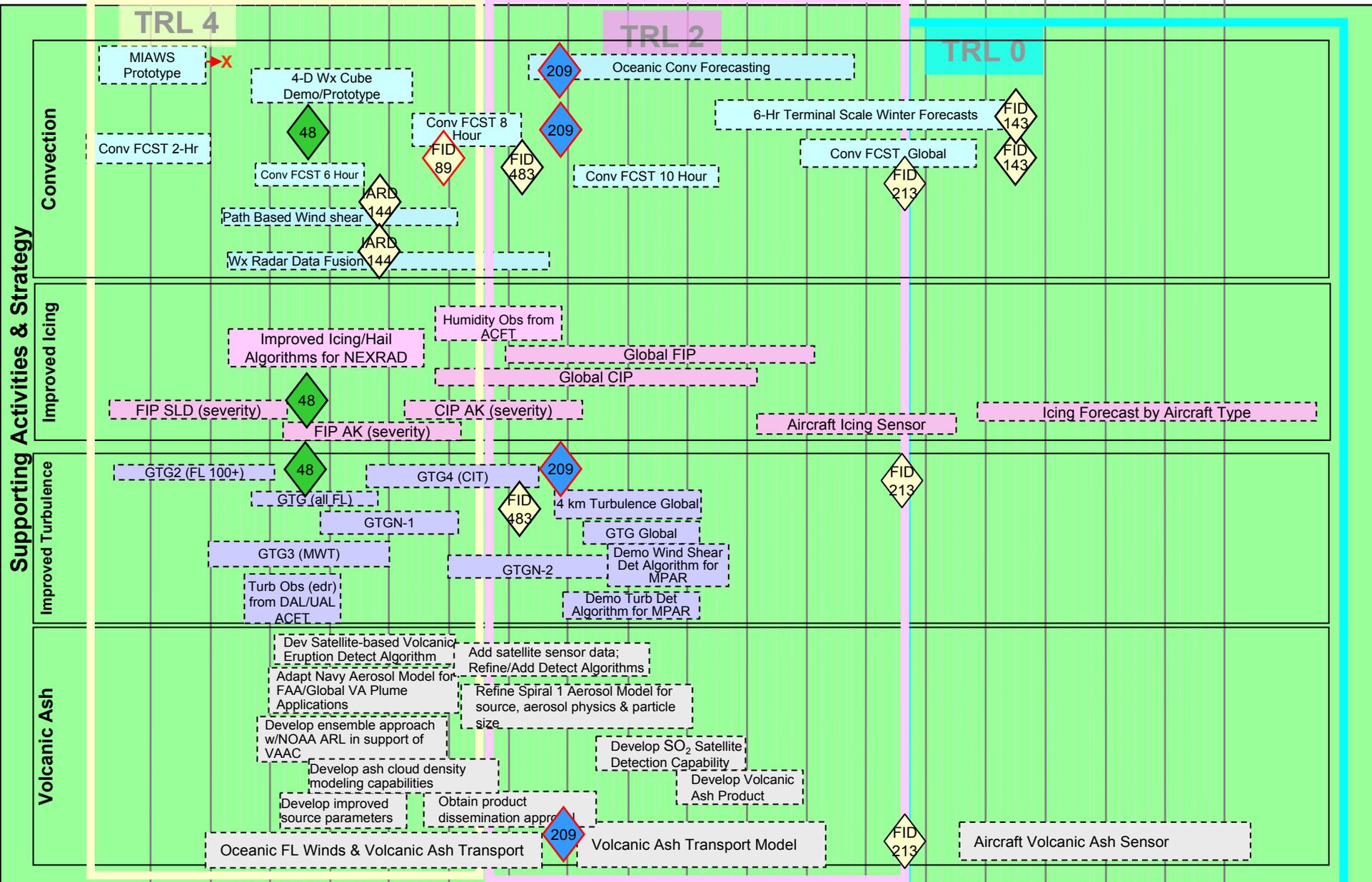


# Weather Roadmap (2 of 4)



# Weather Roadmap (3 of 4)

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



# Weather Roadmap (4 of 4)

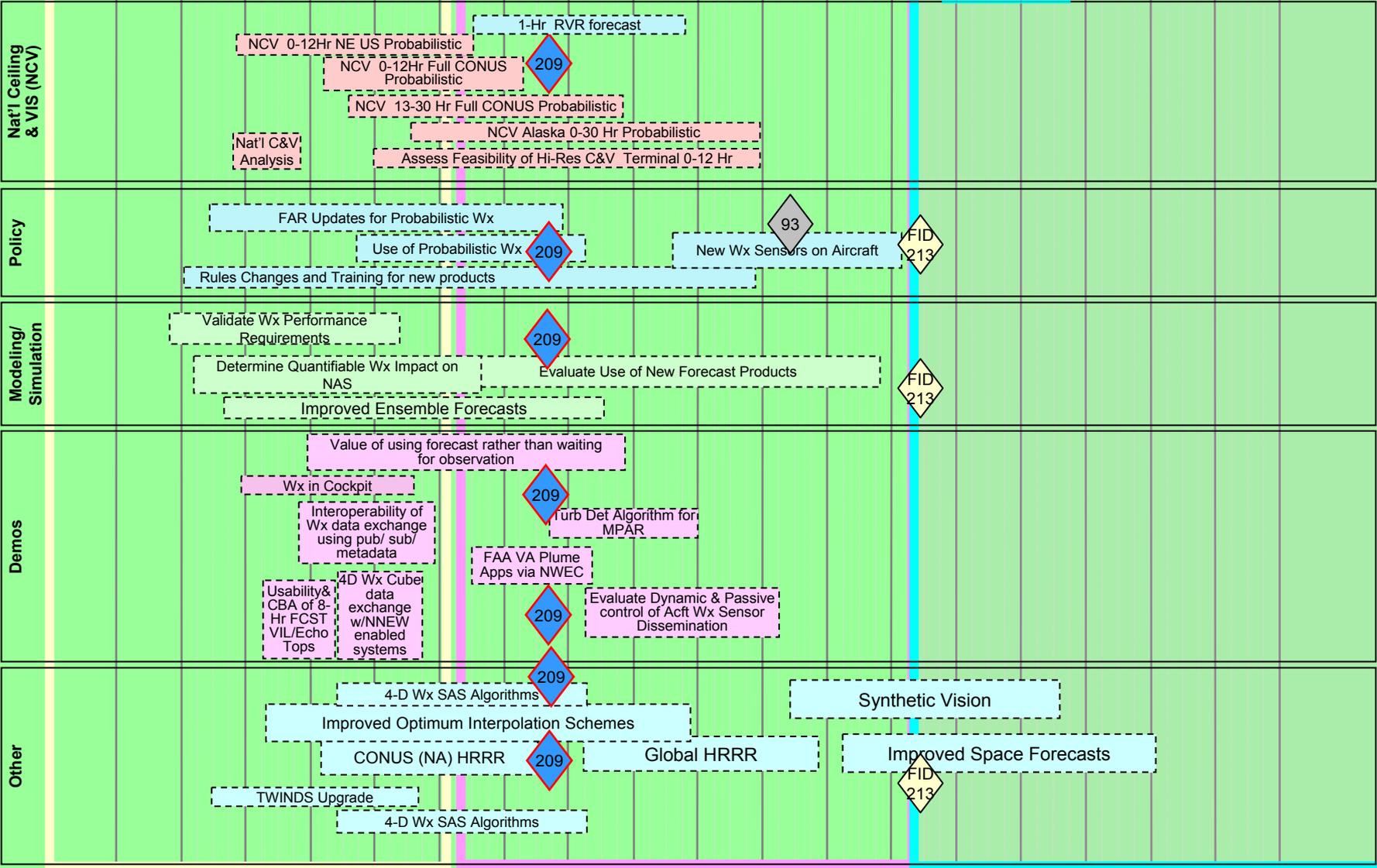
CY 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

TRL 4

TRL 2

TRL 0

Supporting Activities & Strategy



Approved

# Weather Roadmap: Assumptions (1 of 2)

Identifier	Description
WX-01	Ongoing NextGen (NG) Weather functional and performance requirements development may result in new/emerging requirements that create perturbations in NextGen Weather Architecture
WX-02	<p>Weather Sensor Sustainment Issues:</p> <ol style="list-style-type: none"> <li>1) Terminal Portfolio approach               <ol style="list-style-type: none"> <li>a) Wind Shear systems (LLWAS, WSP, TDWR &amp; LIDAR) consolidated into WSDS (Wind Shear Detection Services) to sustain capabilities with DP's for IARD, IID, FID &amp; ISD</li> <li>b) Perform ATO-T Wx 'Right Sizing' study for NextGen Sfc Observing Capability; then consolidate Automated Sfc Observing systems (ASOS, AWOS, AWSS) plus F-420, DASI, WME &amp; CHI into a single platform if NG Sfc Observing requirements permit</li> </ol> </li> <li>2) NextGen Surveillance/Weather Radar continues to support Weather requirements (Terminal &amp; En route)</li> <li>3) Continue obtaining Surface Observations from non-Fed AWOS systems</li> <li>4) Both NextGen Surveillance/Weather Radar &amp; Sfc Observing capabilities will consider multi-agency requirements</li> </ol>
WX-03	<ol style="list-style-type: none"> <li>1) WMSCR ADAS/ALDARS functionality to be subsumed by NNEW WP 2 (information extraction functionality of NNEW WP2 enables publishing of lightning reports to NG Sfc Observing capability)</li> <li>2) Having replaced aging technology, ADAS-Rehost serves as a consolidating access point for Wx observations at NNCCs (National Network Control Center) rather than ARTCCs</li> </ol>
WX-04	Wind Shear/Microburst functionality continues to be ground based unless aircraft avionics technology matures to the point where the capability can be transferred to the aircraft
WX-05	<p>The following aircraft decisions may have an impact on weather: 93, 174. For full descriptions see decision spreadsheet</p> <ol style="list-style-type: none"> <li>1) Regulatory action likely per DP 93 to define Wx Sensor equipage for fully-capable aircraft</li> </ol>
WX-06	<p>Migrate Wx to common Network Enabled Operations (NEO)</p> <ol style="list-style-type: none"> <li>1) Fund FAA portion of multi-agency 4-D Weather Cube development and management</li> <li>2) Fund FAA portion of the development of associated modeling capability* that produces SAS data/information, implementation and operation of multi-agency 4-D Weather Single Authoritative Source (SAS) for NextGen ATM</li> </ol> <p>*NOTE: 1) modeling capability not part of the 4-D Wx SAS but required to create data          2) In accordance with ICAO ConOps for ATM, ATM includes Service Providers &amp; Users, e.g., pilots &amp; dispatchers</p>
WX-07	Develop Wx Performance Requirements & pursue aggressive AMS schedule to field NextGen Wx Processor by 2014

# Weather Roadmap: Assumptions (2 of 2)

Identifier	Description
WX-08	<p>Convergence of Wx Processing Capability into NextGen Wx Processor</p> <ol style="list-style-type: none"> <li>1) NextGen Weather Processor WP 1               <ol style="list-style-type: none"> <li>a) CIWS continues as prototype until integrated into NWP WP1 as part of 0-6 hour convective forecast capability</li> <li>b) WARP RAMP (radar acquisition &amp; mosaic processor) must be sustained into NextGen era until transferred to NextGen system and RBT functionality to general IDS with NNEW-provided data</li> <li>c) ITWS data/product exchanges to achieve operational consistency among Wx system displays</li> </ol> </li> <li>2) NextGen Wx WP2:               <ol style="list-style-type: none"> <li>a) Selected Wx R&amp;D algorithms matured since WP1 baseline was frozen</li> <li>b) Implement improved Convective algorithms from Aviation Wx R&amp;D</li> <li>c) Majority of ITWS functionality transferred to NWP WP2, except functions allocated to NextGen Far Term Work Package to meet latency requirements of Wind Shear/Microburst Detection &amp; Prediction advisories, or ITWS Tech Refresh</li> </ol> </li> <li>3) NextGen Wx WP3:               <ol style="list-style-type: none"> <li>a) Selected Wx R&amp;D algorithms matured since WP2 baseline was frozen</li> </ol> </li> <li>4) NextGen Wx Processor WP3 most likely not an FAA 'box'</li> </ol>
WX-09	<p>To provide improved observations &amp; enhanced forecasts, significant R&amp;D and infrastructure changes are required</p> <ol style="list-style-type: none"> <li>1) R&amp;D must be prioritized in order to meet NextGen Vision</li> <li>2) To reach NextGen by 2025 R&amp;D funding (Near/Mid-term) must be increased</li> <li>3) The output of a number of Algorithms developed via R&amp;D will be available via the 4-D Wx SAS</li> <li>4) Sensor measurement accuracy and frequency must be increased</li> </ol>
WX-10	Weather information becomes available at user-specified resolution but weather impact is determined by user DST
WX-11	Wx Comms functionality to be provided by NNEW
WX-12	That NG Sfc Observing Capability & NG Surv/Wx Radar Capability [systems] will be implemented as multi-agency systems
WX-13	CWSU support system will not be addressed in this Roadmap as it is not envisioned as an FAA system
WX-14	WARP Remote Brfg Terminal requirements to be included in National IDS contract
WX-15	ASOS maintenance to now be done 'in house' including conducting remote monitoring maintenance of all ASOS; DP 26 (OES EC Strategy Decision regarding ASOS maintenance 'out sourcing') to be deleted
WX-16	CIWS prototype continues receiving Avn Wx R&D funding to develop longer-range Convective forecasts & improved Winter Weather products/forecasts that will be available to operational users

# Weather Roadmap: Decision Points (1 of 3)

DP#	Target Date	High Priority	Domain	Name
31	2010 Q3	N	Automation	Final Investment Decision for Post ERAM R3 Work Package
37	2010 Q1	N		IARD to Tech Refresh/SLEP wind shear detection services capability of all WS systems (to address wind shear study & technologies)
38	2011	N		Executive Level Decision to transition WMSCR Comms functionality to web access via NNEW WP2 & ALDARS Comms functionality to NNEW WP2
40	2011	N		Initial Investment Decision to acquire & deploy initial phase of Wake Turbulence capability for Mitigation for Departures (WTMD) from Closely Spaced Parallel Runways (CSPR)
48	2010 Q3	N		Strategy to Fund FAA Portion of NextGen 4-D Weather Cube
49	2010 Q3	N		Strategy to Obtain and Disseminate Total Lightning Data
61	2015	N		Investment Decision to add WT for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
77	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
79	2010 Q1	Y		Investment Analysis Readiness Decision (IARD) for NextGen Wx Processor WP1 and NNEW WP1 to enter IA
85	2013	N		Investment Decision (IARD) to Consolidate & Replace Automated Surface Observing Systems
86	2011 Q4	Y		Investment Decision (IID) for NextGen Wx Processor WP1 (includes CIWS functionality, NG WARP functionality & NNEW WP1 functionality (includes WARP WINS & FBWTG))
88	2018	N		Executive Level Decision to move ADAS/ALDARS functionality to NNEW WP2
89	2012 Q4	Y		Final Investment Decision for NextGen Wx Processor WP1
93	2018	N	Aircraft	Rulemaking decision for equipage of Weather Sensors and Wake Turbulence implementation
104	2017	N	Surveillance	Final Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
130	2009 Q3	N	Enterprise Services	Selection of SWIM Segment 2 candidates (Complete)
143	2022	N		Investment Decision (FID) to Provide 10-Hour Convective Forecast Capability and In-Flight Icing Observation from Airborne Aircraft To NextGen Weather Processor WP3
144	2011 Q4	N		Investment Decision (IARD) to Tech Refresh ITWS systems (includes improved data quality, upgraded TWINDS & path-based wind shear), or transfer all functionality (TWINDS & path-based wind shear) to NWP WP2 or Tech Refresh ITWS
147	2018	N		Executive Level Decision to transfer ITWS' functionality to NWS WP3 (if not done in DP 144) and safety functionality (Microburst Predict) to NextGen Far Term WP (NG FT WP)

# Weather Roadmap: Decision Points (2 of 3)

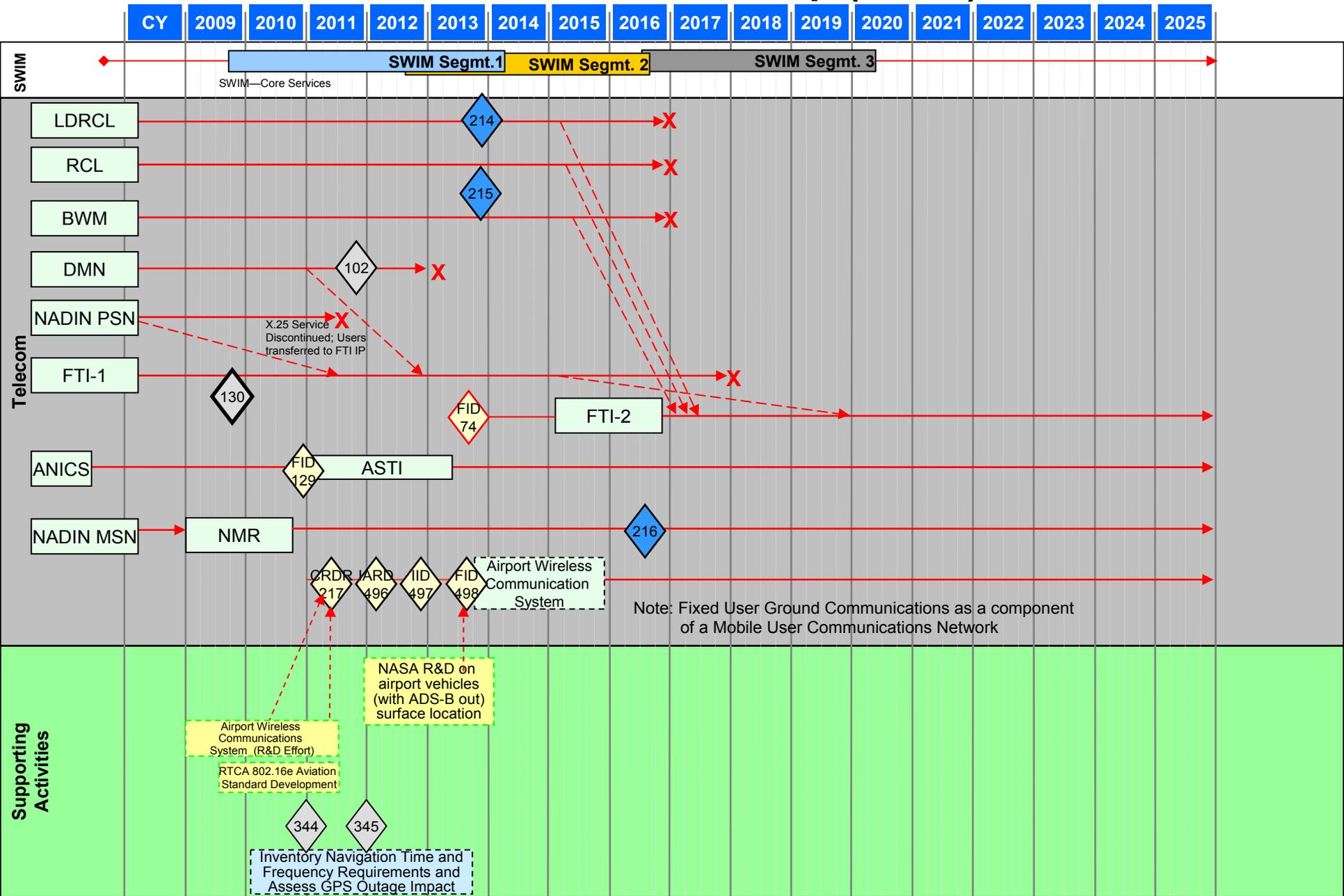
DP#	Target Date	High Priority	Domain	Name
209	2014	Y		Executive Level Decision to fund FAA portion of NextGen 4-D Weather Single Authoritative Source (4-D Wx SAS)
210	2008 Q4	N		Final Investment Decision (FID) to fund WARP contract maintenance until subsumed into NextGen Wx Processor Work Package 1 ( NWP WP1) (Complete)
212	2020	N		Investment Decision (IARD) to add WT Mitigation for Single Runway (WTSR) decision support capability
213	2020	N		Executive Level Decision to fund FAA portion 4-D Wx SAS Tech Refresh
341	2015	N		Final Investment Decision (FID) to transition WMSCR Comms functionality to web access via SWIM Seg 3 & ALDARS Comms to NNEW WP2
407	2013 Q4	N	Surveillance	Investment Analysis Readiness Decision for NextGen Surveillance and Weather Radar Capability
443	2010 Q3	N		IID to Tech Refresh/SLEP wind shear detection services of all WS systems
444	2012	N		Final Investment Decision (FID) to Tech Refresh/SLEP all low-level wind shear detection systems as part of wind shear detection service
445	2015	N		IID to consolidate and replace automated surface observing capability with multi-agency NextGen Surface Observing capability
446	2016	N		Final Investment Decision (FID) to consolidate and replace automated surface observing capability
447	2022	N		ISD to replace all automated surface observing systems with NextGen Surface Observing capability
448	2013	N		IARD to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS to Comms to NNEW WP
449	2014	Y		IID to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS Comms to NNEW WP2
450	2018	Y		IARD to fund FAA portion of 4-D Weather SAS Tech Refresh
451	2019	Y		IID to fund FAA portion of 4-D Weather SAS Tech Refresh
452	2020	Y		IARD to provide 10-hour Convective Forecast capability to NWP WP3 and in-flight Icing Observation from airborne aircraft to NWP WP3
453	2021	Y		IID to provide 10-hour Convective Forecast capability to NWP WP3 and provide in-flight Icing Observation from airborne aircraft to NWP WP3
454	2024	Y		ISD to document final configuration of the NextGen Wx Processor Work Pkg 3 (NWP WP3)
455	2012 Q2	Y		Final Investment Decision (FID) to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
456	2014	Y		ISD to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)

# Weather Roadmap: Decision Points (3 of 3)

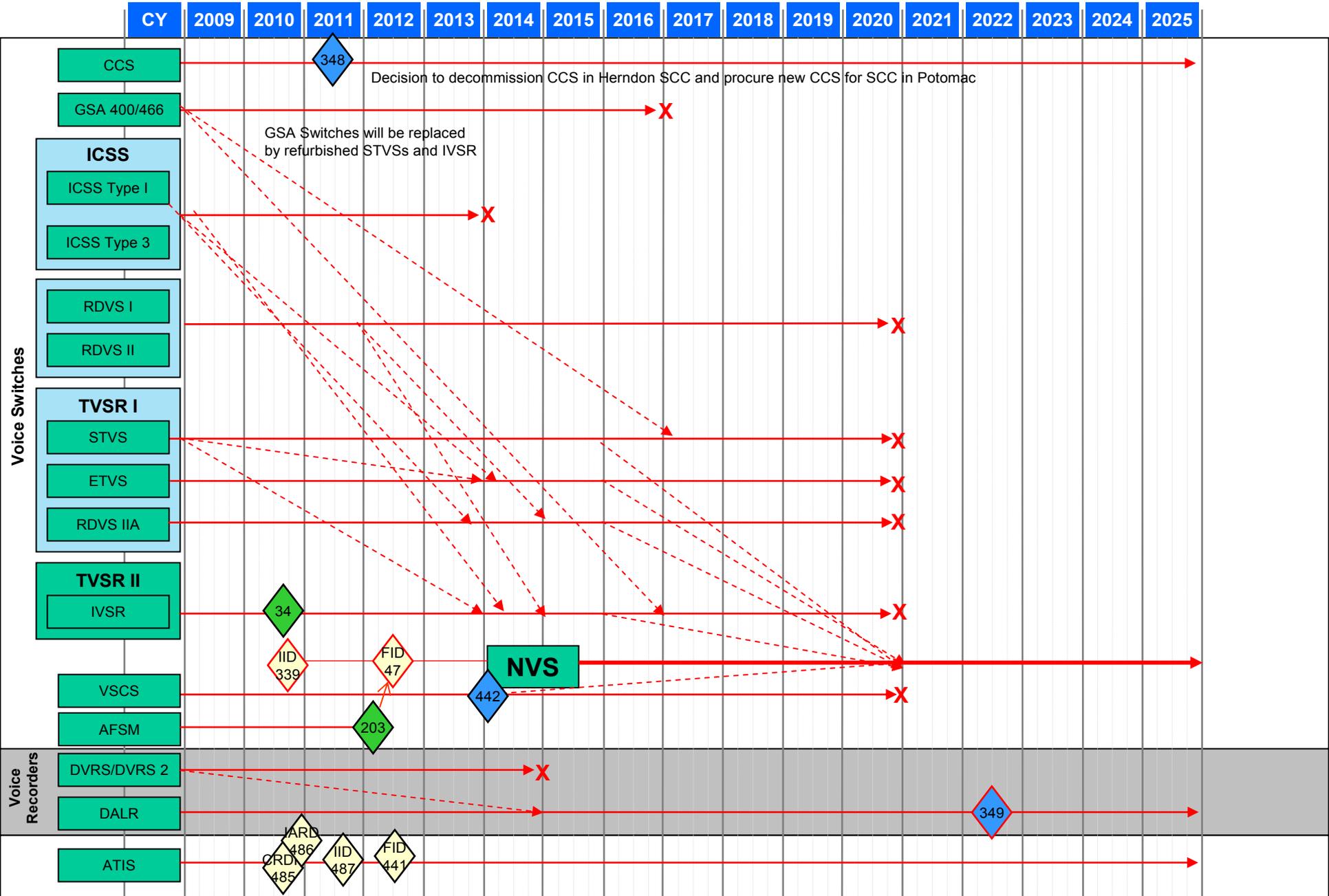
DP #	Target Date	High Priority	Domain	Name
457	2016	Y		IID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
458	2017	Y		Final Investment Decision (FID) to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
459	2019	Y		ISD to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
460	2020	Y		IID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
461	2021	Y		Final Investment Decision (FID) to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
462	2024	Y		ISD to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
481	2013	N		Executive Level decisions to move access to Lightning data to NNEW
482	2012	N		IID to transfer most ITWS functionality to NWP WP2 or Tech Refresh ITWS
483	2014	N		Final Investment Decision (FID) to transfer most ITWS functionality to NWP WP2 or Tech Refresh ITWS

# Communication

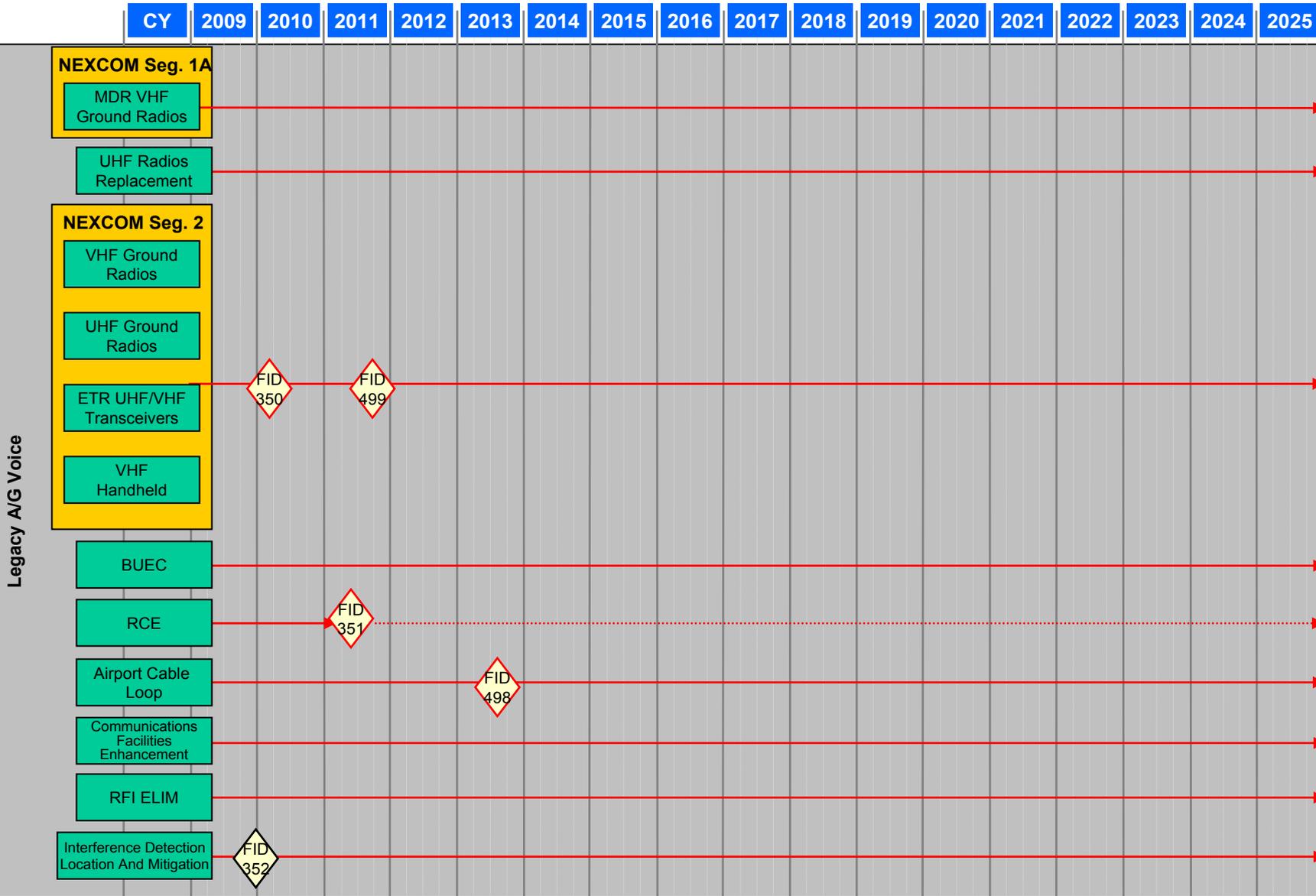
# Communication Roadmap (1 of 4)



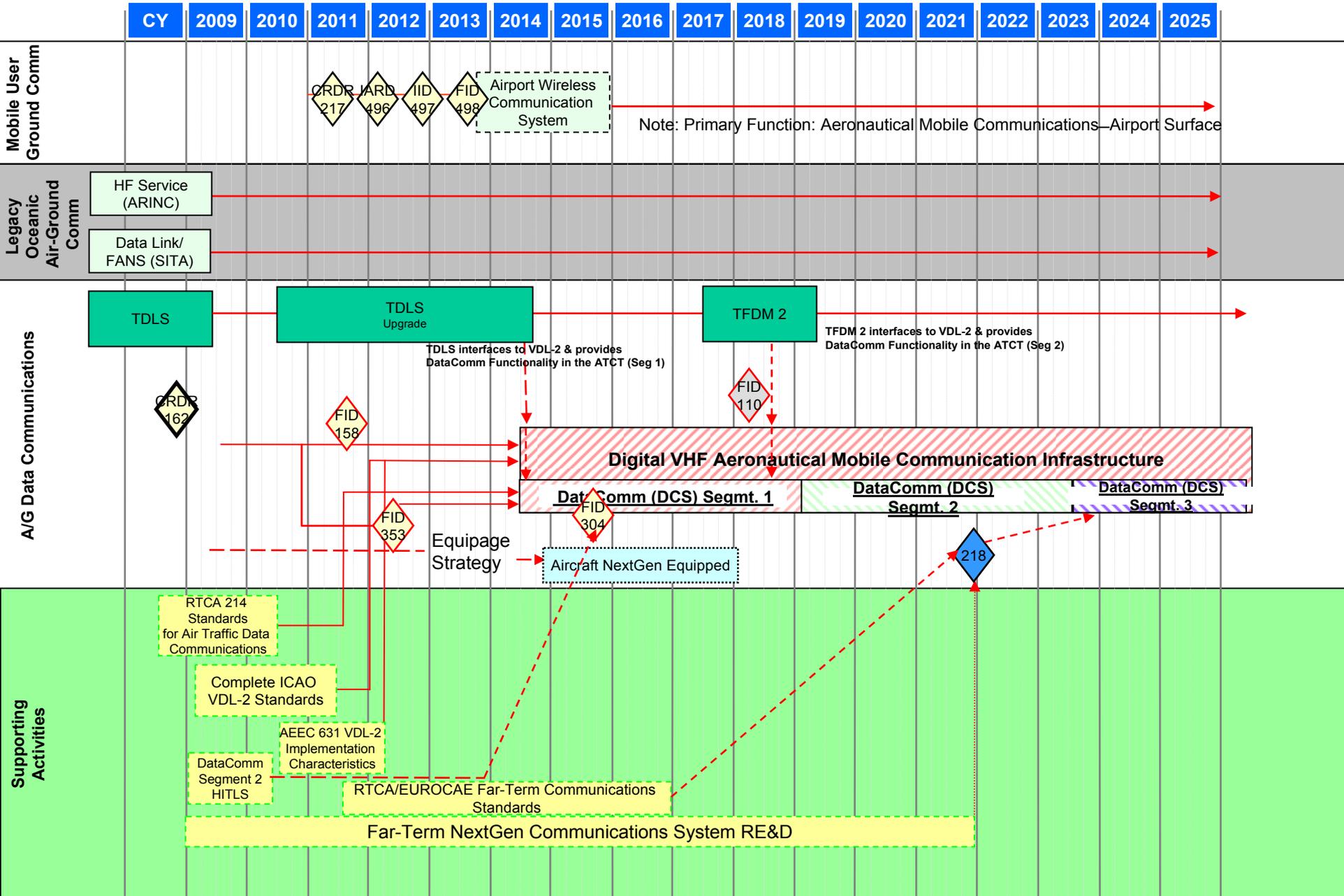
# Communication Roadmap (2 of 4)



# Communication Roadmap (3 of 4)



# Communication Roadmap (4 of 4)



# Communication Roadmap: Assumptions (1 of 2)

Identifier	Description
COMM-01	NAS must transition from dedicated “nailed up” sector-based and independent facility operations to networked area based operations
COMM-02	FTI becomes primary Voice/Data transport system a) ASTI (ANICS) will not be integrated into FAA Telecommunications Infrastructure contract
COMM-03	NAS Voice Switch is required to meet consolidation/collocation, Business Continuity Plan, Load Balancing/Load Sharing, 4D Trajectory concepts (resource mapped to flows, and Big Airspace)
COMM-04	All flight safety critical A/G communications are over VHF based systems a) 8.33 KHz spacing for voice communications may be necessary to provide sufficient spectrum for data communications b) Advisory communications (e.g. Weather, NAS Status, NOTAMS) may be supported by commercial communications services through "airborne SWIM" services. Initial Implementation linked to NextGen Network Enabled Weather (NEW) capability
COMM-05	Infrastructure evolution is driven by: a) Transition strategies start in higher altitude airspaces migrating toward lower altitudes b) Implementation starts in large facilities migrating to small facilities c) Expectation for reduction in number of facilities—(staffed and unstaffed) d) Infrastructure and people “dedicated to specific airspace” changing to “quickly and easily adapted to airspace as needed” e) Expectation for very low growth in number of operational sectors (“airspace growth”) through the mid term, limiting demand on dedicated resources
COMM-07	There will be a JRC decision in 2014 (DP 214) to decommission LDRCL. LDRCL users will transition to FTI-2 Services.
COMM-08	There will be a JRC decision in 2010 (DP 215) to decommission RCL. RCL users will transition to FTI-1 Services. It is also assumed in this time frame that BWM is being used solely in conjunction with the RCL, and so it will be decommissioned in concert with the RCL.

## Communication Roadmap: Assumptions (2 of 2)

Identifier	Description
COMM-09	There will be an approved transition plan for migrating real-time surveillance data directly onto FTI services in order to allow DMN decommissioning.
COMM-10	There will be a decision (DP 218) whether to implement ATC data communications capabilities using yet to be defined broad-band communications links in addition to VDL-2.
COMM-11	Relationship between SWIM and Communications: SWIM requires FTI IP service.
COMM-12	Three ICSS switches in Alaska AFSSs (represented by AFSM on the Roadmap) will be replaced by NVS switches. The coordination for this replacement is captured by DP 203.

# Communication Roadmap: Decision Points (1 of 2)

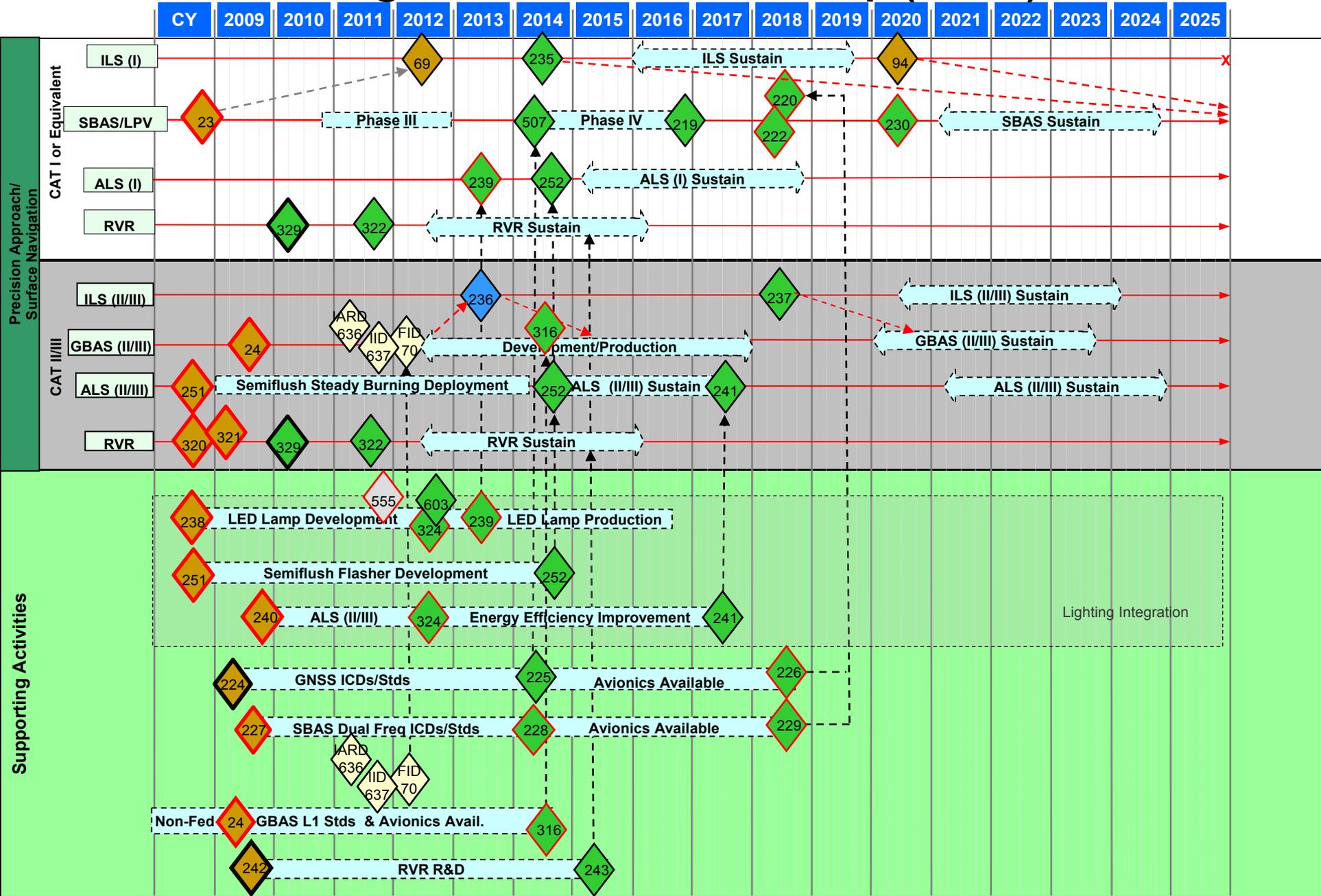
DP #	Target Date	High Priority	Domain	Name
34	2010 Q3	N		Decision on Voice Bridge Contract (Align with NVS IID)
47	2012	Y		Final Investment Decision for NAS Voice Switch
74	2013	Y		Approve FTI Re-Compete Decision
102	2011 Q4	N	Surveillance	Final Investment Decision to implement SIM in terminal and en route legacy radar systems
110	2018	Y	Automation	Approve final investment for transition to NextGen automation platforms and display subsystem through convergence
129	2010 Q4	N		Final Investment Decision for Alaska Satellite Telecommunications Infrastructure (ASTI) Technical Refresh
130	2009 Q3	N	Enterprise Services	Selection of SWIM Segment 2 candidates (Complete)
158	2011 Q3	Y		Data Communications Segment 1 FID (part 1 of a split FID)
162	2008	Q3		Agency Link Decision for FCI (Complete)
203	2012 Q1	N		Flight Service, AFSM Voice System Provisioning Coordination with NVS
214	2013	N		Determine to Sustain or Decommission LDRCL
215	2013 Q4	N		Determine to Sustain or Decommission RCL
216	2016	N		Determine to Sustain NMR or incorporate it into FTI-2
217	2011	N		Airport Wireless Communication System CRDR
218	2021	N		CRDR for migration to L-band for DataComm
304	2015	Y		Data Communications Segment 2 FID
339	2010 Q3	Y		Initial Investment Decision for NAS Voice Switch
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
348	2011	N		Approve new CCS for ATCSCC in Potomac
349	2022	N		Approve Digital Audio Legal Recorder replacement
350	2010 Q1	Y		FID for NEXCOM Segment 2 Modernization Phase 1
351	2011 Q2	Y		Approve RCE Replacement
352	2009 Q4	N		Approve IDLM Enhancement

# Communication Roadmap: Decision Points (2 of 2)

DP #	Target Date	High Priority	Domain	Name
353	2012 Q1	Y		Data Communications Segment 1 FID (part 2 of a split FID)
441	2012 Q2	N		ATIS Technical Refresh FID
442	2014	N		Determine need for VSCS Technical Refresh Phase IV
485	2010 Q3	N		ATIS Technical Refresh CRDR
486	2010 Q4	N		ATIS Technical Refresh IARD
487	2011 Q2	N		ATIS Technical Refresh IID
496	2012 Q1	N		Airport Wireless Communication System IARD
497	2012 Q4	N		Airport Wireless Communication System IID
498	2013 Q3	N		Airport Wireless Communication System FID
499	2011 Q3	N		FID for NEXCOM Segment 2 Modernization Phase 2

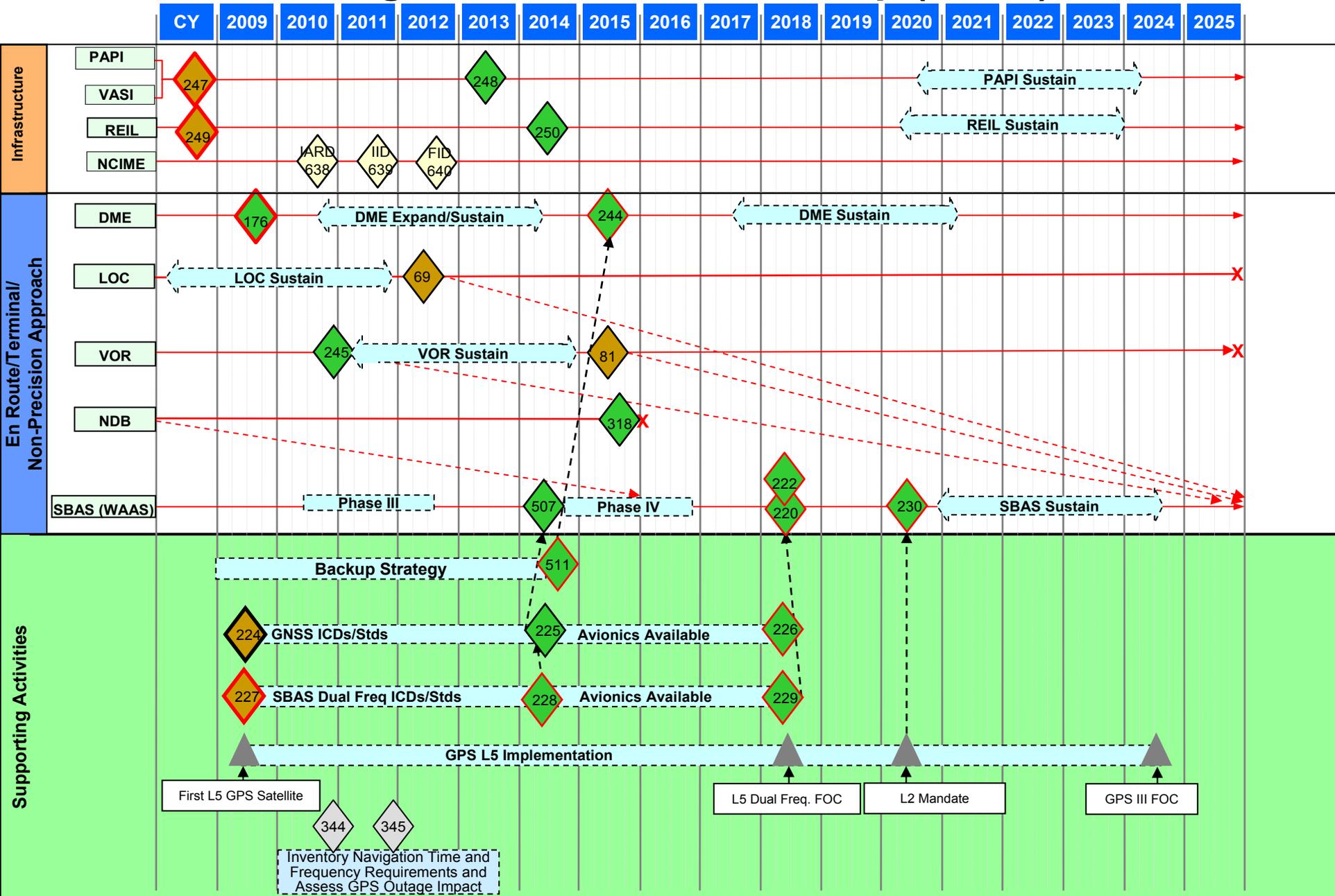
# Navigation

# Navigation Services Roadmap (1 of 2)



Approved

# Navigation Services Roadmap (2 of 2)



Approved

# Navigation Services Roadmap: Assumptions

Identifier	Description
NAV-01	<p>NextGen implementation requires an aggressive transition to services that support performance-based navigation. This requires:</p> <ul style="list-style-type: none"> <li>a) Close collaboration with the aviation community</li> <li>b) A clear definition of the standard services that will be provided by FAA</li> <li>c) Other services supported by non-Federal entities</li> </ul>
NAV-02	<p>FAA is migrating to NAS-wide performance-based navigation —RNAV/RNP/LPV (primarily GNSS) for en route, terminal, and approach &amp; landing domains. This will include:</p> <ul style="list-style-type: none"> <li>a) Transition from VORs to GNSS RNAV for en route and terminal</li> <li>b) Transition from ILS to GNSS (SBAS/GBAS)* for approach and landing</li> <li>c) Provision for CAT I or equivalent approach &amp; landing service by SBAS at airports meeting minimum criteria</li> <li>d) Extent of CAT II and CAT III service by GBAS is TBD</li> </ul> <p>* SBAS is WAAS; GBAS is LAAS</p>
NAV-03	<p>Need to continue working closely with users and the avionics industry on equipage issues</p> <ul style="list-style-type: none"> <li>a) Current equipage is insufficient to support transition from ground-based infrastructure to performance-based navigation</li> <li>b) In the future, equipage will be in place to support transition to performance-based navigation</li> <li>c) Implementation dates allow sufficient lead time to accommodate time-lines</li> </ul>
NAV-04	<p>Policy will be in place to maintain safety, security, and capacity and preclude significant economic impact during GNSS outages</p>
NAV-05	<p>Department of Defense will maintain a GPS constellation consistent with the Standard Positioning Service.</p>

# Navigation Roadmap: Decision Points (1 of 2)

DP #	Target Date	High Priority	Domain	Name
23	2008 Q3	N		Cat I Instrument Approach Policy (Complete)
24	2009 Q1	Y		Decision to proceed with Ground Based Augmentation System (GBAS) Cat II/III research and development to develop a prototype, validate requirements, and demonstrate feasibility for a low risk acquisition of Cat-II/III capable Local Area Augmentation System (LAAS) (Complete)
69	2012	N		Approved Cat I Instrument Approach policy Allows Cat I Drawdown
70	2012 Q1	N		Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
81	2015	N		VOR decision on far-term drawdown
94	2020	N		Decision on complete ILS CAT I drawdown
176	2009 Q3	Y		DME NextGen Strategy Plan—Decision to procure next generation of DMEs to replace aging systems and expand the network where needed to support RNAV & NextGen (Complete)
219	2016	N		Completion of all WAAS instrument approach procedures (LPV and LP) for all qualifying runways in the National Airspace System (NAS), estimated to be 5500 runway ends. Original date of 2018 was accelerated to 2016.
220	2018	Y		Completion of Dual Frequency (GPS L1 and L5) development & testing for the WAAS ground and space segment hardware, software, and user equipment standards and avionics, required by DoD Mandate, issued September 2008
222	2018	Y		24 GPS dual frequency satellites with L1 and L5 operating and transmitting useable signals for aviation.
224	2009 Q2	N		Decision to develop dual frequency multi-constellation GNSS avionics (Complete)
225	2014	N		Decision to proceed with dual frequency multi-constellation GNSS avionics activities to validate standards and lower risk for avionics development.
226	2018	Y		Completion of Dual frequency multi-constellation GNSS avionics activities
227	2009 Q2	Y		Decision to develop dual frequency SBAS/WAAS avionics (Complete)
228	2014	Y		Decision to proceed with WAAS dual frequency avionics activities to validate standards and lower risk for avionics development.
229	2018	Y		Completion of WAAS Dual frequency avionics activities.
230	2020	Y		Cut-over to dual frequency operations
235	2014	N		Decision on active drawdown of Cat I ILSs operating in the NAS
236	2013	N		Decision to buy systems for Cat II/III ILSs where necessary
237	2018	N		Decision on replacement Cat II/III ILSs operating in the NAS
238	2008 Q4	Y		ALS (I) - Decision to develop and implement replacements for PAR 38 & 56 lamps (Complete)

# Navigation Roadmap: Decision Points (2 of 2)

DP #	Target Date	High Priority	Domain	Name
239	2013	Y		ALS I LED Lamps are available
240	2009 Q4	Y		ALS (II/III) - Decision to improve energy efficiency of lighting systems (Complete)
241	2017	N		Energy efficient ALSF-2 production systems available
242	2009 Q3	N		Decision to conduct R & D to explore RVR for prediction of precipitation (Complete)
243	2015	N		Decision to implement enhanced capability based on results of RVR research
244	2015	Y		Next generation of DMEs available to support RNAV throughout the NAS
245	2010 Q4	N		Decision on near-term minimum operational VOR ground network
247	2008 Q4	Y		Decision to develop and implement LED technology to replace incandescent lamps. PAPI is the ICAO accepted standard visual glide slope indicator. Whenever possible, VASI systems will be replaced with PAPI systems (Complete)
248	2013	N		Next generation of LED PAPI systems available
249	2008 Q4	Y		Decision to develop and implement replacements for REIL lamps with LEDs (Complete)
250	2014	N		Next generation of LED REIL systems available
251	2008 Q4	Y		Decision to deploy semiflush fixtures for existing sites and new establishments (Complete)
252	2014	N		Semiflush flasher fixtures production system available
316	2014	Y		GBAS/LAAS ground facilities and single-frequency avionics available for use
318	2015	N		All federal NDBs decommissioned from the NAS
320	2008 Q4	Y		Decision to implement RVR 1800 at OEP Airports (Complete)
321	2009 Q1	Y		Increased capacity at ILS/RVR equipped runways during IMC (Complete)
322	2011	N		Enhanced low visibility operations supported by navigation infrastructure
324	2012	Y		ALS (I) - Design and development of PAR 38 and PAR 56 LED replacement lamps is completed
329	2010 Q1	N		RVR Sustainment: ISD for PC-RVR for use within the NAS (Complete)
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
507	2014	N		WAAS moves from Phase III to Phase IV
511	2014	Y		Decision on national backup

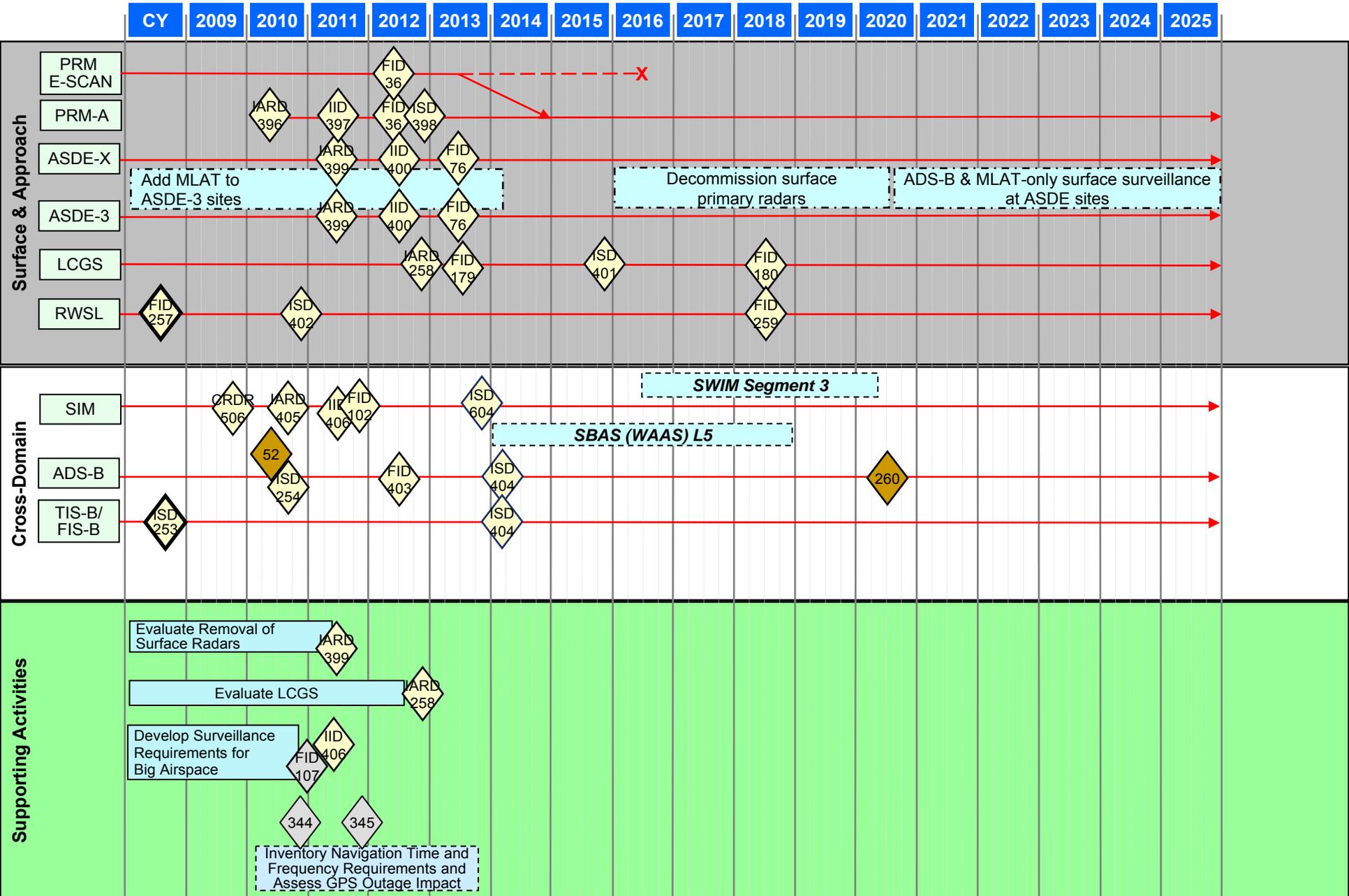
# Navigation Roadmap: Decision Points (2 of 2)

DP #	Target Date	High Priority	Domain	Name
555	2011	Y	Aircraft	Strategy for transition to LED Airport/Approach Lighting
603	2012	N		LED Prototypes available for testing
636	2011 Q1	N		Investment Analysis Readiness Decision (IARD) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
637	2011 Q3	N		Initial Investment Decision (IID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
638	2010 Q3	N		Investment Analysis Readiness Decision (IARD) for the Acquisition of NAVAID Control, Interlock, and Monitoring Equipment (NCIME)
639	2011 Q3	N		Initial Investment Decision (IID) for the Acquisition of NAVAID Control, Interlock, and Monitoring Equipment (NCIME)
640	2012 Q3	N		Final Investment Decision (FID) for the Acquisition of NAVAID Control, Interlock, and Monitoring Equipment (NCIME)

# Surveillance



# Surveillance Roadmap (2 of 2)



# Surveillance Roadmap: Assumptions

Identifier	Description
SURV-01	<p>Migration to Automatic Dependent Surveillance—Broadcast (ADS-B) as primary means of surveillance</p> <ul style="list-style-type: none"> <li>a) Airspace rule to be in effect and backup to be in place by 2020 (compliance date)               <ul style="list-style-type: none"> <li>1. Existing surveillance infrastructure will remain in place until 2020</li> </ul> </li> <li>b) WMLAT operations to be tested in Colorado and Alaska</li> </ul>
SURV-02	<p>Backup to mitigate loss of on-board GPS positioning source required</p> <ul style="list-style-type: none"> <li>a) Backup strategy was identified in January 2007               <ul style="list-style-type: none"> <li>1. Retain all en route beacons (~150 monopulse systems with selective interrogation)</li> <li>2. Retain limited set of terminal beacons at Operational Evolution Partnership (OEP)/High Density Terminals (~50 locations)</li> <li>3. A review of the ADS-B Backup Strategy will be conducted to determine which terminal beacon sites are to be kept for backup based on NextGen assumptions such as 3X Capacity</li> </ul> </li> <li>b) All terminal primary radars are retained               <ul style="list-style-type: none"> <li>1. Used as safety (ATC) backup</li> <li>2. May also be retained for aviation security and/or weather requirements</li> </ul> </li> </ul>
SURV-03	<p>Surface primary radars will not be required after ADS-B rule compliance date</p> <ul style="list-style-type: none"> <li>a) Requires mandated equipage of all surface vehicles</li> <li>b) Surface surveillance to be supported by ADS-B</li> <li>c) Multilateration will be established as a backup to ADS-B at all ASDE airports</li> </ul>
SURV-04	PRM-A, with multilateration technology, will replace PRM E-Scan
SURV-05	The following aircraft decisions will have an impact on surveillance: 52, and 260. For full descriptions see decision spreadsheet.
SURV-06	Department of Defense/Department of Homeland Security continues to fund LRR systems through 2025
SURV-07	Digital automation system inputs are assumed for implementation of SIM

# Surveillance Roadmap: Decision Points (1 of 3)

DP #	Target Date	High Priority	Domain	Name
36	2012	N		Final Investment Decision for migration of PRM to PRM-A (based on multilateration)
52	2010 Q2	N		Final Decision for Avionics Mandate/Rulemaking for ADS-B (out)/MODE-S/UAT
76	2013	N		Final Investment Decision for removal or SLEP/replace ASDE surface primary radars (evolving requirements for safety and security may impact decision)
77	2016 Q1	N		Initial Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
78	2016 Q1	N		Initial Investment Decision to implement a NextGen beacon/backup radar system for ATC
95	2024 Q2	N		Decision for replacement of terminal primary radars (ASR-11 PSR) and removal of terminal beacons (ASR-11 MSSR)
96	2024	N		Decision for replacement of en route beacons (ATCBI-6)
97	2010 Q4	N		Initial Investment Decision for legacy radar (ASR-9) SLEP, through 2025
98	2010 Q4	N		Initial Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
99	2008 Q4	N		Decision for ASR-11 Technology Refresh Segment 1 Final Investment Decision (Complete)
100	2010 Q4	N		Initial Investment Decision for legacy beacon (Mode S) SLEP through 2025
102	2011 Q4	N		Final Investment Decision to implement SIM in terminal and en route legacy radar systems
103	2014	N		Final Investment Decision for technology refresh of beacons (ATCBI-6)
104	2017	N		Final Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
105	2017	N		Final Investment Decision to implement a NextGen beacon/backup radar system for ATC
107	2010 Q4	Y	Automation	TAMR Phase 3 Final Investment Decision
179	2013	N		Final Investment Decision for LCGS
180	2018	N		Final Investment Decision for ADS-B to assume LCGS function, or approve a Technology Refresh for LCGS
253	2008 Q4	N		In-Service Decision for SBS Essential Services (TIS-B/FIS-B) NAS wide implementation (Complete)
254	2010 Q3	N		In-Service Decision for SBS Critical Services (ADS-B) NAS wide implementation, including backup strategy
255	2010 Q2	N		In-Service Decision for WM/LAT (Alaska and Colorado)
256	2013	N		Final Investment Decision for ASR-11 Technology Refresh Segment 2 (through 2025)
257	2008 Q4	N		JRC FID (JRC 2B) Decision for acquisition of RWSL systems (Complete)
258	2012 Q4	N		Investment Analysis Readiness Decision for LCGS
259	2018	N		Final Investment Decision for RWSL Technology Refresh

# Surveillance Roadmap: Decision Points (2 of 3)

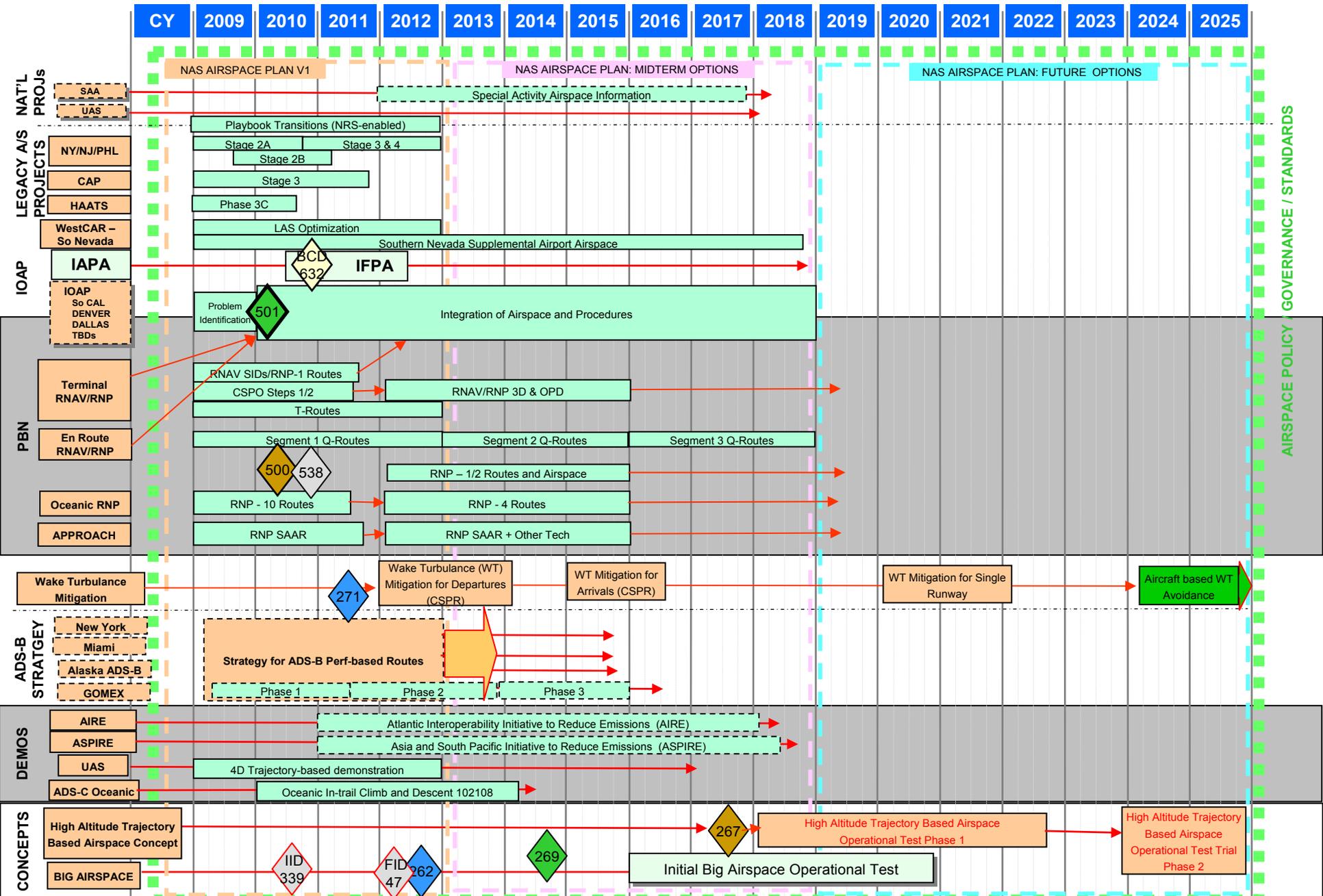
DP #	Target Date	High Priority	Domain	Name
260	2020	N		Decision on ADS-B Rule Compliance
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
390	2011 Q4	N		Final Investment Decision for legacy beacon (Mode S) SLEP through 2025
391	2011 Q4	N		Final Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
392	2011 Q4	N		Final Investment Decision for legacy radar (ASR-9) SLEP through 2025
393	2010 Q4	N		Initial Investment Decision for Technology Refresh of ATCBI-5 beacon system
394	2012	N		Final Investment Decision for Technology Refresh of ATCBI-5 beacon system
395	2013	N		Initial Investment Decision for Technology Refresh of ATCBI-6 beacon system
396	2010 Q2	N		Investment Analysis Readiness Decision for Precision Runway Monitor-Alternate
397	2011	N		Initial Investment Decision for migration of PRM to PRM-A (based on multilateralation)
398	2012 Q4	N		In-Service Decision for PRM-A (based on multilateralation)
399	2011	N		Investment Analysis Readiness Decision for removal or SLEP/replace ASDE surface primary radars
400	2012	N		Initial Investment Decision for removal or SLEP/replace ASDE surface primary radars
401	2015	N		In-Service Decision for Low Cost Ground Surveillance system
402	2010 Q4	N		In-Service Decision for Runway Status Light system
403	2012	N		Final Investment Decision for SBS Implementation of Advanced ADS-B Applications
404	2014	N		In-Service Decision (ISD) for Final Operational Capability (FOC) for ADS-B Critical and Essential Services
405	2010 Q3	N		Investment Analysis Readiness Decision for SIM in terminal and en route legacy radar systems
406	2011 Q2	N		Initial Investment Decision for SIM in terminal and en route legacy radar systems
407	2013 Q4	N		Investment Analysis Readiness Decision for NextGen Surveillance and Weather Radar Capability
408	2023	N		In-Service Decision for NextGen Surveillance and Weather Radar Capability
409	2013 Q4	N		Investment Analysis Readiness Decision for New Beacon/Backup System

# Surveillance Roadmap: Decision Points (3 of 3)

DP #	Target Date	High Priority	Domain	Name
410	2023	N		In-Service Decision for New Beacon/Backup System
506	2009 Q4	N		Concept and Requirements Definition Readiness (CRDR) Decision for SIM in Terminal and En Route Legacy Radar Systems
515	2010 Q2	N		Concept and Requirements Definition Readiness (CRDR) Decision for a Mobile/Transportable Airport Surveillance Radar (MASR)
516	2011	N		Investment Analysis Readiness Decision (IARD) for a Mobile/Transportable Airport Surveillance Radar (MASR)
517	2011 Q4	N		Initial Investment Decision (IID) for a Mobile/Transportable Airport Surveillance Radar (MASR)
518	2012 Q1	N		Final Investment Decision (FID) for a Mobile/Transportable Airport Surveillance Radar (MASR)
519	2014 Q4	N		In-Service Decision (ISD) for a Mobile/Transportable Airport Surveillance Radar (MASR)
593	2010 Q2	N		Investment Analysis Readiness Decision (IARD) for Technology Refresh of ATCBI-5 beacon system
604	2013 Q4	N		In-Service Decision (ISD) for SIM in Terminal and En Route Legacy Radar Systems

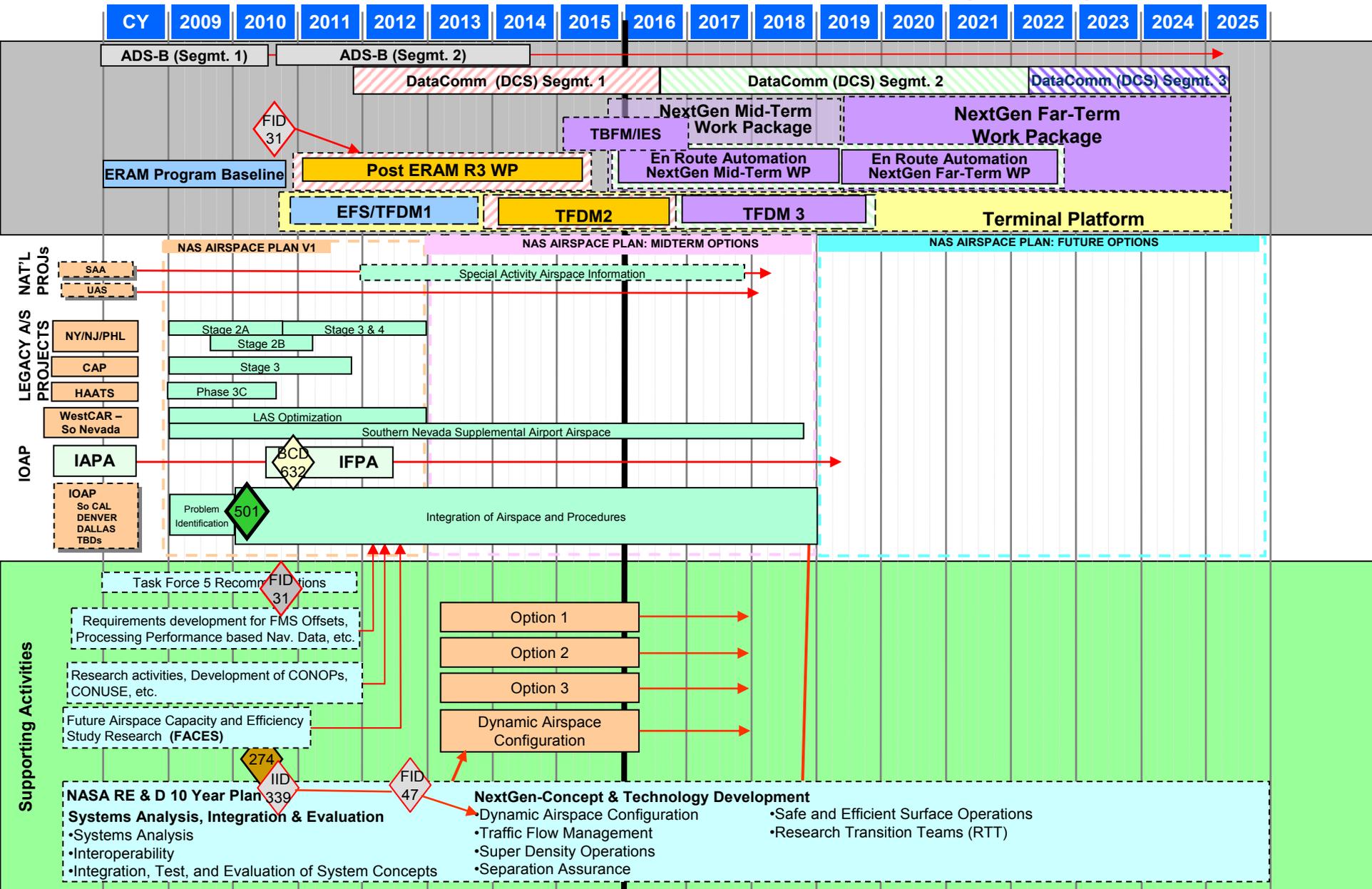
# Airspace & Procedures

# Airspace & Procedures Roadmap (1 of 9)

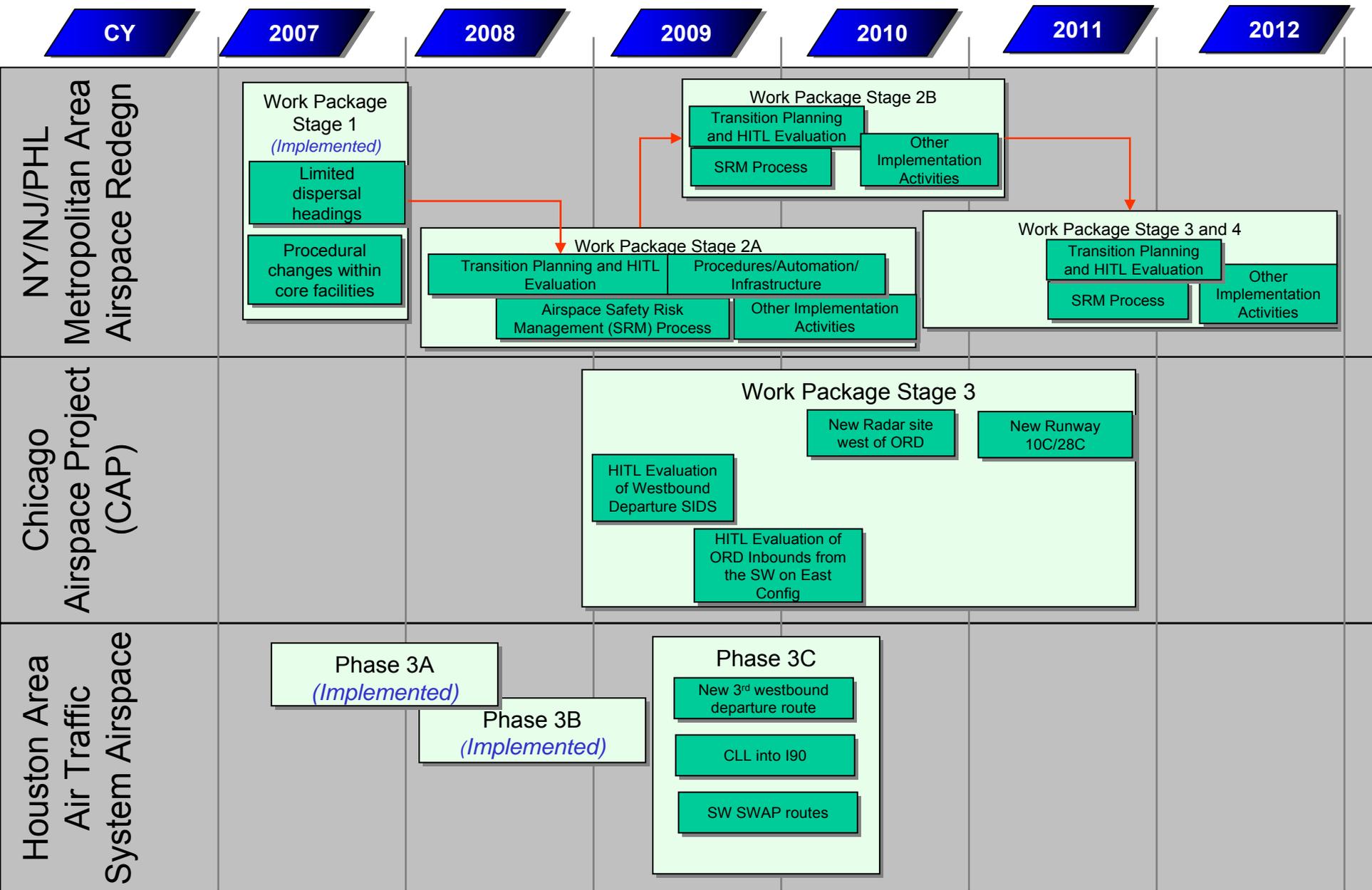


AIRSPACE POLICY / GOVERNANCE / STANDARDS

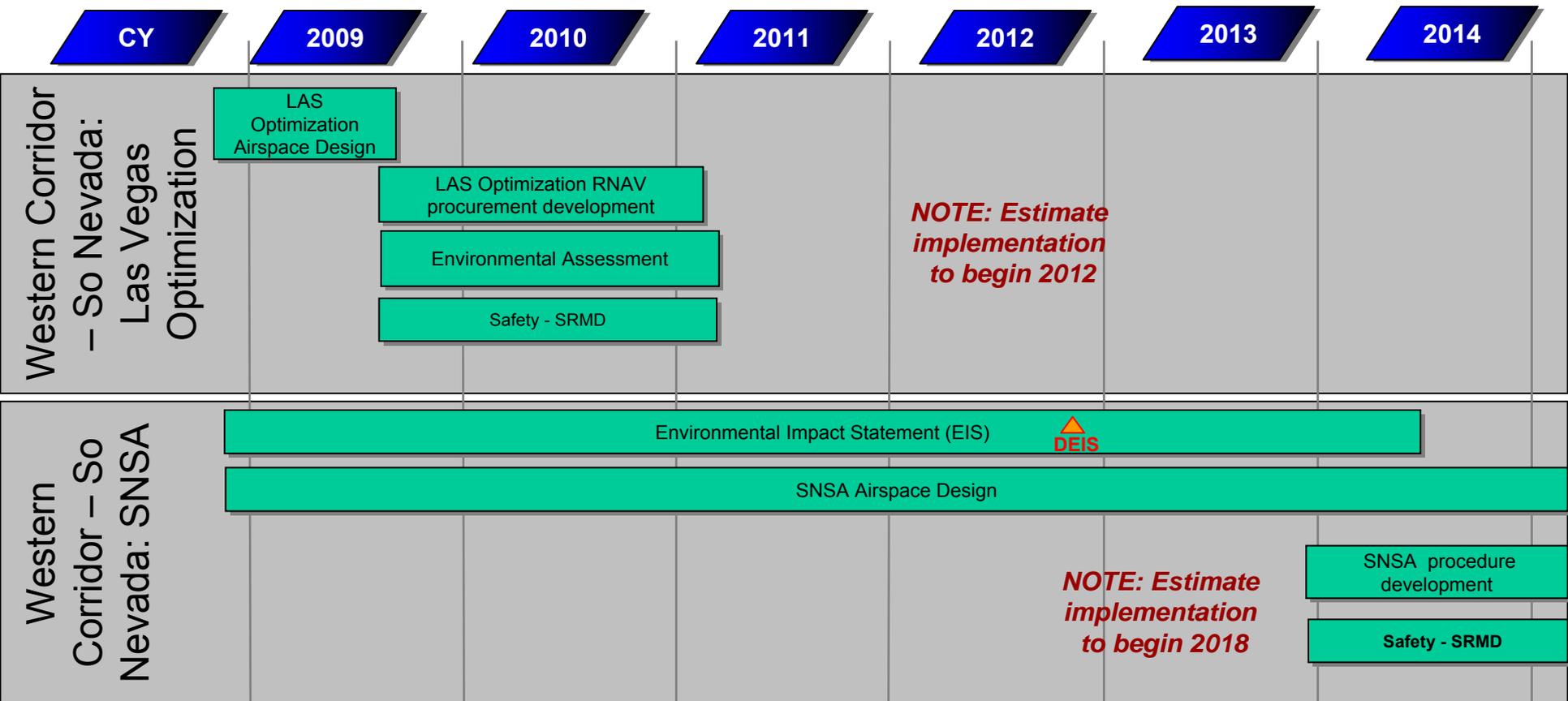
# Airspace & Procedures Roadmap (2 of 9)



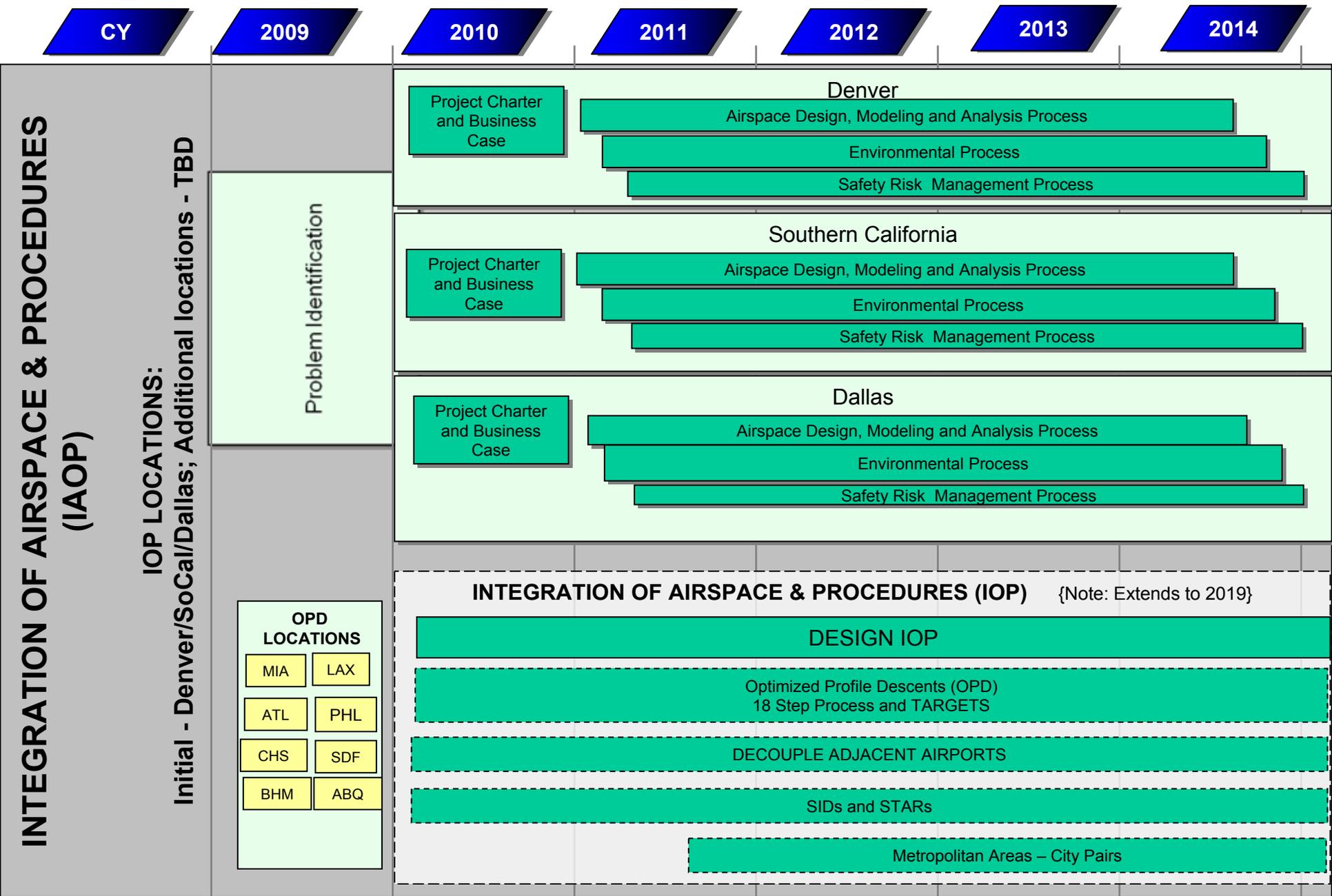
# Airspace & Procedures Roadmap (3 of 9)



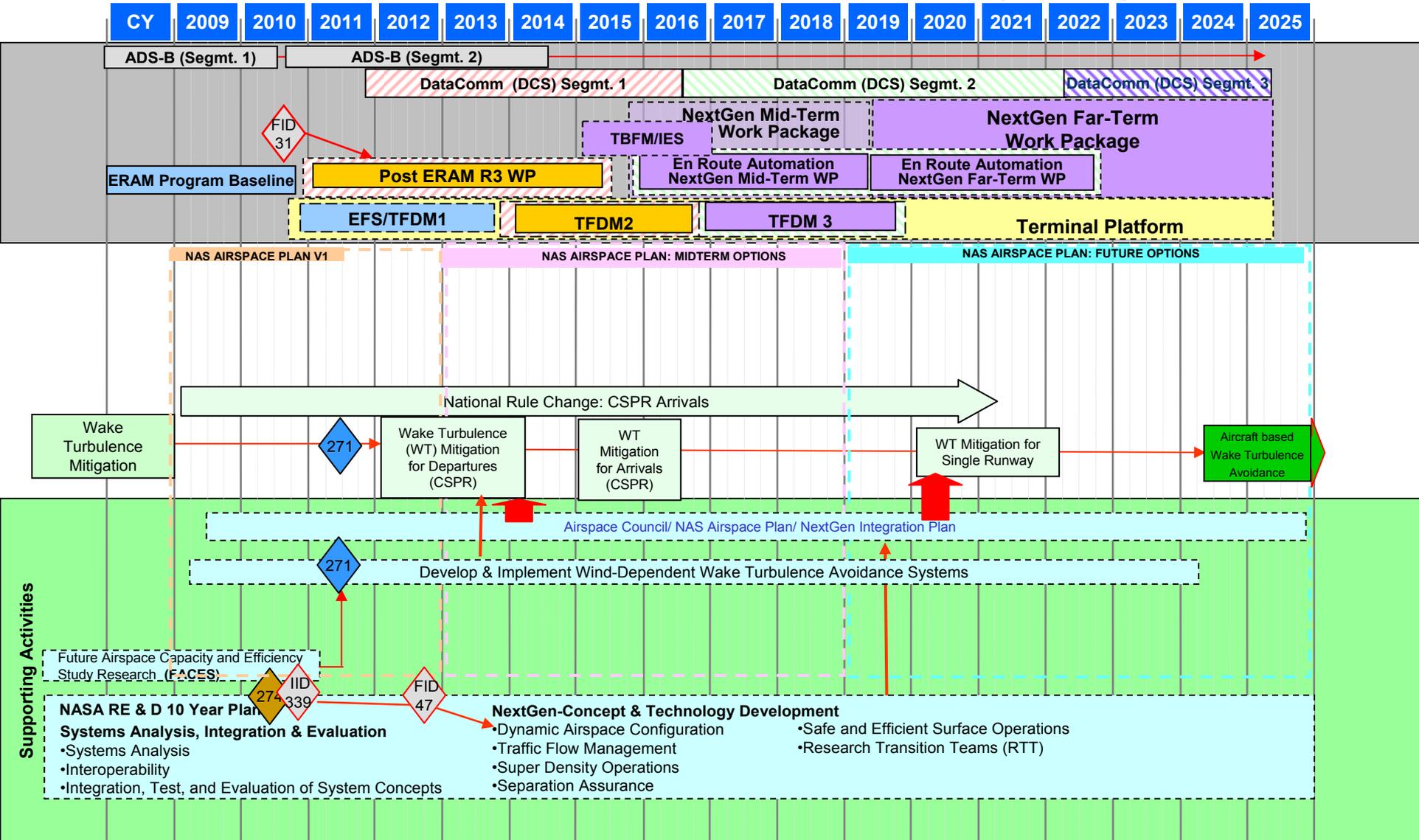
# Airspace & Procedures Roadmap (4 of 9)



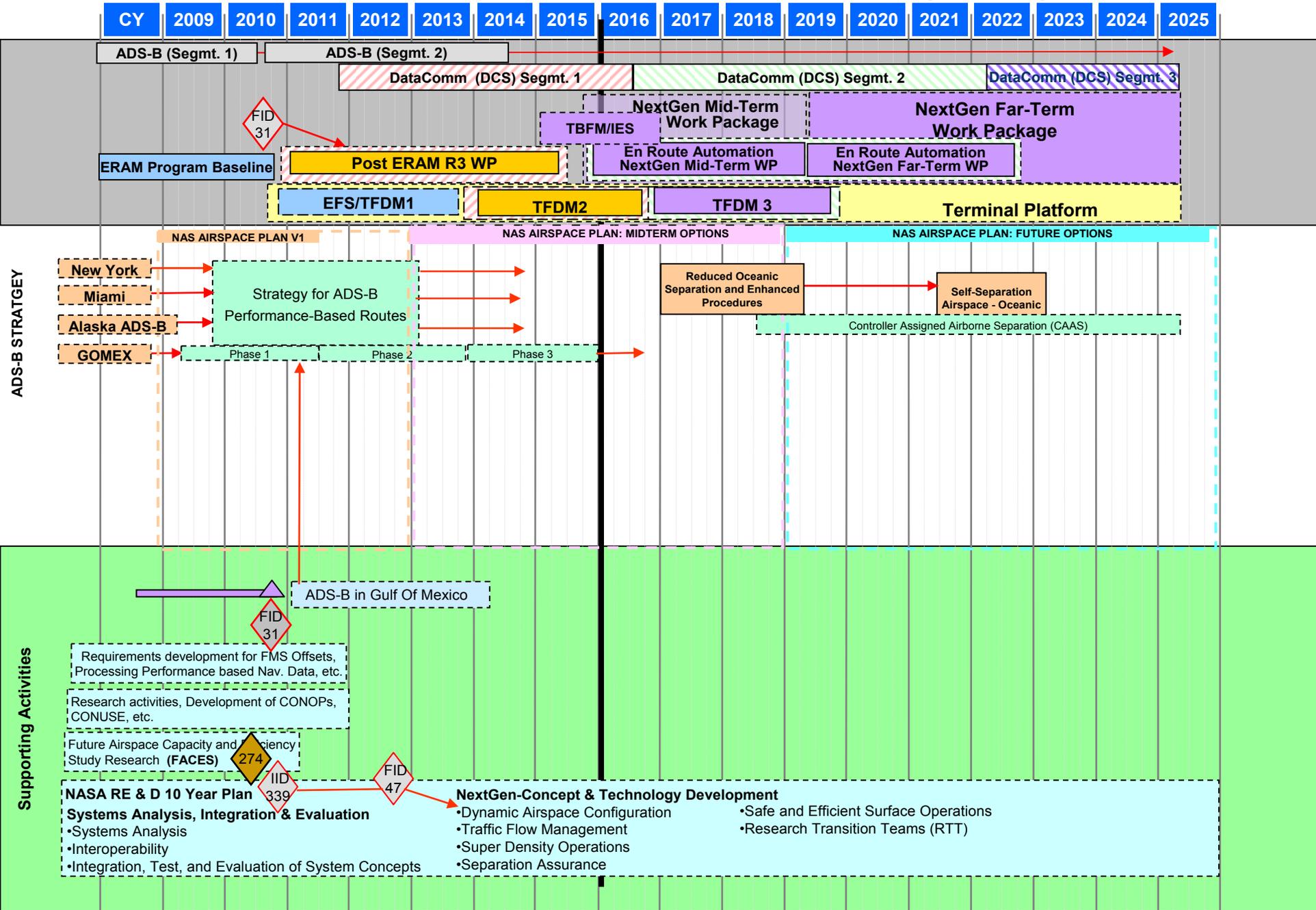
# Airspace & Procedures Roadmap (5 of 9)



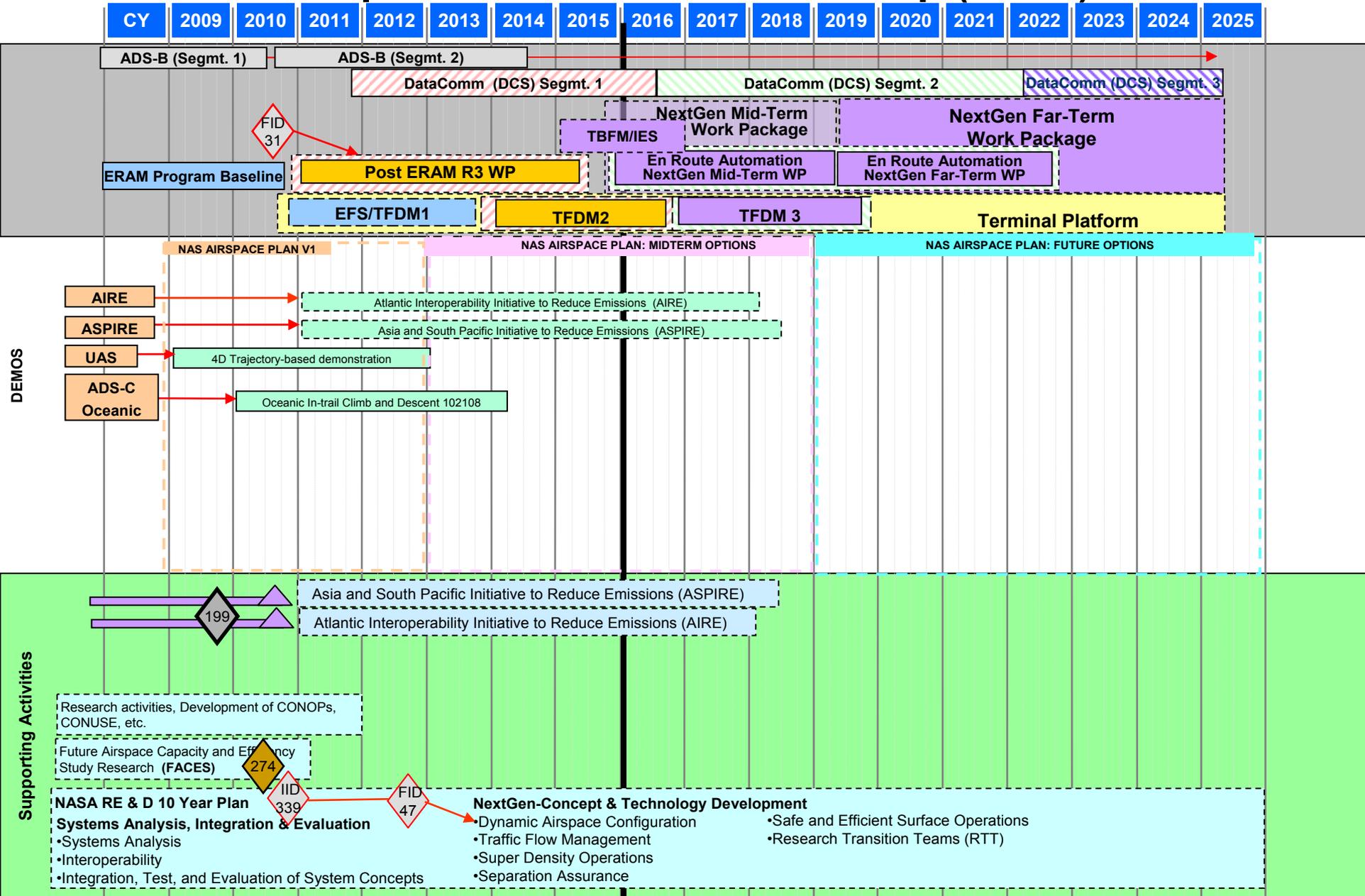
# Airspace & Procedures Roadmap (6 of 9)



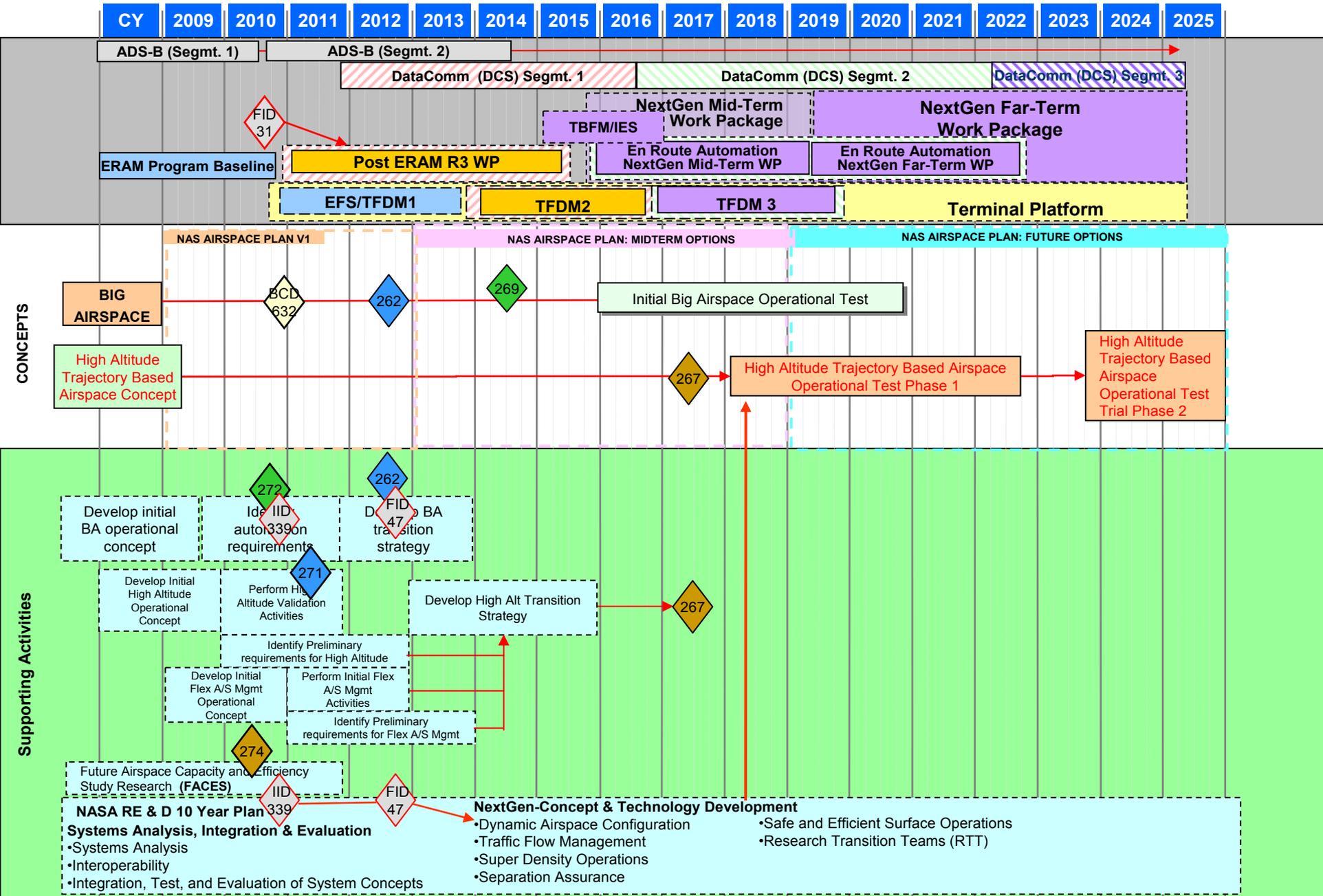
# Airspace & Procedures Roadmap (7 of 9)



# Airspace & Procedures Roadmap (8 of 9)



# Airspace & Procedures Roadmap (9 of 9)



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# Airspace & Procedures Roadmap: Assumptions

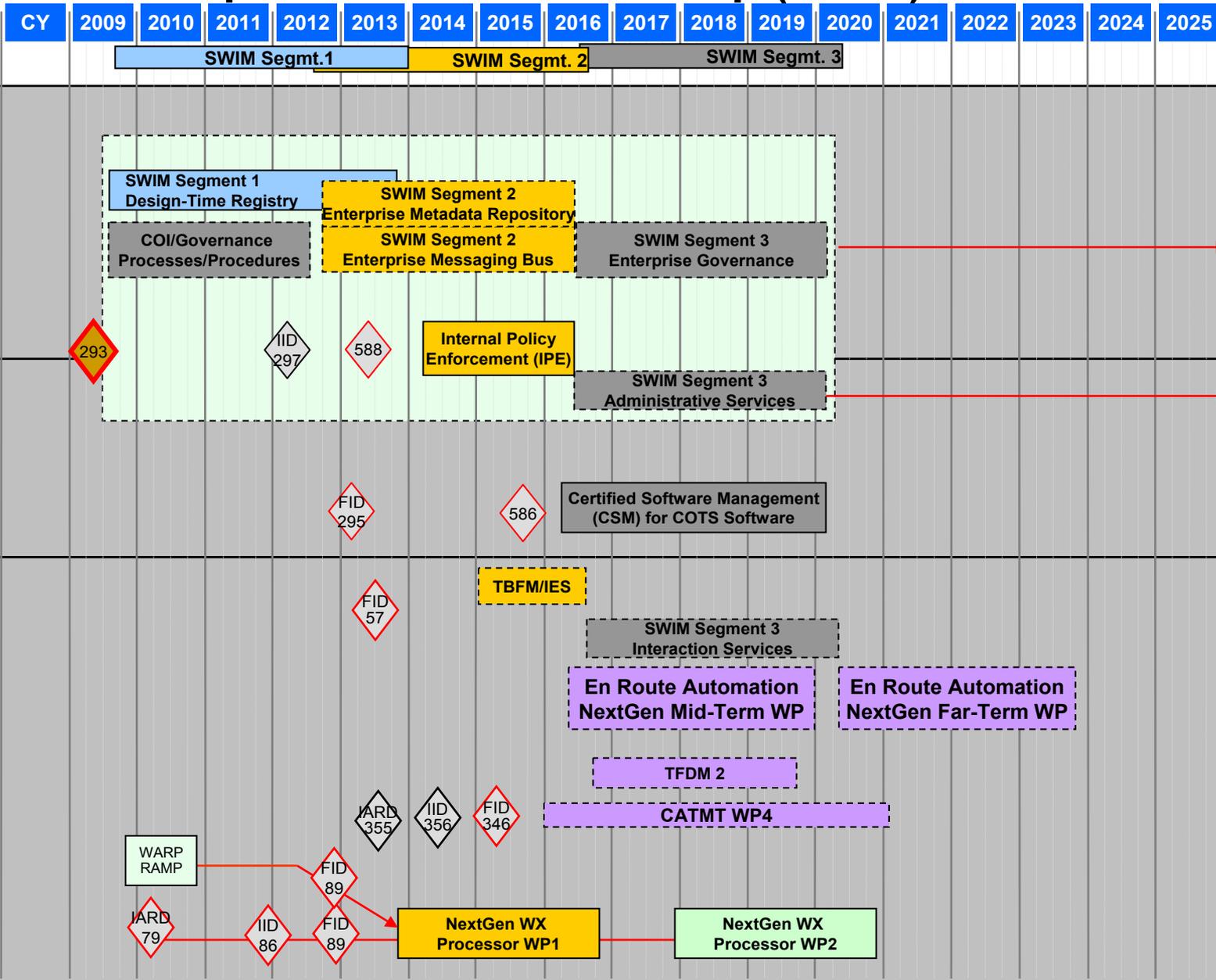
Identifier	Description
A&P-01	<p>Airspace Modernization Assumptions</p> <ul style="list-style-type: none"> <li>a) Flexibility into any of the agency’s facility plans</li> <li>b) Future Airspace &amp; NASA research funding is sufficient and provides favorable benefits</li> <li>c) System Dependencies               <ul style="list-style-type: none"> <li>1. ADS-B</li> <li>2. ERAM</li> <li>3. TFMS WP2</li> <li>4. DataComm</li> </ul> </li> </ul>
A&P-02	<p>Big Airspace (BA) Assumptions</p> <ul style="list-style-type: none"> <li>a) Key BA enablers:               <ul style="list-style-type: none"> <li>1. Extension of 3 Mile Separation &amp; Terminal Procedures</li> <li>2. Integrated arrival/departure airspace configurations</li> <li>3. Flexible sector &amp; bi-directional routes published</li> <li>4. 5 mile lateral spacing for Required Navigation Performance (RNP) enables 5 mile lateral route spacing</li> <li>5. New Voice switch, leased circuits, and Air-Ground communications channels to handle transition</li> <li>6. Cost benefits are based on creating X Big Airspace facilities, covering X major metropolitan areas</li> </ul> </li> <li>b) Cost analysis based on general assumptions about the concept, not on any detailed requirements or technical solutions</li> <li>c) Benefits analysis based on extrapolating results from FT simulations to other sites given traffic forecasts and historical weather patterns</li> <li>d) Sites identified where large TRACON facilities exist could accommodate additional BA operational positions with refurbishment. New buildings would be needed where no large TRACON exists.</li> </ul>

# Airspace and Procedures Roadmap: Decision Points

DP #	Target Date	High Priority	Domain	Name
31	2010 Q3	Y	Automation	Final Investment Decision for Post ERAM R3 Work Package
47	2012	Y	Communication	Final Investment Decision for NAS Voice Switch
67	2010 Q4	N	Automation	Approval of offshore implementation long term plan
199	2010 Q3	N	Automation	DOTS Sustainment/Integration Decision (Complete)
262	2012	N		Decision to implement Big Airspace at candidate areas
267	2017	N		Decision to proceed with High Altitude Generic Airspace Concept Phase 1
269	2014	N		Identify locations (e.g. additional TRACONS and previously re-designed facilities)
271	2011 Q2	N		Wake Turbulence Procedures
272	2010 Q3	N		Recommend 1 or 2 test field locations and define automation requirements
274	2010 Q2	N		Decision to continue funding Future Airspace Capacity and Efficiency Research
339	2010 Q3	Y	Communication	Initial Investment Decision for NAS Voice Switch
344	2010 Q4	N	Enterprise Services	Establish Requirements for a Backup Timing Source
345	2011	N	Enterprise Services	Implementation strategy decision for GPS timing backup
500	2010 Q2	N		Understand Impact of Environmental Policy on PBN Implementation
501	2010 Q1	N		Determine Implementation Plan and initial Demonstration Site(s) for IOP (Complete)
538	2010 Q4	N	Aircraft	Order 8400.33 (60 Lat in WATRS)
632	2010 Q4	N		Baseline Change Decision (BCD) for Instrument Flight Procedures Automation

# Enterprise Services

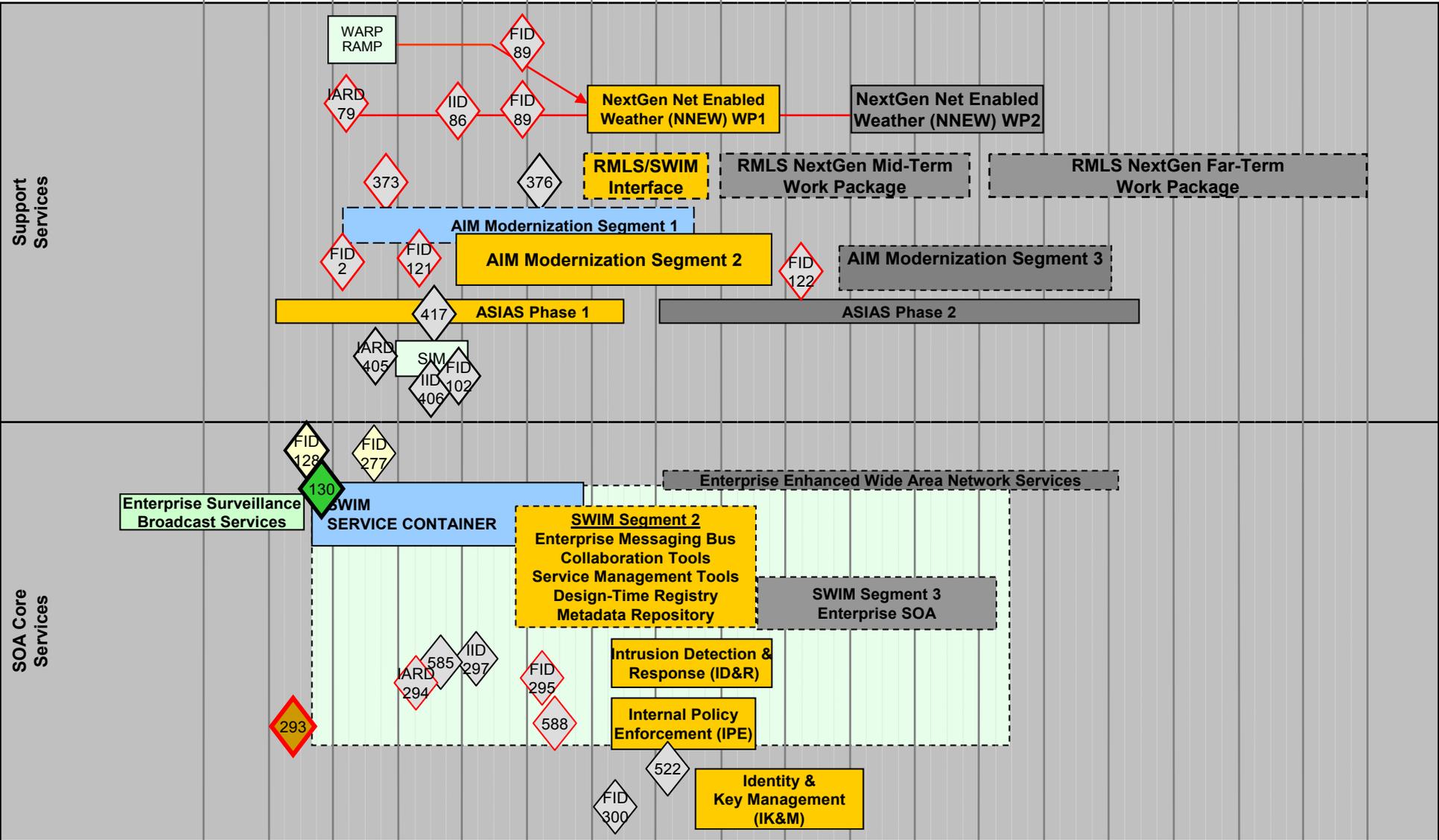
# Enterprise Services Roadmap (1 of 7)



# Enterprise Services Roadmap (2 of 7)

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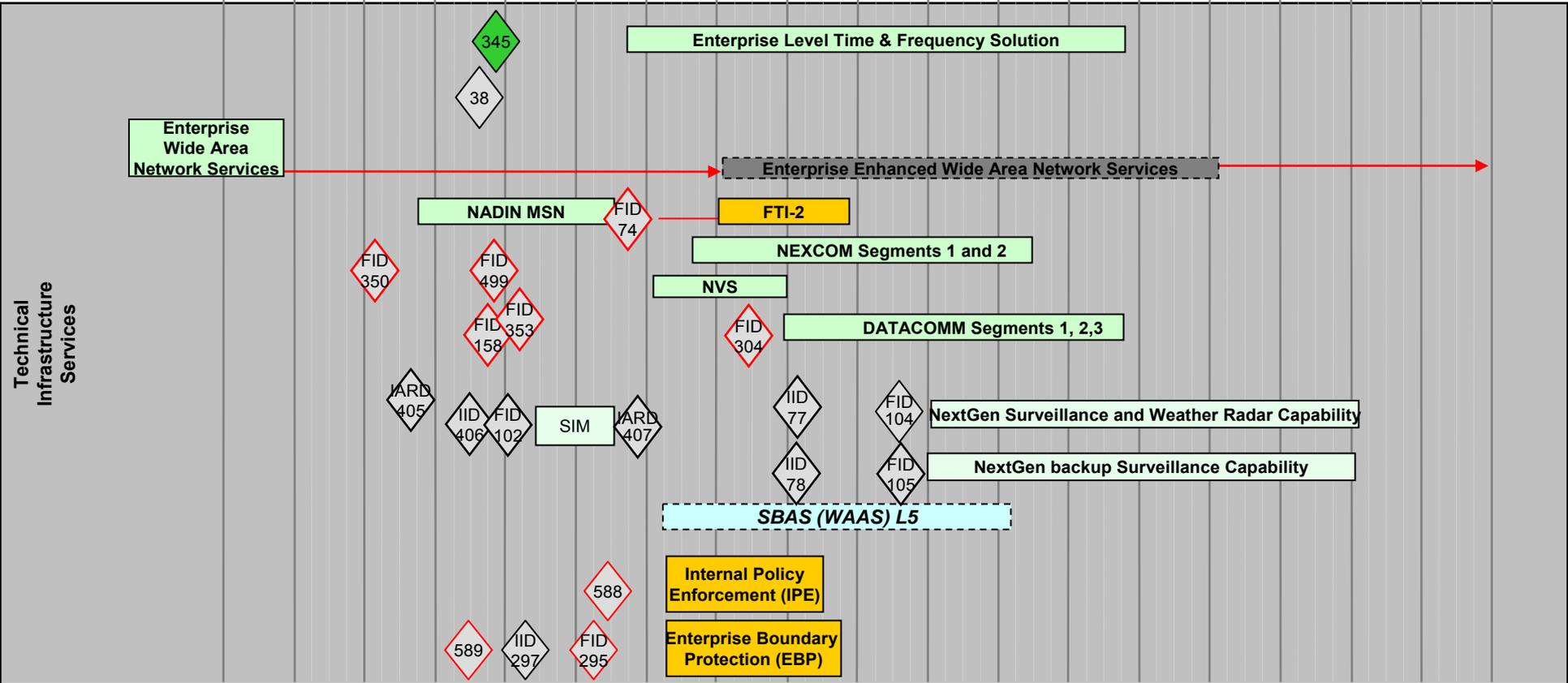
SWIM Segmt. 1 SWIM Segmt. 2 SWIM Segmt. 3



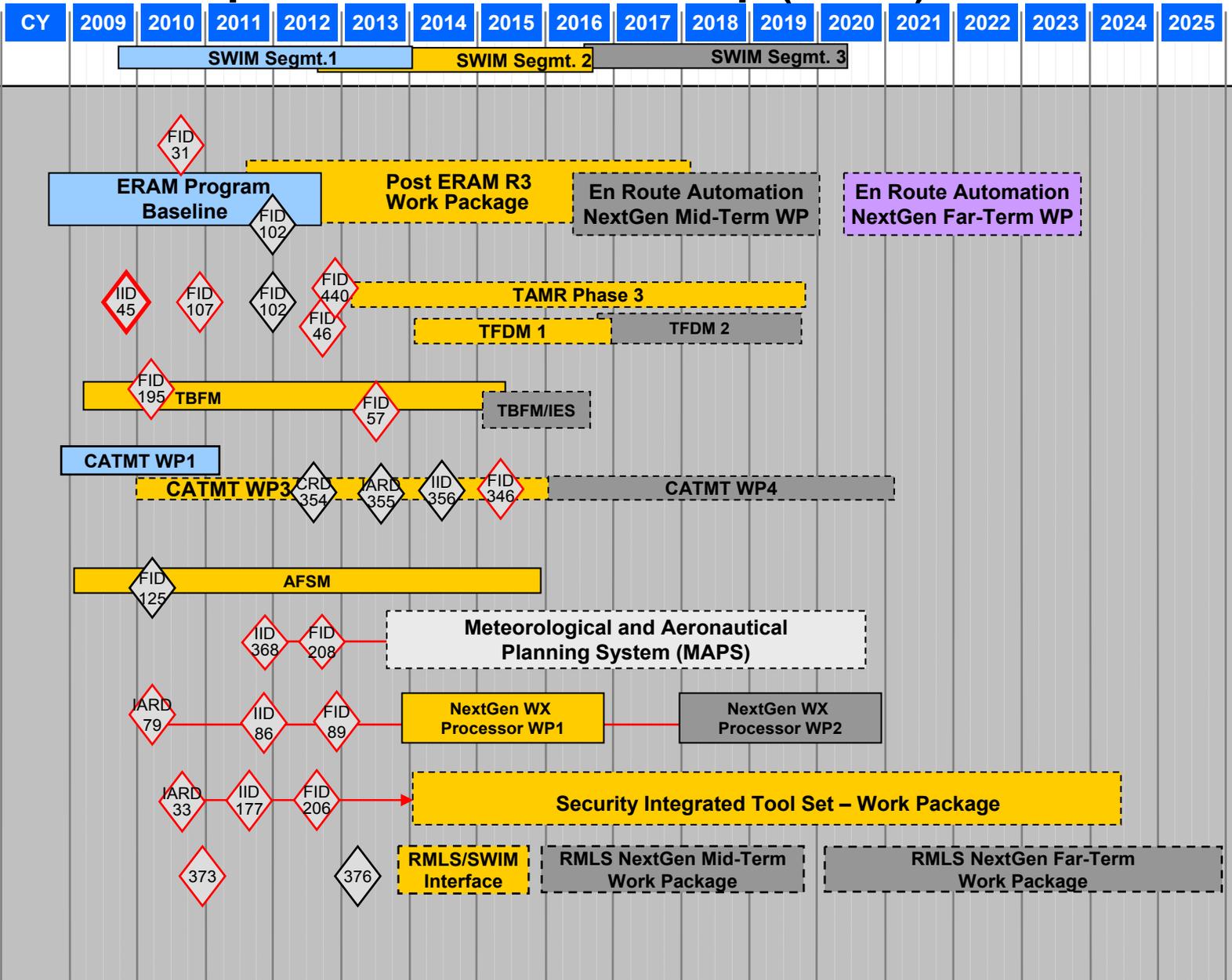
# Enterprise Services Roadmap (3 of 7)

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

SWIM Segmt. 1 SWIM Segmt. 2 SWIM Segmt. 3

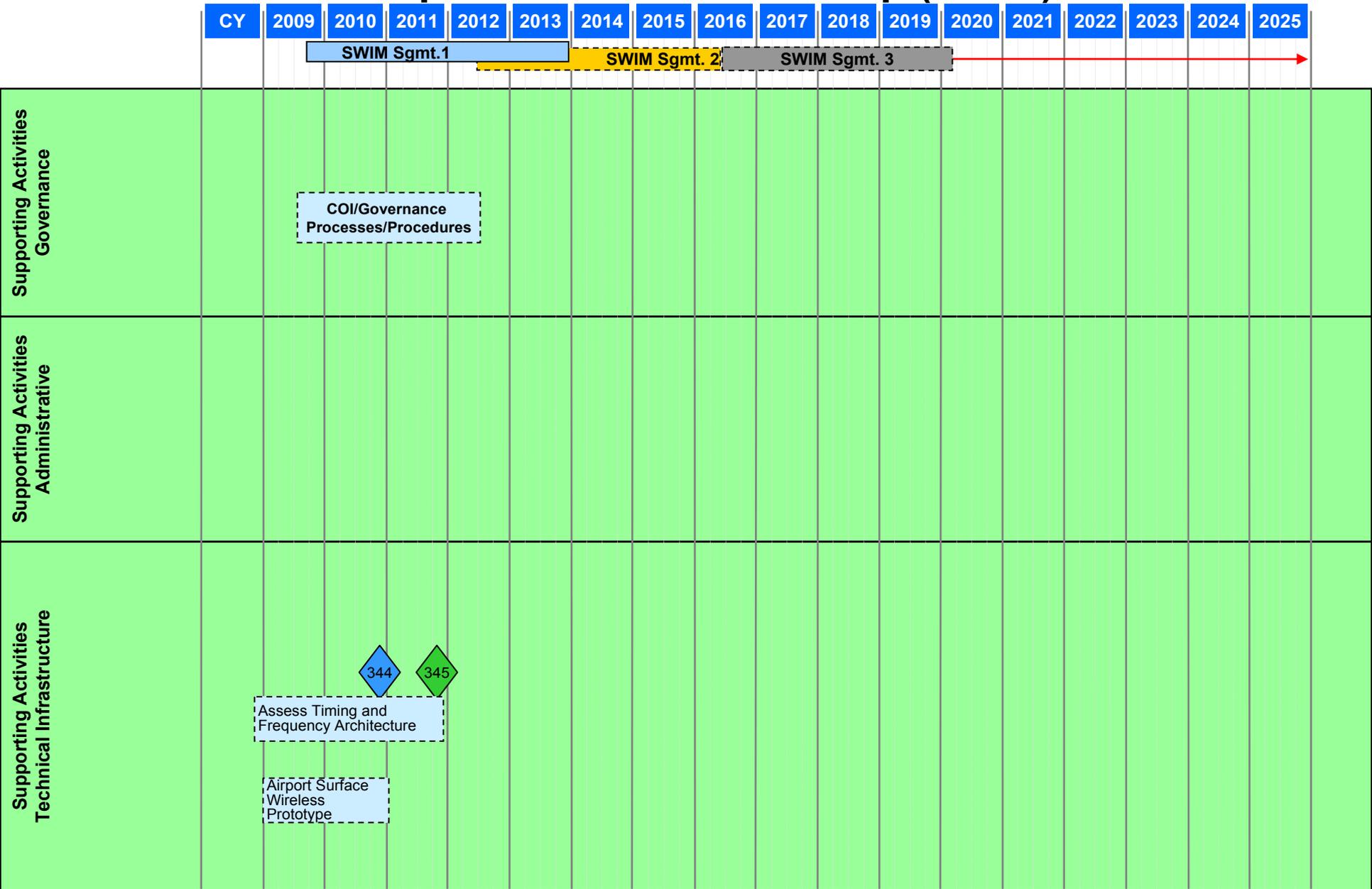


# Enterprise Services Roadmap (4 of 7)

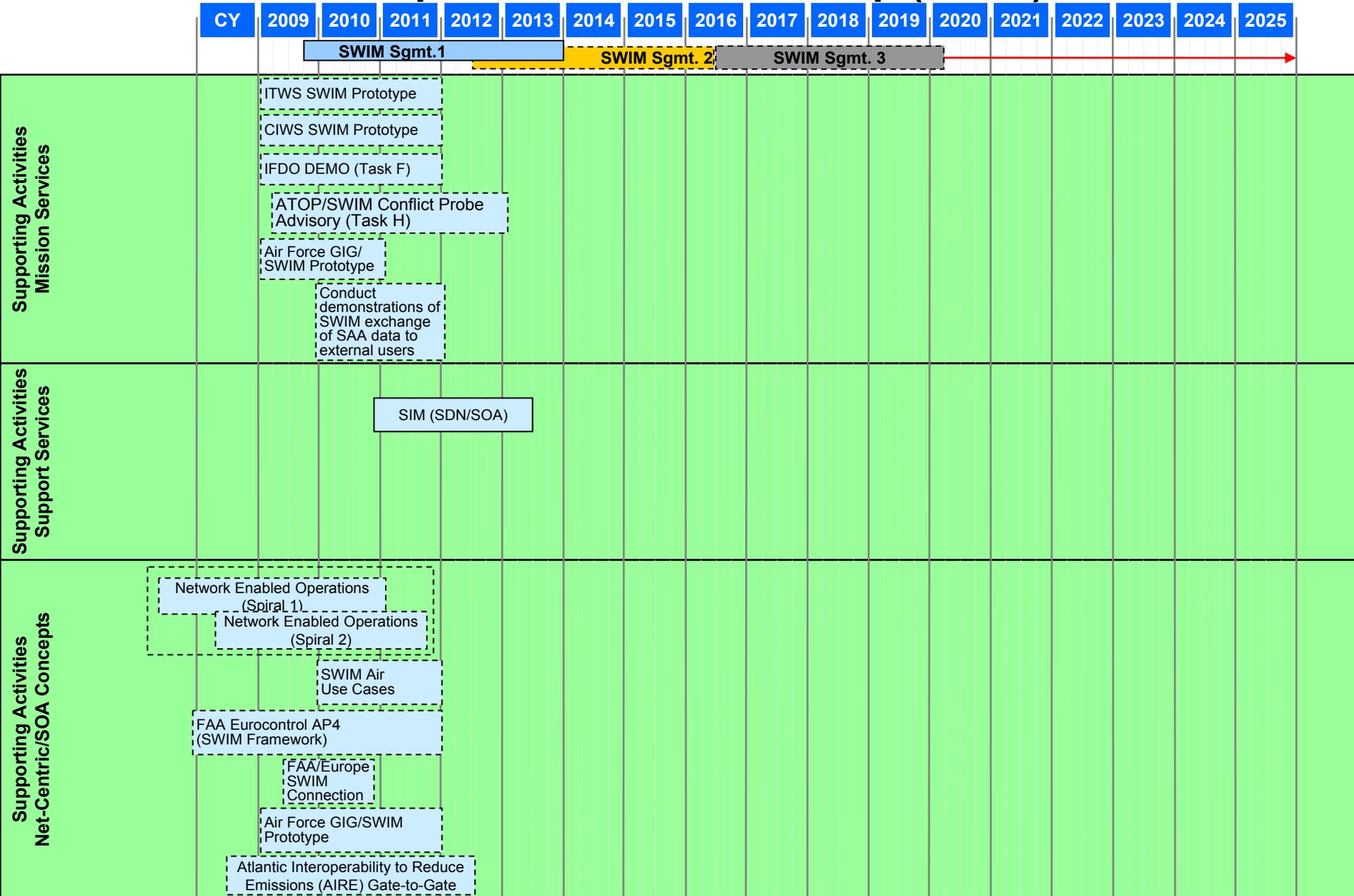


Enterprise Mission Services

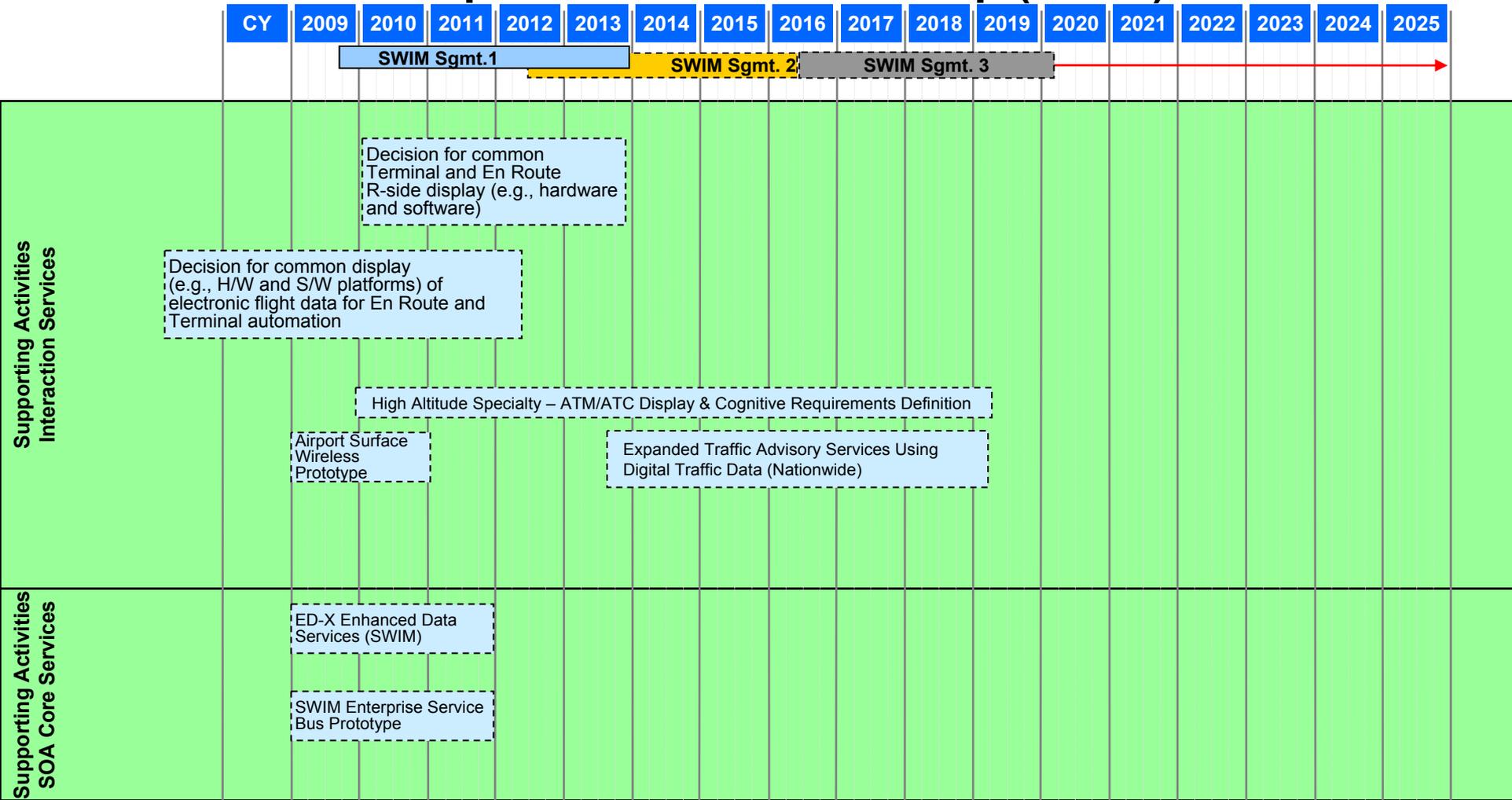
# Enterprise Services Roadmap (5 of 7)



# Enterprise Services Roadmap (6 of 7)



# Enterprise Services Roadmap (7 of 7)



# Enterprise Services Roadmap: Assumptions

Identifier	Description
ES-01	FAA Net Centric Programs will exchange information based on Service Oriented Architecture principles, comply with SWIM policies and standards and use SWIM core infrastructure to the extent practicable
ES-02	SWIM will provide policies, standards, and core infrastructure to support data management, based on existing systems and networks to the extent practicable, and using proven technologies to reduce cost and risk

# Enterprise Services Roadmap: Decision Points (1 of 3)

DP #	Target Date	High Priority	Domain	Name
2	2010 Q1	Y	Automation	AIM Modernization Segment 1 Final Investment Decision
31	2010 Q3	Y	Automation	Final Investment Decision for Post ERAM R3 Work Package
33	2010 Q3	Y	Automation	Investment Analysis Readiness Decision for Security Integrated Tool Suite (SITS)
38	2011	N	Weather	Executive Level Decision to transition WMSCR Comms functionality to web access via NNEW WP2 & ALDARS Comms functionality to NNEW WP2
45	2009 Q4	Y	Automation	Terminal Automation Modernization and Replacement (TAMR) Phase 3 Initial Investment Decision (Complete)
46	2012 Q3	Y	Automation	Tower Flight Data Manager 1 (TFDM1) Final Investment Decision
57	2013	Y	Automation	TBFM/IES Final Investment Decision
74	2013	Y	Communication	Approve FTI Re-Compete Decision
77	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
78	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen beacon/backup radar system for ATC
79	2010 Q1	Y	Weather	Investment Analysis Readiness Decision (IARD) for NextGen Wx Processor WP1 and NNEW WP1 to enter IA
86	2011 Q4	Y	Weather	Investment Decision (IID) for NextGen Wx Processor WP1 (includes CIWS functionality, NG WARP functionality & NNEW WP1 functionality (includes WARP WINS & FBWTG))
89	2012 Q4	Y	Weather	Final Investment Decision for NextGen Wx Processor WP1
104	2017	N	Surveillance	Final Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
105	2017	N	Surveillance	Final Investment Decision to implement a NextGen beacon/backup radar system for ATC
107	2010 Q4	Y	Automation	TAMR Phase 3 Final Investment Decision
121	2011	Y	Automation	AIM Modernization Segment 2 Final Investment Decision
125	2010 Q1	N	Automation	Alaska Flight Service Modernization (AFSM) Segment 1 Final Investment Decision
128	2009 Q2	N		Final Investment Decision for SWIM Segment 1B (Baseline for FY 11 - 13) (Complete)
130	2009 Q3	N		Selection of SWIM segment 2 candidates (Complete)
158	2011 Q3	Y	Communication	Data Communications Segment 1 FID (part 1 of a split FID)
177	2011 Q3	Y	Automation	Initial Investment Decision for SITS Air Domain Security Architectures
195	2010 Q1	Y	Automation	Time Based Flow Management (TBFM) Final Investment Decision
206	2012 Q3	Y	Automation	Final Investment Decision for SITS Air Domain Security Architecture
208	2012 Q3	Y	Automation	Meteorological and Aeronautical Planning System (MAPS) Final Investment Decision

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# Enterprise Services Roadmap: Decision Points (2 of 3)

DP #	Target Date	High Priority	Domain	Name
277	2010 Q3	N		Final Investment Decision for SWIM Segment 2 (Baseline FY12-16)
293	2009 Q2	Y	Information Systems Security	Policy Decision between ATO-E, ATO-W, and ATO-P to allocate the initial focus of Enterprise Information System Security (ISS) (Complete)
294	2011 Q1	Y	Information Systems Security	IARD for Mid Term Work Package
295	2013 Q1	Y	Information Systems Security	FID for ID&R, EBP, IPE, and CSM capabilities of Mid Term Work Package
296	2012 Q1	N	Information Systems Security	IID for RE&D for I&KM
297	2012 Q1	N	Information Systems Security	IID for EBP, ID&R, IPE, and CSM for the Mid Term Work Package
300	2014 Q2	N	Information Systems Security	FID for I&KM Mid Term Work Package
301	2023 Q2	N	Information Systems Security	BCD Far Term Work Package
304	2015	Y	Communication	Data Communications Segment 2 FID
344	2010 Q4	N		Establish Requirements for a Backup Timing Source
345	2011	N		Implementation strategy decision for GPS timing backup
346	2015	Y	Automation	Final Investment Decision for CATMT Work Package 4
350	2010 Q1	Y	Communication	FID for NEXCOM Segment 2 Modernization Phase 1
353	2012 Q1	Y	Communication	Data Communications Segment 1 FID (part 2 of a split FID)
354	2012	N	Automation	CATMT Work Package 4 Concept and Requirements Definition
355	2013	N	Automation	CATMT Work Package 4 Investment Analysis Readiness Decision
356	2014	N	Automation	CATMT Work Package 4 Initial Investment Decision
368	2011 Q4	N	Automation	Meteorological and Aeronautical Planning System (MAPS) Initial Investment Decision
373	2010 Q4	Y	Automation	RMMS CONOPS for NextGen Integration Strategy Decision
376	2013 Q1	N	Automation	Interface RMLS with SWIM Segment 2 Executive Level Decision
405	2010 Q3	N	Surveillance	Investment Analysis Readiness Decision for SIM in terminal and en route legacy radar systems
406	2011 Q2	N	Surveillance	Initial Investment Decision for SIM in terminal and en route legacy radar systems
407	2013 Q4	N	Surveillance	Investment Analysis Readiness Decision for NextGen Surveillance and Weather Radar Capability
417	2011	N	Safety	Develop and Implement an ASIAs Enterprise Architecture Interface between ATSAP and ASIAs
440	2012 Q4	N	Automation	Flight Data Interface Modernization Final Investment Decision

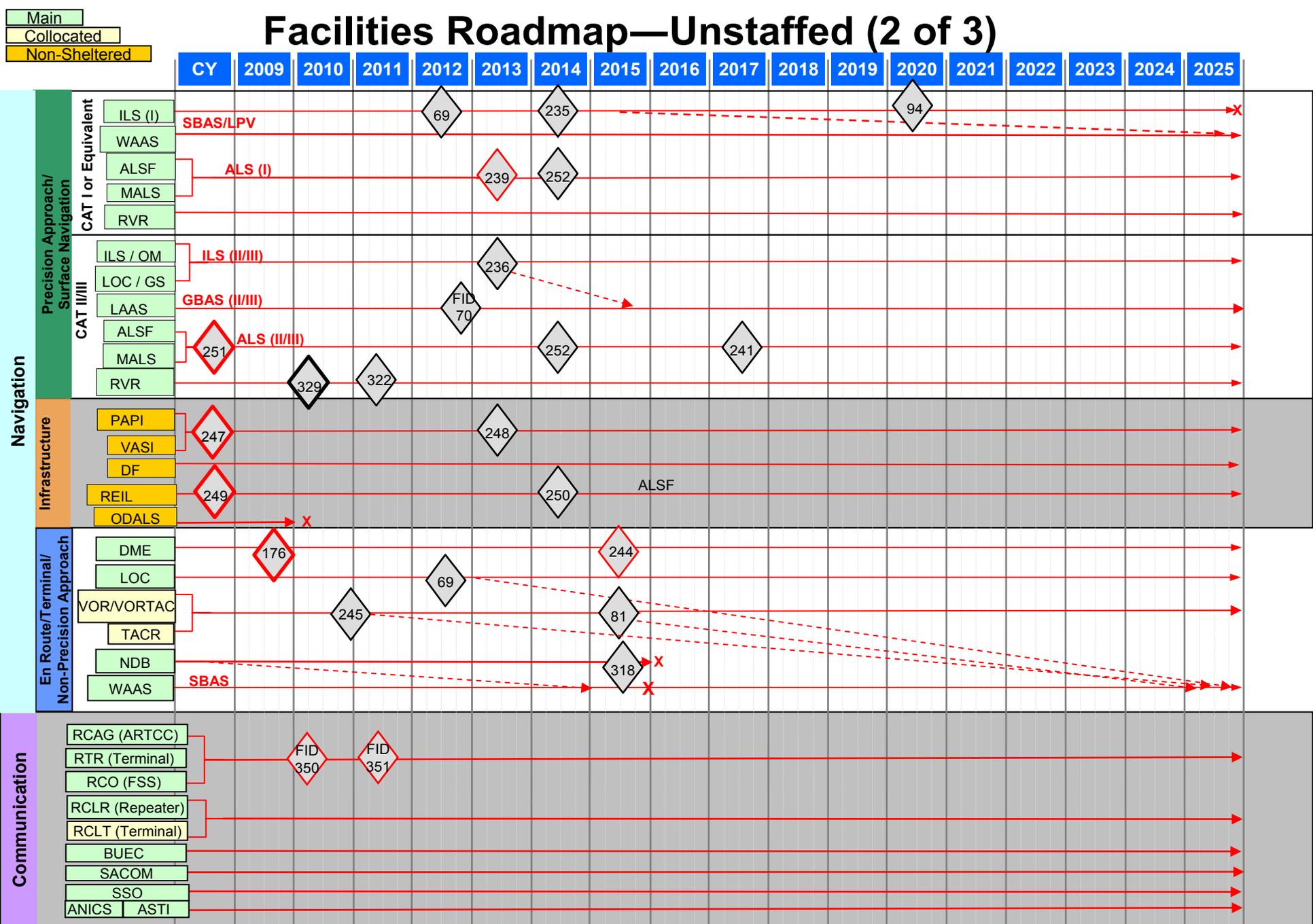
# Enterprise Services Roadmap: Decision Points (3 of 3)

DP #	Target Date	High Priority	Domain	Name
499	2011 Q3	N	Communication	FID for NEXCOM Segment 2 Modernization Phase 2
522	2015 Q1	N	Information Systems Security	Transition Plan for NAS Programs to use Identity and Key Management Enterprise capability completed
585	2011 Q3	N	Information Systems Security	Transition plan for NAS Programs to use the Intrusion Detection & Response capability completed
586	2015 Q3	Y	Information Systems Security	Transition plan for NAS Programs to use the Certified Software Management capability completed
588	2013 Q2	Y	Information Systems Security	Transition plan for NAS Programs to use the Internal Policy Enforcement capability completed
589	2011 Q2	Y	Information Systems Security	Transition plan for NAS Programs to use the External Boundary Protection capability completed
601	2010 Q2	N	Information Systems Security	Concept and Requirements Definition Readiness (CRDR) for Information Systems Security Mid Term Work Package

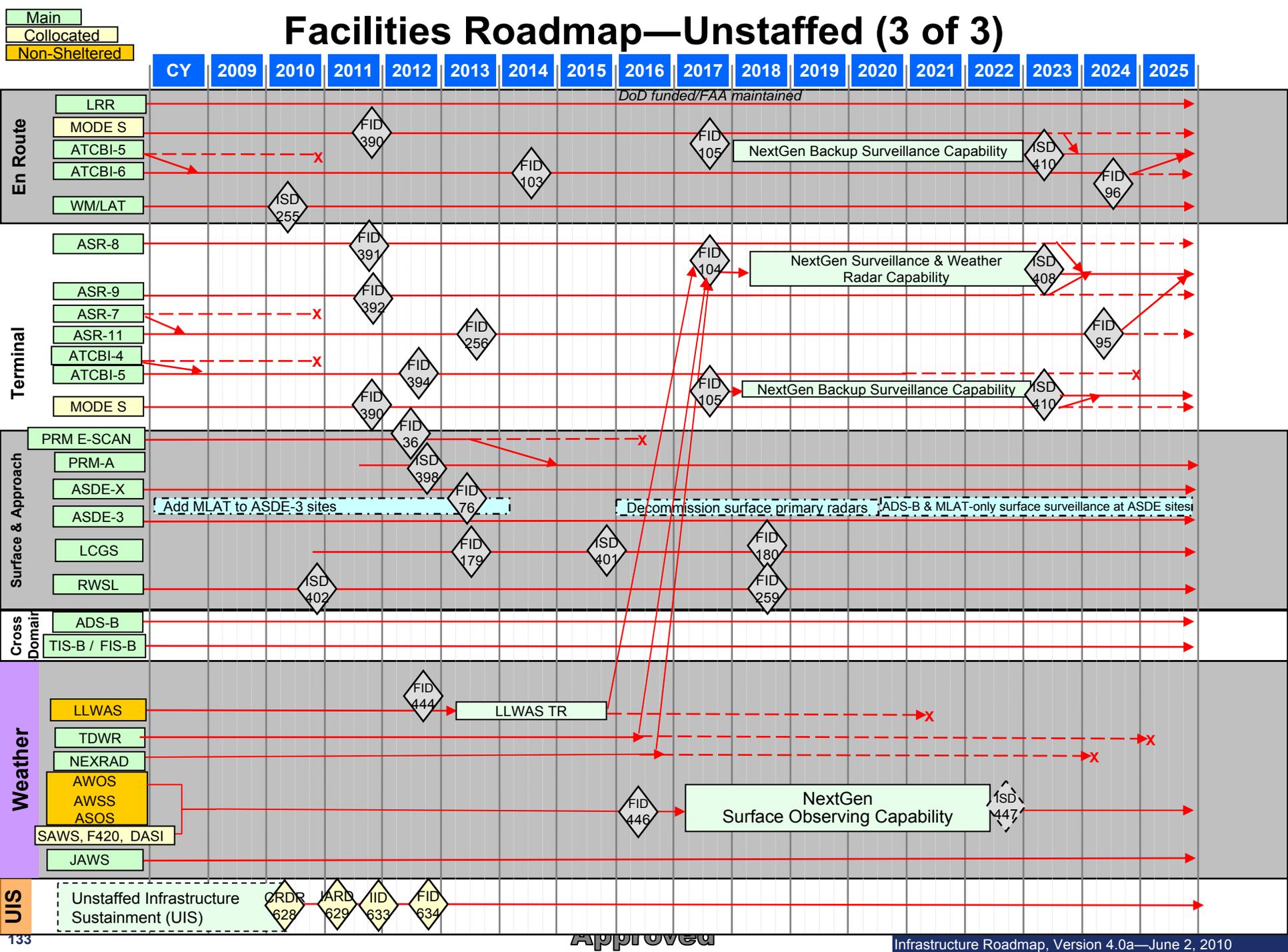
# Facilities



# Facilities Roadmap—Unstaffed (2 of 3)



# Facilities Roadmap—Unstaffed (3 of 3)



# Facilities Roadmap: Assumptions

Identifier	Description
FAC-01	Business Continuity will be integrated into the design of the NextGen Facilities
FAC-02	Facilities will be built to mandated security and safety guidelines
FAC-03	The airspace will be restructured to accommodate transitional and NextGen airspace concepts (e.g. Big Airspace, flexible airspace, classic en route airspace, mixed equipage airspace, special use airspace, super-density flexible airspace, etc.)
FAC-04	NextGen Facilities will use a new geo-independent model, where service delivery is best aligned to manage costs and increase efficiencies
FAC-05	Accommodate up to three (3) times the amount of air traffic with no resulting net increase in the number of controllers
FAC-06	ATC tasks will evolve consistent with changes in the management of airspace
FAC-07	NextGen Facilities will accommodate NextGen automation and enterprise services enhancements
FAC-08	Site locations will be determined according to a number of factors that consider safety, security, and human resources
FAC-09	Facilities Unstaffed (UIS) Roadmap depicts only significant AMS (FID and ISD) and policy/strategy decisions from other Infrastructure Roadmaps that affect UIS Facilities

# Facilities Roadmap: Decision Points—Staffed Facilities (1 of 4)

DP #	Target Date	High Priority	Domain	Name
47	2012	Y	Communication	Final Investment Decision (FID) for NAS Voice Switch
55	2009 Q2	N	Automation	Assess common front end display components for Radar Display (i.e., R-side) monitor (Complete)
67	2010 Q4	N	Automation	Approval of offshore implementation long term plan
109	2010 Q3	N	Automation	Architectural Decision to Pursue a Common Information Display System (IDS)
110	2018	Y	Automation	Approve final investment for transition to NextGen automation platforms and display subsystem through convergence
126	2013 Q4	N		Initial Investment Decision (IID) Flight Services Facilities
127	2015 Q4	N		Final Investment Decision (FID) Flight Services Facilities
179	2013	N	Surveillance	Final Investment Decision (FID) for LCGS
198	2014	N	Automation	Tower Flight Data Manager 2 (TFDM2) Final Investment Decision
208	2012 Q3	Y	Automation	Meteorological and Aeronautical Planning System (MAPS) Final Investment Decision
262	2012	N	Airspace & Procedures	Decision to implement Big Airspace at candidate areas
267	2017	N	Airspace & Procedures	Decision to proceed with High Altitude Generic Airspace Concept Phase 1
272	2010 Q3	N	Airspace & Procedures	Recommend 1 or 2 test field locations and define automation requirements
303	2010 Q2	N		Future Facility Strategy Decision
385	2013	N	Automation	Initial Investment Decision of Common Information Display Systems (IDS) capability in En Route and Terminal
440	2012 Q4	N	Automation	Flight Data Interface Modernization Final Investment Decision
594	2011 Q3	N		Strategy Decision for Flight Services Facilities
595	2012 Q3	N		IARD for Continuation of Flight Services
606	2010 Q2	N		Concept and Requirements Definition Decision (CRDR) for the Airborne Labs: Regional Commuter Capabilities (Convair 580 Replacement)
607	2011 Q1	N		Investment Analysis Readiness Decision (IARD) for Airborne Labs: Regional Commuter Capabilities (Convair 580 Replacement)
608	2011 Q3	N		Initial Investment Decision (IID) for Airborne Labs: Regional Commuter Capabilities (Convair 580 Replacement)
609	2012 Q2	N		Final Investment Decision (FID) for the Airborne Labs: Regional Commuter Capabilities (Convair 580 Replacement)

# Facilities Roadmap: Decision Points—Staffed Facilities (2 of 4)

DP #	Target Date	High Priority	Domain	Name
610	2012 Q1	N		Concept and Requirements Definition Decision (CRDR) for Airborne Labs: General Aviation Capabilities (Aero Commander 680E Replacement)
611	2012	N		Investment Analysis Readiness Decision (IARD) for Airborne Labs: General Aviation Capabilities (Aero Commander 680E Replacement)
612	2012	N		Initial Investment Decision (IID) for Airborne Labs: General Aviation Capabilities (Aero Commander 680E Replacement)
613	2013	N		Final Investment Decision (FID) for Airborne Labs: General Aviation Capabilities (Aero Commander 680E Replacement)
614	2014	N		Concept and Requirements Definition Decision (CRDR) for Airborne Labs: Rotorcraft Capabilities (Sikorski S76 Replacement)
615	2014	N		Investment Analysis Readiness Decision (IARD) for Airborne Labs: Rotorcraft Capabilities (Sikorski S76 Replacement)
616	2015	N		Initial Investment Decision (IID) for Airborne Labs: Rotorcraft Capabilities (Sikorski S76 Replacement)
617	2015	N		Final Investment Decision (FID) for Airborne Labs: Rotorcraft Capabilities (Sikorski S76 Replacement)
618	2016	N		Strategy Decision - Airborne Labs: Very Light Jet
619	2019	N		Concept and Requirements Definition Decision (CRDR) for Airborne Labs: Air Taxi Capability (King Air Replacement)
620	2019	N		Investment Analysis Readiness Decision (IARD) for Airborne Labs: Air Taxi Capability (King Air Replacement)
621	2020	N		Initial Investment Decision (IID) for Airborne Labs: Air Taxi Capability (King Air Replacement)
622	2020	N		Final Investment Decision (FID) for Airborne Labs: Air Taxi Capability (King Air Replacement)
623	2010 Q3	N		Concept and Requirements Definition Decision (CRDR) Building Information Management (BIM)
624	2011 Q3	N		Investment Analysis Readiness Decision (IARD) for Building Information Management (BIM)
625	2012 Q4	N		Initial Investment Decision (II) for Building Information Management (BIM)
626	2013 Q4	N		Final Investment Decision (FID) for Building Information Management (BIM)
627	2010 Q3	N		Final Investment Decision (FID) for Facility Security Risk Management (FSRM) Phase II

# Facilities Roadmap: Decision Points—Unstaffed (3 of 4)

DP #	Target Date	High Priority	Domain	Name
36	2012	N	Surveillance	Final Investment Decision (FID) for migration of PRM to PRM-A (based on multilateration)
69	2012	N	Navigation	Approved Cat I Instrument Approach policy Allows Cat I Drawdown
70	2012 Q4	N	Navigation	Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
76	2013	N	Surveillance	Final Investment Decision (FID) for removal or SLEP/replace ASDE surface primary radars (evolving requirements for safety and security may impact decision)
81	2015	N	Navigation	VOR decision on far-term drawdown
94	2020	N	Navigation	Decision on complete ILS CAT I drawdown
95	2024 Q2	N	Surveillance	Decision for replacement of terminal primary radars (ASR-11 PSR) and removal of terminal beacons (ASR-11 MSSR)
96	2024	N	Surveillance	Decision for replacement of en route beacons (ATCBI-6)
103	2014	N	Surveillance	Final Investment Decision (FID) for technology refresh of beacons (ATCBI-6)
104	2017	N	Surveillance	Final Investment Decision (FID) to implement a NextGen Surveillance and Weather Radar Capability for ATC
105	2017	N	Surveillance	Final Investment Decision (FID) to implement a NextGen beacon/backup radar system for ATC
176	2009 Q3	Y	Navigation	DME NextGen Strategy Plan—Decision to procure next generation of DMEs to replace aging systems and expand the network where needed to support RNAV & NextGen (Complete)
179	2013	N	Surveillance	Final Investment Decision (FID) for LCGS
180	2018	N	Surveillance	Final Investment Decision (FID) for ADS-B to assume LCGS function, or approve a Technology Refresh for LCGS
235	2014	N	Navigation	Decision on active drawdown of Cat I ILSs operating in the NAS
236	2013	Y	Navigation	Decision to buy systems for Cat II/III ILSs where necessary
239	2013	Y	Navigation	ALS I LED Lamps are available
241	2017	N	Navigation	Energy efficient ALSF-2 production systems available
244	2015	Y	Navigation	Next generation of DMEs available to support RNAV throughout the NAS
245	2010 Q4	N	Navigation	Decision on near-term minimum operational VOR ground network
247	2008 Q4	Y	Navigation	Decision to develop and implement replacements for PAPI lamps with LEDs (Complete)
248	2013	N	Navigation	Next generation of LED PAPI systems available
249	2008 Q4	Y	Navigation	Decision to develop and implement replacements for REIL lamps with LEDs (Complete)
250	2014	N	Navigation	Next generation of LED REIL systems available
251	2008 Q4	Y	Navigation	Decision to deploy semiflush fixtures for existing sites and new establishments (Complete)

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# Facilities Roadmap: Decision Points—Unstaffed (4 of 4)

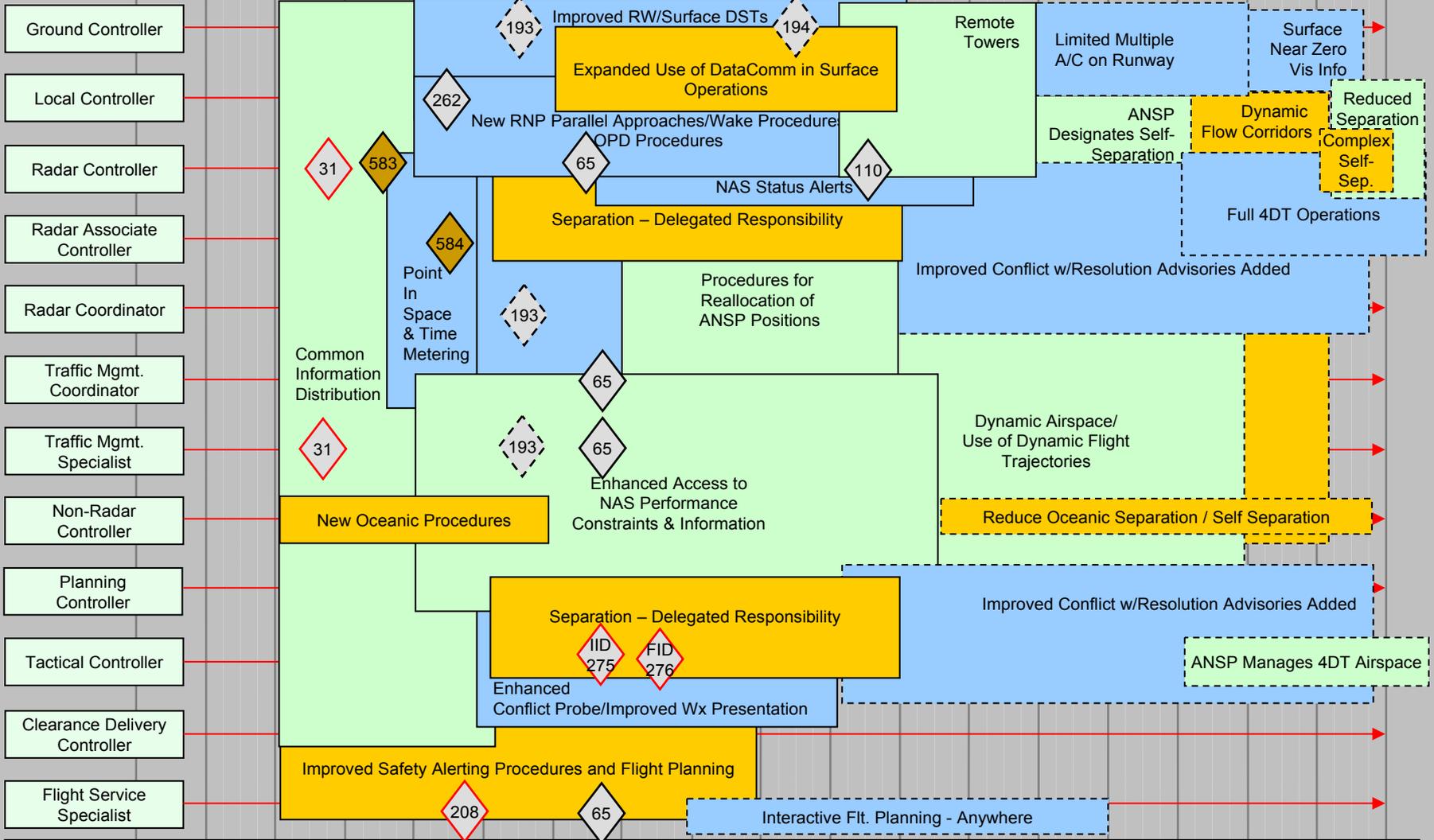
DP #	Target Date	High Priority	Domain	Name
252	2014	N	Navigation	Semiflush flasher fixtures production system available
255	2010 Q2	N	Surveillance	In-Service Decision for WM/LAT (Alaska and Colorado)
256	2013	N	Surveillance	Final Investment Decision (FID) for ASR-11 Technology Refresh Segment 2 (through 2025)
257	2008 Q4	N	Surveillance	JRC FID (JRC 2B) Decision for acquisition of RWSL systems (Complete)
259	2018	N	Surveillance	Final Investment Decision (FID) for RWSL Technology Refresh
318	2015	N	Navigation	All federal NDBs decommissioned from the NAS
322	2011	N	Navigation	Enhanced low visibility operations supported by navigation infrastructure
329	2010 Q1	N	Navigation	RVR Sustainment: ISD for PC-RVR for use within the NAS (Complete)
350	2010 Q1	Y	Communication	Final Investment Decision (FID) for NEXCOM Segment 2 Modernization Phase 1
351	2011 Q2	N	Communication	Approve RCE Replacement
390	2011 Q4	N	Surveillance	Final Investment Decision (FID) for legacy beacon (Mode S) SLEP through 2025
391	2011 Q4	N	Surveillance	Final Investment Decision (FID) for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
392	2011 Q4	N	Surveillance	Final Investment Decision (FID) for legacy radar (ASR-9) SLEP through 2025
394	2012	N	Surveillance	Final Investment Decision (FID) for Technology Refresh of ATCBI-5 beacon system
398	2012 Q4	N	Surveillance	In-Service Decision for PRM-A (based on multi-lateration)
401	2015	N	Surveillance	In-Service Decision for Low Cost Ground Surveillance system
402	2010 Q4	N	Surveillance	In-Service Decision for Runway Status Light system
408	2023	N	Surveillance	In-Service Decision for NextGen Surveillance and Weather Radar Capability
410	2023	N	Surveillance	In-Service Decision for New Beacon/Backup System
444	2012	Y	Weather	Final Investment Decision (FID) to Tech Refresh/SLEP all low-level wind shear detection systems as part of wind shear detection service
446	2016	Y	Weather	Final Investment Decision (FID) to consolidate and replace automated surface observing capability
447	2022	Y	Weather	ISD to replace all automated surface observing systems with NextGen Surface Observing capability
628	2010 Q3	N		Concept and Requirements Definition Readiness Decision (CRDR) for Unstaffed Infrastructure Sustainment (UIS)
629	2011 Q1	N		Investment Analysis Readiness Decision (IARD) for Unstaffed Infrastructure Sustainment (UIS)
633	2011 Q4	N		Initial Investment Decision (IID) for Unstaffed Infrastructure Sustainment (UIS)
634	2012 Q3	N		Final Investment Decision (FID) for Unstaffed Infrastructure Sustainment (UIS)

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# Human Systems Integration

# Human Systems Integration Roadmap (1 of 5)

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

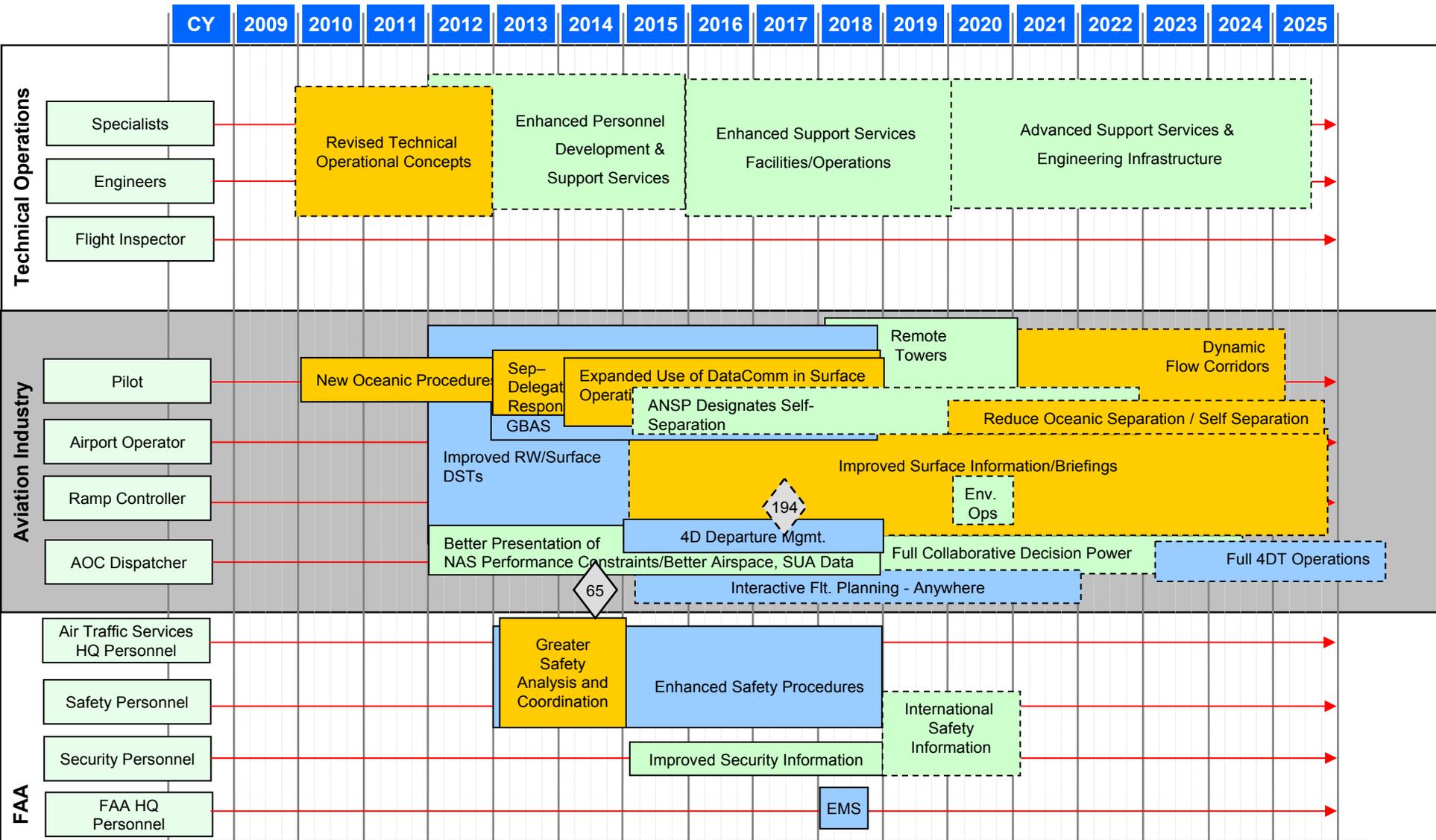


**Notes:**

- (1) The shaded boxes above are intended to reflect changes to the NAS workforce and work environment.
- (2) The shaded boxes above are intended to represent an earliest potential "implementation" of a capability.
- (3) Far Term representations on the HSI Roadmap (2018 – 2025) depicted in dotted-line boxes are included for planning purposes.
- (4) The actors represented in this roadmap are selected from NAS EA "mechanisms".

Work Environment Change in Automation
  Mixed Workforce/Work Environment Change
  Workforce Change in Role/Responsibility

# Human Systems Integration Roadmap (2 of 5)

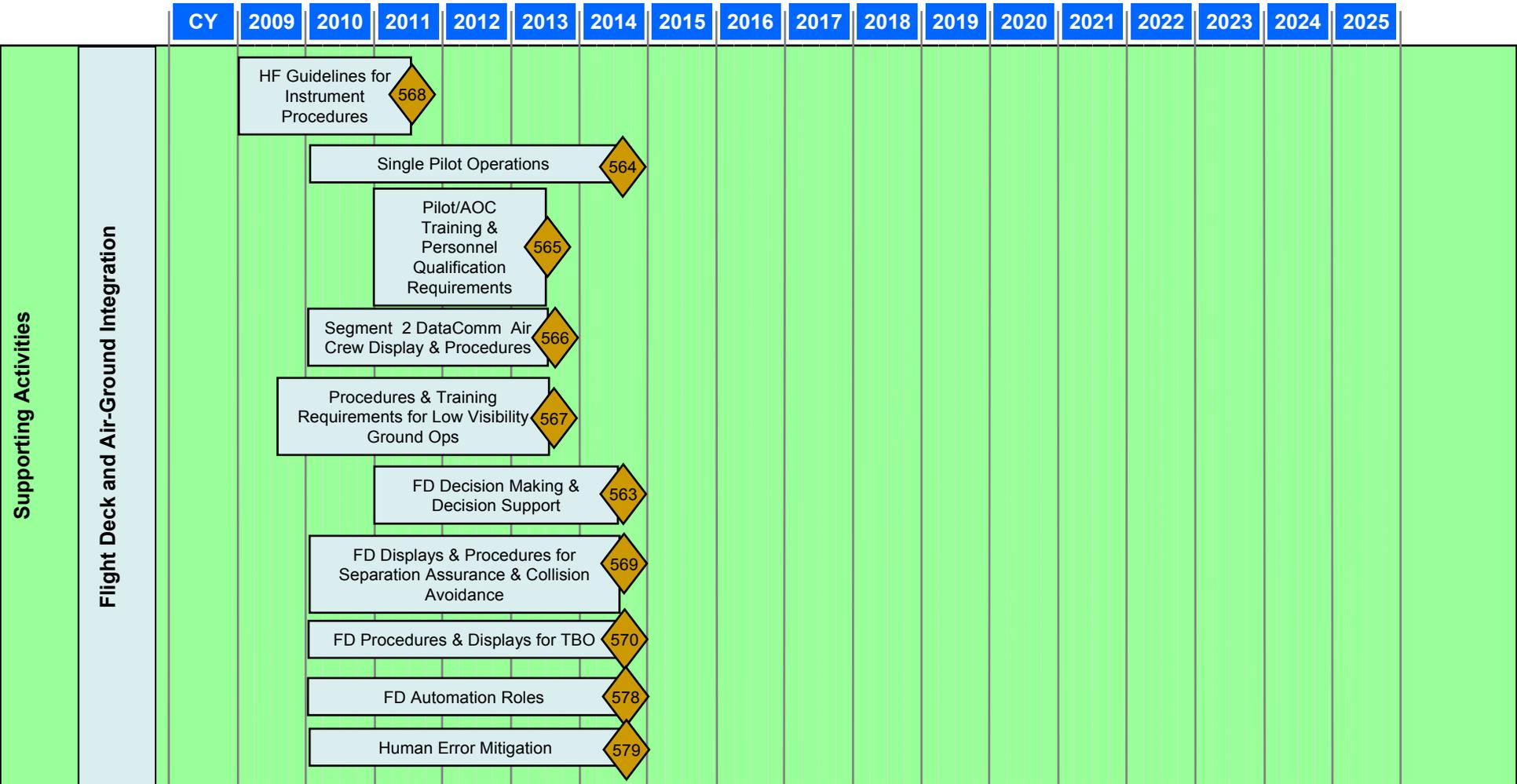


**Notes:**

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- (2) The shaded boxes above are intended to represent an earliest potential "implementation" of a capability.
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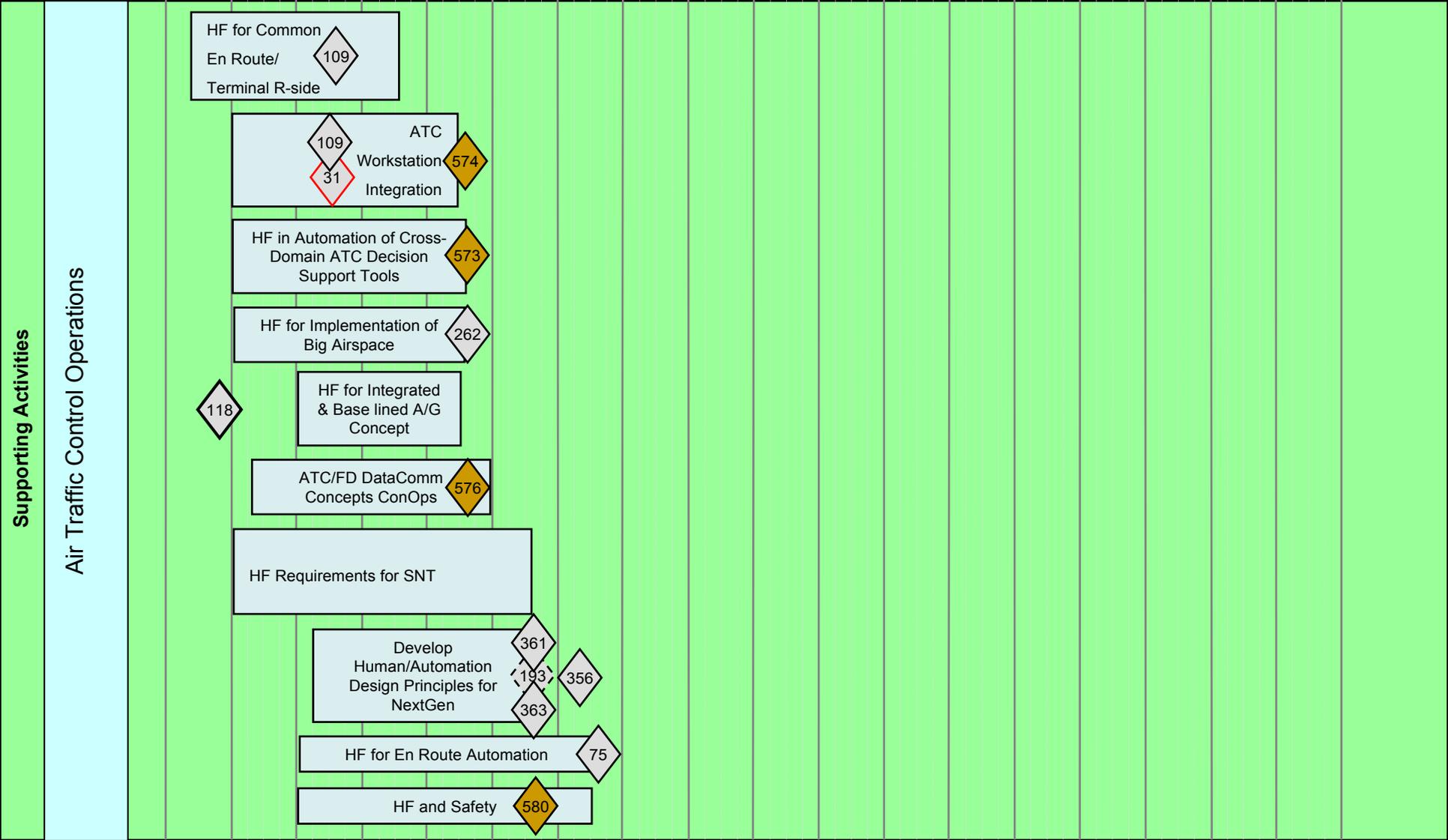
Work Environment Change in Automation
  Mixed Workforce/Work Environment Change
  Workforce Change in Role/Responsibility

# Human Systems Integration Roadmap (3 of 5)

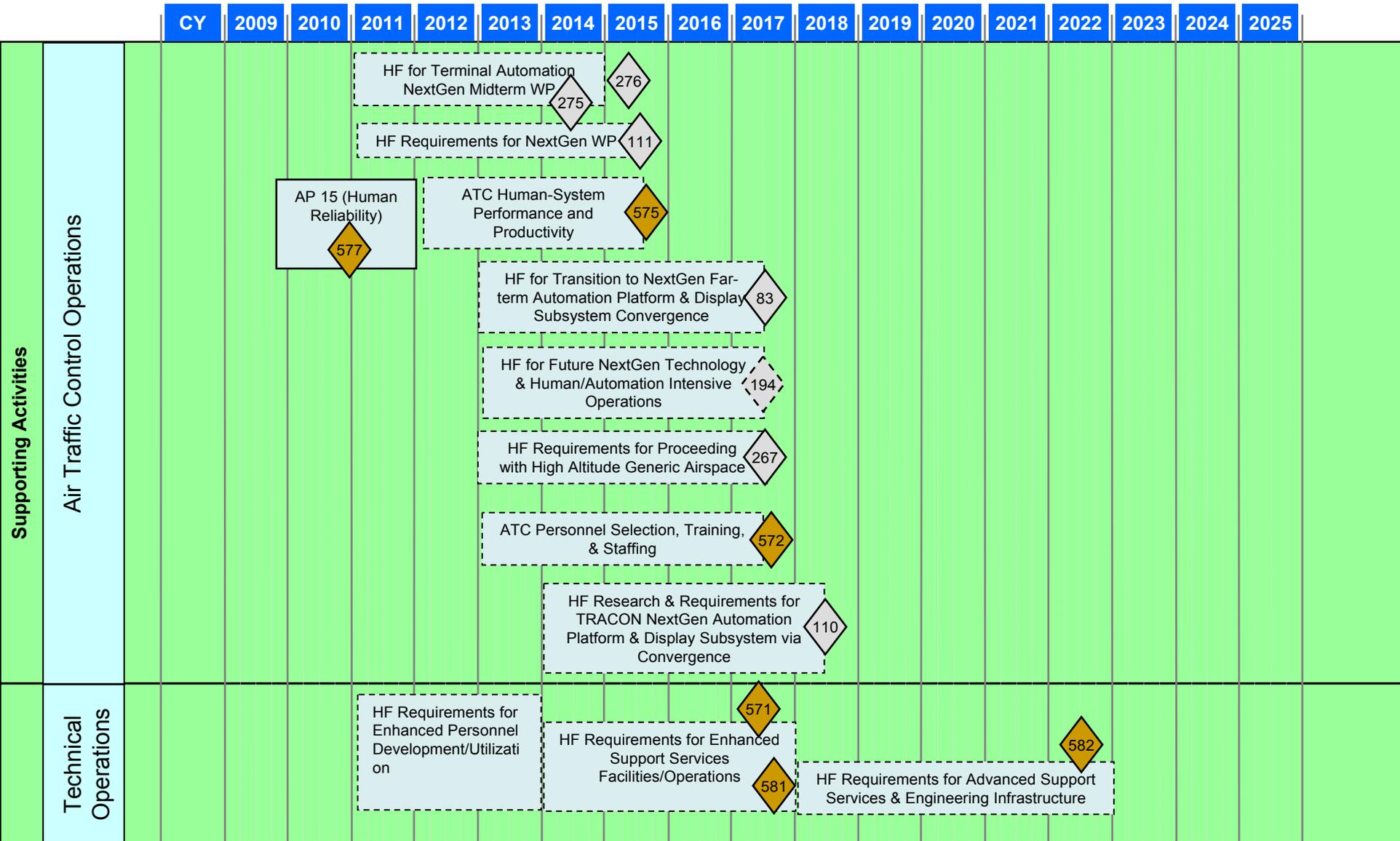


# Human Systems Integration Roadmap (4 of 5)

CY	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
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# Human Systems Integration Roadmap (5 of 5)



# Human Systems Integration Roadmap: Assumptions

Identifier	Description
HSI-01	The HSI Roadmap relates to the NextGen changes in roles and responsibilities (and therefore procedures), but also includes human-system performance and productivity, safety (human reliability), information requirements and information display, personnel selection, training, and staffing impacts.
HSI-02	Human Factors analysis, design, development, and testing are to be accomplished within program/project detailed system engineering activities and not necessarily represented in the HSI Roadmap.
HSI-03	NAS infrastructure and capabilities are not constrained by limitations in personnel staffing, selection, and training unless otherwise identified.
HSI-04	Additional HSI impacts and dependencies are to be fully analyzed as needed in terms of: <ul style="list-style-type: none"> <li>a) Convergent or divergent roles (e.g., new actors, obsolete roles)</li> <li>b) Implied role changes not apparent in the OI description</li> <li>c) Non-OI dependent changes to roles/functions</li> <li>d) More comprehensive Far-term OI impacts on the human actors in the workforce and work environments</li> </ul>
HSI-05	“Gaps” in concept of ops/concept of use (such as off-nominal scenarios) will be filled to identify and resolve other changes in roles and responsibilities.
HSI-06	NextGen HSI Roadmap products represent information requirements, guidelines, standards, design requirements, specifications, methods, and tools for incorporating human factors in NextGen NAS Enterprise Architecture. (Other core human factors program requirements are not fully represented.)
HSI-07	Notional “Operational Improvements” devised for the purposes of constructing the Tech Ops HSI Roadmap will be validated.

# Human Systems Integration Roadmap: Decision Points (1 of 2)

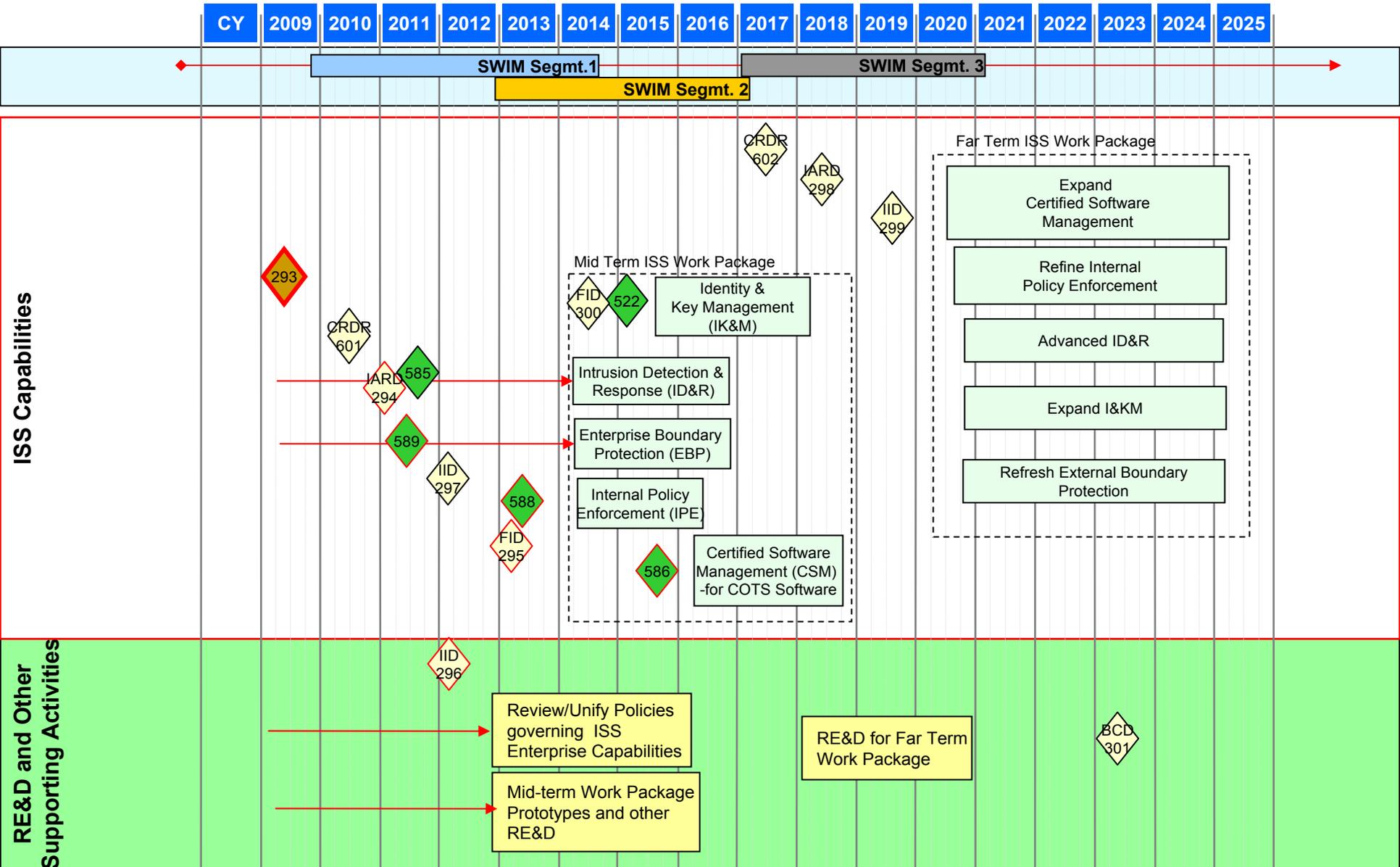
DP #	Target Date	High Priority	Domain	Name
31	2010 Q3	Y	Automation	FID for Post ERAM R3 Work Package
65	2014	N	Automation	Common Information Display Systems (IDS) capability in En Route and Terminal Final Investment Decision
75	2014	Y	Automation	En Route Automation NextGen Mid-Term Work Package Initial Investment Decision
83	2017	Y	Automation	Transition to NextGen Far Term automation platforms and display subsystem through convergence Initial Investment Decision
109	2010 Q3		Automation	Architectural Decision to Pursue a Common Information Display System (IDS)
110	2018	Y	Automation	Approve final investment for transition to NextGen automation platforms and display subsystem through convergence
111	2015	Y	Automation	En Route Automation NextGen Mid-Term Work Package Final Investment Decision
118	2008 Q4	N	Automation	Define and Approve En route pre-implementation acquisition strategy (Completed)
193	2013	N	Air-Ground	Planning Decision: Develop Human/Automation design principles to support NextGen infrastructure
194	2017	N	Air-Ground	Planning Decision: Incorporate results into future Requirement for NextGen Technology and Human/Automation intensive operations
208	2012 Q3	Y	Automation	Meteorological and Aeronautical Planning System (MAPS) Final Investment Decision
262	2012	N	Airspace & Procedures	Decision to implement Big Airspace at candidate areas
267	2017	N	Airspace & Procedures	Decision to proceed with High Altitude Generic Airspace Concept Phase 1
275	2014	Y	Automation	Terminal Automation NextGen Mid-Term Work Package Initial Investment Decision
276	2015	Y	Automation	Terminal Automation NextGen Mid-Term Work Package Final Investment Decision
356	2014	N	Automation	CATMT Work Package 4 Initial Investment Decision
361	2013	N	Automation	En Route Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
363	2013	N	Automation	Terminal Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
563	2014	N		Define Collaborative Integrated Flight Deck Decision Support Requirements
564	2014	N		Identify Unique Requirements for Single Pilot Operations
565	2013	N		Define New and Recurrent Pilot/AOC Training and Certification Requirements
566	2013	N		Establish Air Crew Segment 2 DataComm Requirements for Displays & Procedures
567	2013	N		Define Procedures and Training Requirements for Low Visibility Ground Operations
568	2011	N		Define Human Factors Guidelines for NextGen Instrument Procedures

# Human Systems Integration Roadmap: Decision Points (2 of 2)

DP #	Target Date	High Priority	Domain	Name
570	2014	N		Determine Flight Deck Display and Procedures for Trajectory Based Operations
571	2017	N		Provide HF Requirements for Tech Ops Workforce and Workstation
572	2017	N		Provide Requirements and Standards for Personnel Selection, Training, and Staffing
573	2012	N		Provide HSI Requirements for Cross-Domain ATC Decision Support Tools
574	2012	N		Provide HSI Requirements for Workstation Integration
575	2015	N		Provide HSI Requirements to Support ATC Efficiency and Effectiveness Objectives
576	2012	N		Provide ATC/FD DataComm Concept of Operations
577	2010 Q4	N		Prototype application of internationally harmonized human reliability assessment tool requirements
578	2014	N		Determine guidelines for FD functional allocation and automation roles
579	2014	N		Provide requirements for FD & A/G human error mitigation
580	2013	N		Determine human reliability requirements for safety risk management
581	2017	N		Provide HF Tech Ops requirements for enhanced Support Services Facilities/Operations
582	2022	N		Provide HF Tech Ops requirements for advanced support services & engineering infrastructure
583	2011	N		Initial HF Requirements for Common Workstation
584	2012	N		NextGen strategic job selection requirements

# Information System Security

# Information System Security Roadmap



# Information System Security Roadmap: Assumptions (1 of 2)

Identifier	Description
	<b>General Assumptions</b>
ISS-01	The responsibility for providing information security to the NAS will be extended from individual NAS programs/systems to the NAS Enterprise which will offer five enterprise level information security capabilities: (1) Enterprise Boundary Protection, (2) Incident Detection & Response (including incident prevention and audit), (3) Certified Software Management, (4) Internal Policy Enforcement (protection of data flows between NAS systems ), and (5) Identity and Key Management. Individual NAS programs/systems will implement these five capabilities according to their SCAP Plan of Actions and Milestones and in coordination with the capability providers. Other NAS security capabilities, e.g. local system security management, will remain the sole responsibility of individual systems.
ISS-02	The NAS Enterprise Level Information Security will leverage existing programs to provide the five enterprise level ISS capabilities: (1) NAS WAN Infrastructure Provider, e.g. FTI, for the initial network level boundary protection (2) FTI and SWIM Segment 2 for hosting the application gateways for External Boundary Protection and application guards for Internal Policy Enforcement. (3) CSMC and SIG for the enterprise Incident [Prevention] Detection & Response (4) LAACS and SWIM Segment 2 for the Identity and Key Management capability (5) SWIM Segment 2 for the Certified Software Management capability
	<b>Intrusion Detection and Response (ID&amp;R) Capability Assumptions</b>
ISS-03	Enterprise security policy and governance structure will exist for intrusion detection and response such that the NAS is monitored for malware and other ISS events.
ISS-04	Information regarding all security incidents and events is transmitted to the Cyber Security Management Center (CSMC) for analysis.
ISS-05	Coordination of NAS ISS incident detection and response is through the NAS Security Information Group (SIG).
ISS-06	A standard NAS Intrusion Detection System architecture and design will be developed cooperatively between AIS and ATO.
ISS-07	NAS programs, the SIG, and CSMC will cooperatively plan and engineer the NAS intrusion detection system monitoring, analysis, and response capability.

# Information System Security Roadmap: Assumptions (2 of 2)

Identifier	Description
<b>Assumptions for an Enterprise Boundary Protection (EBP) Capability</b>	
ISS-08	Data flows into the NAS from non-NAS entities (external) are potential vectors of information security attack to the NAS and must be protected by the Enterprise Boundary Protection (EBP) capability.
ISS-09	For each external data flow requiring boundary protection, FTI will provide the communications transport between the NAS system and the EBP gateway.
<b>Assumptions for an Internal Policy Enforcement Capability</b>	
IPE-01	The Internal Policy Enforcement (IPE) capability is needed to mitigate information security risk arising from (1) the NAS insider threat, (2) the Enterprise Boundary Protection (EBP) residual risk, and (3) the malicious or accidental introduction of malicious software (malware) into the NAS.
<b>Assumptions for the Identity and Key Management Capability</b>	
ISS-10	Identity and Key Management services for the NAS (users and information technology devices) will be provided over the next 5 years by extensively leveraging functional capabilities available through the LAACS or SWIM programs or both.
ISS-11	The FAA is planning to first implement Identity and key management services for non-NAS systems and users during which time NAS prototype activities will take place for Identity and Key Management encryption-based services.
ISS-12	AIO/AIS and ATO will collaborate on the planning and engineering of the identify and key management services for the NAS.
ISS-13	NAS requirements for Identity and Key Management services include authentication, non-repudiation, and confidentiality.
<b>Assumptions for a Certified Software Management Capability</b>	
ISS-14	Enterprise security policy will require that official NAS software, configuration, and adaptation data is provided by the Certified Software Management capability of the NAS Enterprise Security Architecture.
ISS-15	The Certified Software Management capability of the NAS Enterprise Security Architecture (NESA) will provide a central repository, access control from any part of the NAS, secure retrieval and transfer, and integrity guarantee.
ISS-16	AIO/AIS and ATO will designate a responsible organization to plan, develop, and implement a Certified Software Management capability.

# Information System Security Roadmap: Decision Points

DP #	Target Date	High Priority	Domain	Name
293	2009 Q2	Y		Policy Decision between ATO-E, ATO-W, and ATO-P to allocate the initial focus of Enterprise Information System Security (ISS) (Complete)
294	2011 Q1	Y		IARD for Mid Term Work Package
295	2013 Q1	Y		FID for ID&R, EBP, IPE, and CSM capabilities of Mid Term Work Package
296	2012 Q1	N		IID for RE&D for I&KM
297	2012 Q1	N		IID for EBP, ID&R, IPE, and CSM for the Mid Term Work Package
298	2018 Q2	N		IARD for Far Term Work Package
299	2019 Q3	N		IID for Far Term Work Package
300	2014 Q2	N		FID for I&KM Mid Term Work Package
301	2023 Q2	N		BCD Far Term Work Package
522	2015 Q1	N		Transition plan for NAS Programs to use Identity and Key Management Enterprise capability completed
585	2011 Q3	N		Transition plan for NAS Programs to use the Intrusion Detection & Response capability completed
586	2015 Q3	Y		Transition plan for NAS Programs to use the Certified Software Management capability completed
588	2013 Q2	Y		Transition plan for NAS Programs to use the Internal Policy Enforcement capability completed
589	2011 Q2	Y		Transition plan for NAS Programs to use the External Boundary Protection capability completed
601	2010 Q2	N		Concept and Requirements Definition Readiness (CRDR) for Information Systems Security Mid Term Work Package
602	2017 Q2	N		Concept and Requirements Definition Readiness (CRDR) for Information Systems Security Far Term Work Package

# Information System Security Roadmap: Additional Information

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**Public availability to be determined under 5 USC 552**

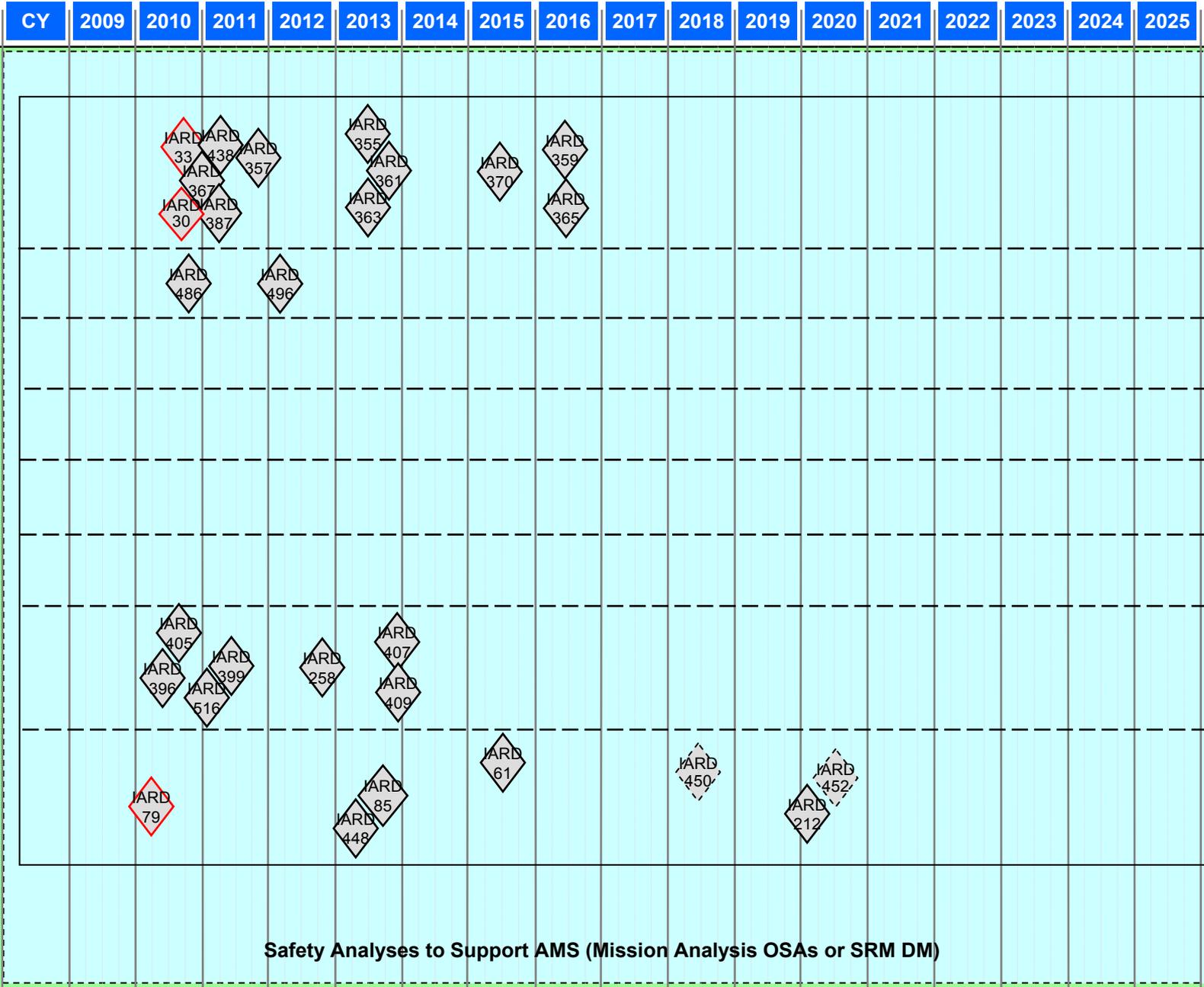
**Detail copies of the Information Systems Security Roadmap  
may be obtained by request to Vidyut Patel, AJP-174,  
Manager, Information Security Team at  
[vidyut.patel@faa.gov](mailto:vidyut.patel@faa.gov) or (609) 485-5046.**

**Approved**

# Safety



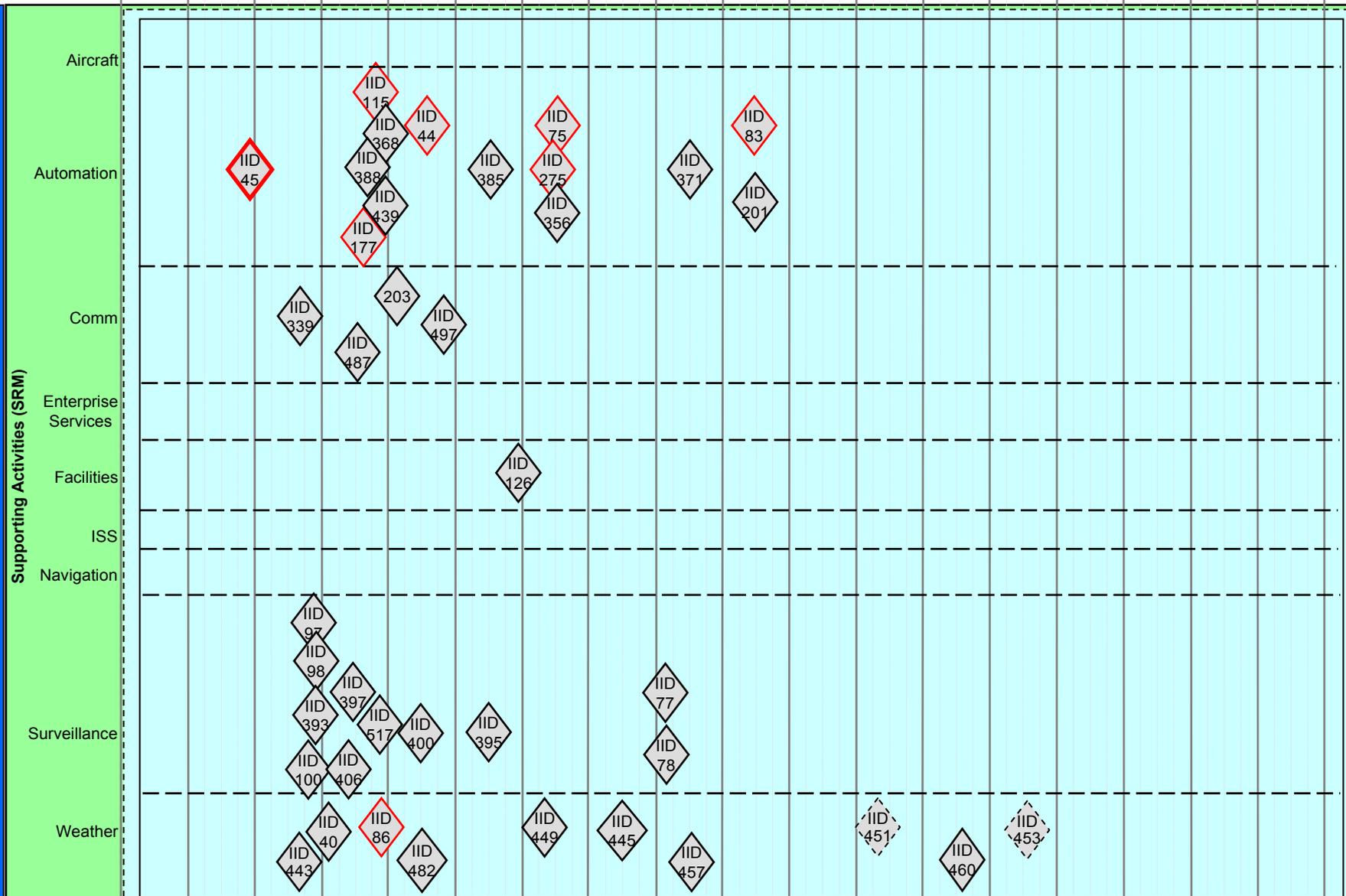
# Safety Roadmap (2 of 10)



# Safety Roadmap (3 of 10)

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

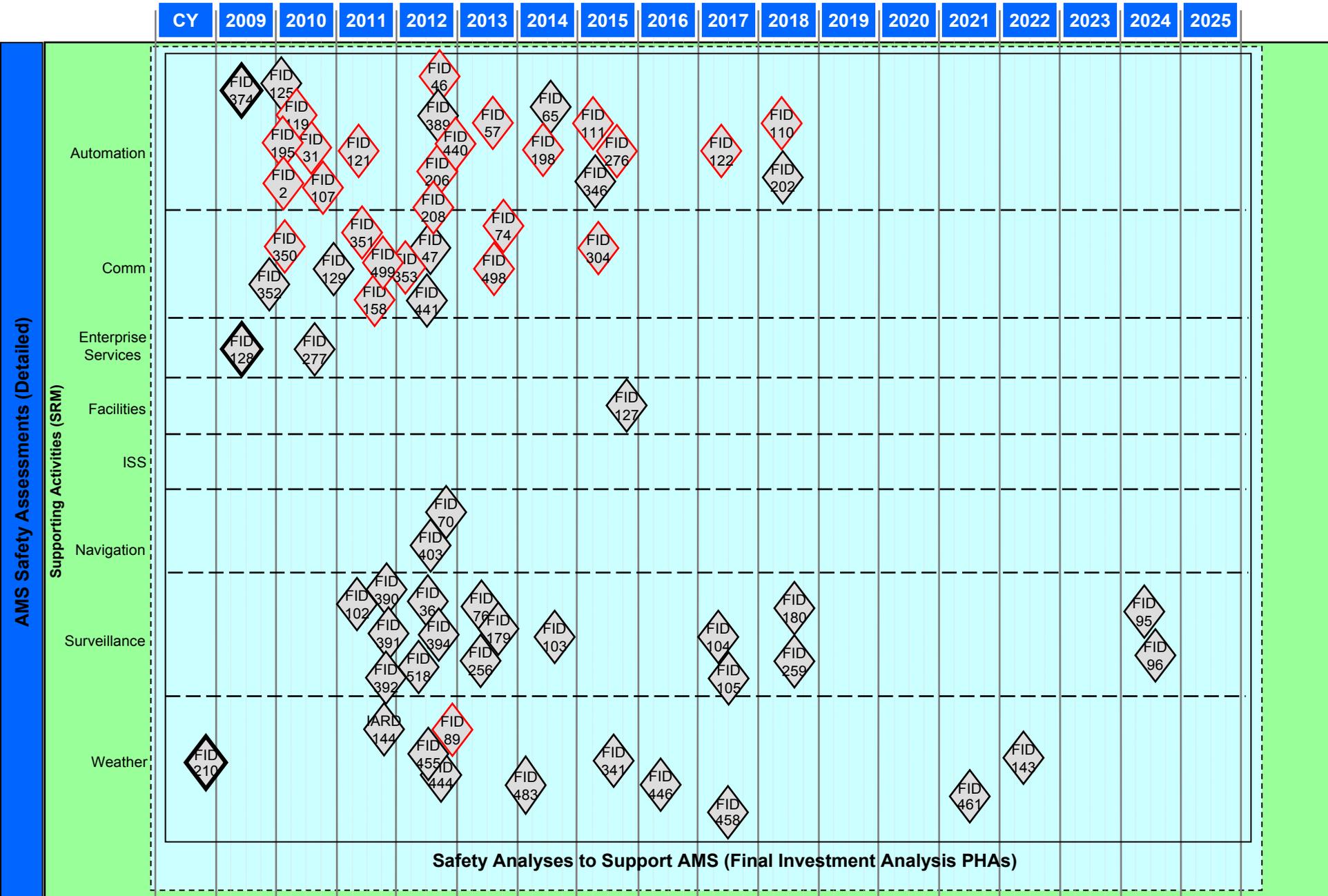
AMS Safety Assessments (Detailed)



Safety Analyses to Support AMS (Initial Investment Analysis CSAs)

Approved

# Safety Roadmap (4 of 10)



# Safety Roadmap (5 of 10)

CY	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
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AMS Safety Assessments (Detailed)

Supporting Activities (SRM)

Automation

Comm

Enterprise Services

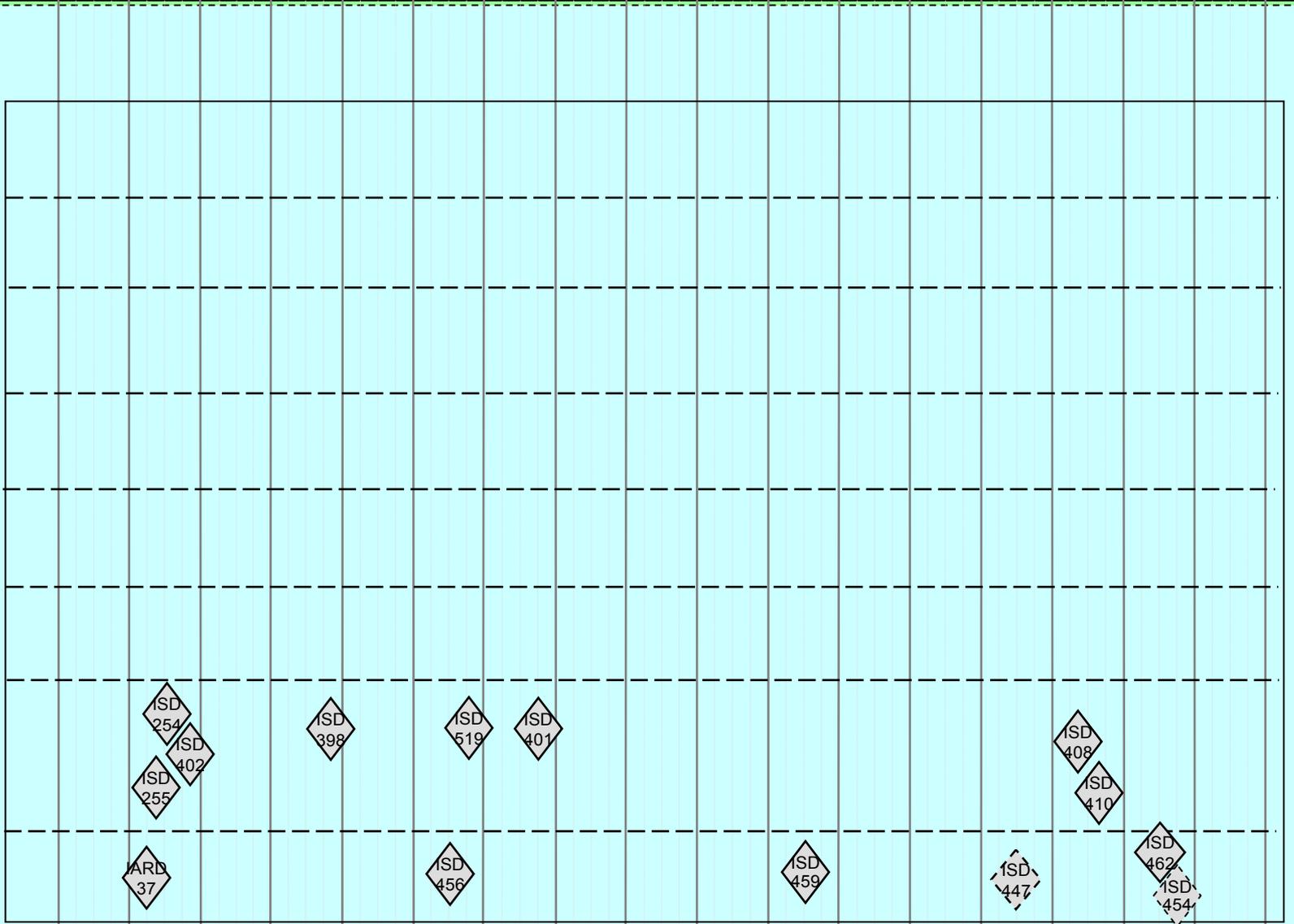
Facilities

ISS

Navigation

Surveillance

Weather



Safety Analyses to Support AMS (Solution Implementation SHA/SSHA/O&SHAs)

Approved

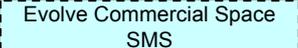
# Safety Roadmap (6 of 10)

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

Implement a SMS for FAA  
Flight Plan Goal 1 (Increased Safety) – Objective 6



Non-NAS EA



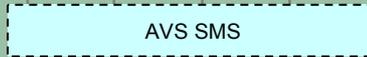
Issue Private Sector SMS Rule



Issue Airport SMS Rule to Implement SMS at Certificated Airports



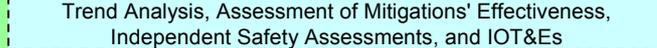
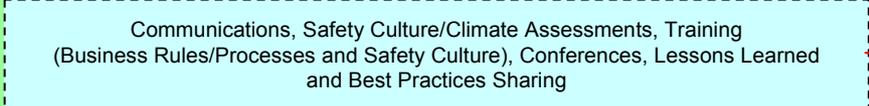
Publish ARP SMS Order to Implement SMS in ARP LOB



Supporting Activities (Safety Policy)

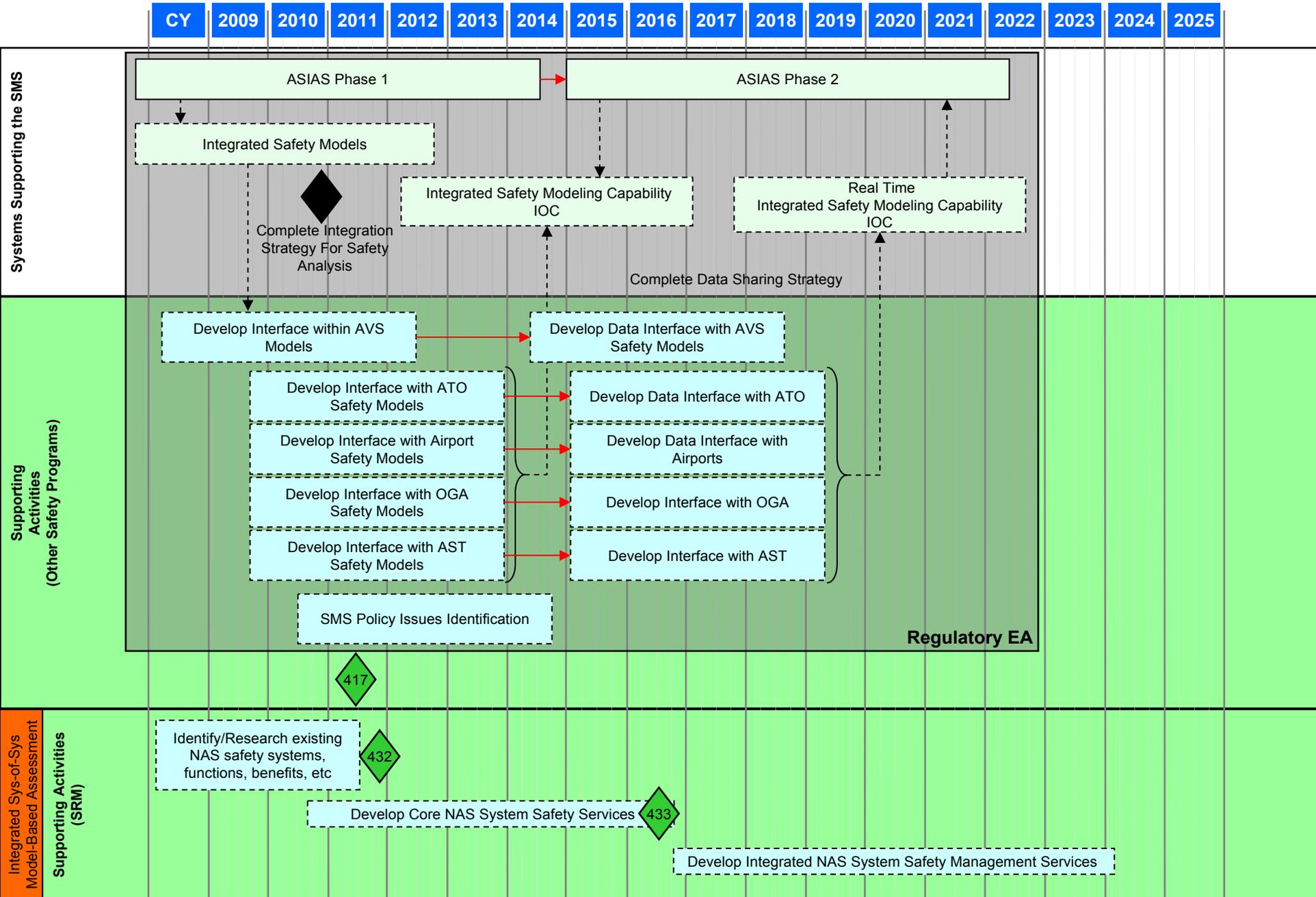
Supporting Activities (Safety Promotion)

Supporting Activities (Safety Assurance)



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# Safety Roadmap (7 of 10)



# Safety Roadmap (8 of 10)

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

412
413
414
415

**Commercial Air Carrier Fatality Rate Reduction Strategy Assessment & Planning**

**PBN**

Terminal RNAV/RNP	RNAV SIDs/RNP-1 Routes	CSPO Steps 1/2	RNAV/RNP 3D & OPD	
En Route RNAV/RNP	Segment 1 Q-Routes	Segment 2 Q-Routes	Segment 3 Q-Routes	
Oceanic RNP	RNP - 10 Routes	RNP - 1/2 Routes and Airspace	RNP - 4 Routes	
APPROACH	RNP SAAR	RNP SAAR + Other Tech		

**Airspace & Procedures Roadmap**

FID 2
**AIM Modernization Segment 1**

**AIM Modernization Segment 2**

FID 122
**AIM Modernization Segment 3**

**Automation Roadmap**

**RSA NAVAID Improvement**
597

**Airport Roadmap**

FD Displays & Procedures for Separation & Collision Avoidance
 
569

**HSI Roadmap**

417

Additional activities include:

- Research Hazardous Materials Safety (aircraft cargo)

**Reduce Commercial Air Carrier Fatality Rate**  
**Flight Plan Goal 1 – Objective 1**

**A-G Separation Management Collision Avoidance- TSAFE Interoperability**
A/G Roadmap

Supporting Activities (Increased Safety)

# Safety Roadmap (9 of 10)

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

Supporting Activities  
(Increased Safety)

**GA Fatality Rate Reduction Strategy Assessment & Planning**

421  
418

419

420

**Surveillance Roadmap**

Add MLAT to ASDE-3 sites

ARD 399

IID 400

FID 76

**PBN**

**Terminal RNAV/RNP**

RNAV SIDs/RNP-1 Routes

CSPO Steps 1/2

T-Routes

RNAV/RNP 3D & OPD

**En Route RNAV/RNP**

Segment 1 Q-Routes

Segment 2 Q-Routes

Segment 3 Q-Routes

RNP - 1/2 Routes and Airspace

**Oceanic RNP**

RNP - 10 Routes

RNP - 4 Routes

**APPROACH**

RNP SAAR

RNP SAAR + Other Tech

**Airspace & Procedures Roadmap**

**HSI Roadmap**

FD Displays & Procedures for Separation & Collision Avoidance

569

**Automation/Communications/Facilities Roadmaps**

ORDR 366

ARD 367

IID 368

203

FID 208

207

AFSM [Voice Switch]

IID 126

AF [Facilities]

FID 127

**Meteorological and Aeronautical Planning System (MAPS)**

DUAT(S)

AFSS CONUS

**Navigation Roadmap**

SBAS (WAAS)

Phase III

507

Phase IV

219

220

230

SBAS Sustain

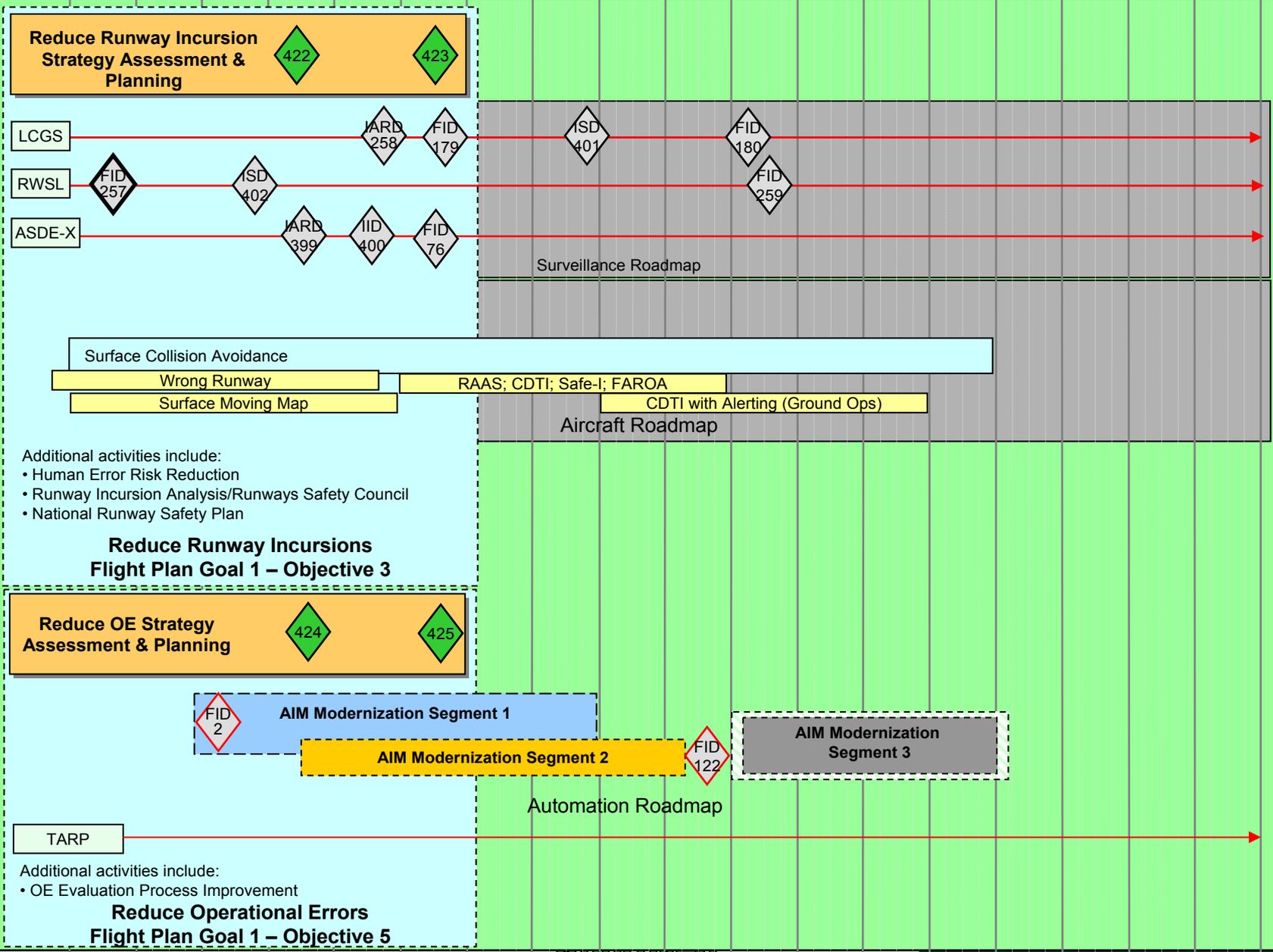
- Additional activities include:
- ADS-B Improved Pilot SA Demos (further coordination required to add/link to Aircraft Roadmap)
  - Alaska Weather Cameras (further coordination required to add/link to Weather Roadmap)
  - Develop WAAS/LPV-LP IAPs (further coordination required to add/link to A&P Roadmap)
  - Develop 3 NM Separation Standards (further coordination required to add/link to A&P Roadmap)

**Reduce GA Fatality Rate**  
**Flight Plan Goal 1 – Objective 2**

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# Safety Roadmap (10 of 10)

CY	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
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Supporting Activities (Increased Safety)

# Safety Roadmap: Assumptions

Identifier	Description
SAFE-01	ASIAs is part of the Regulatory EA. It is depicted on the Safety Infrastructure Roadmap for coordination purposes since: a) It will require NAS data. b) It will provide safety data and tools for the NAS
SAFE-02	SMS Implementations for other LOBs are part of the Non-NAS EAs. These activities are depicted on the Safety Infrastructure Roadmap for coordination purposes.

# Safety Roadmap: Decision Points (1 of 8)

DP #	Target Date	High Priority	Domain	Name
2	2010 Q1	Y	Automation	AIM Modernization Segment 1 Final Investment Decision
30	2010 Q3	Y	Automation	Investment Analysis Readiness Decision for Tower Flight Data Manager 1 (TFDM1)
31	2010 Q3	Y	Automation	Final Investment Decision for Post ERAM R3 Work Package
33	2010 Q3	Y	Automation	Investment Analysis Readiness Decision for Security Integrated Tool Suite (SITS)
36	2012	N	Surveillance	Final Investment Decision for migration of PRM to PRM-A (based on multilateralation)
37	2010 Q1	N	Weather	IARD to Tech Refresh/SLEP wind shear detection services capability of all WS systems (to address wind shear study & technologies)
40	2011	N	Weather	Initial Investment Decision to acquire & deploy initial phase of Wake Turbulence capability for Mitigation for Departures (WTMD) from Closely Spaced Parallel Runways (CSPR)
44	2012	Y	Automation	Time Based Flow Management (TBFM)/Integrated Enterprise Solution (IES) Initial Investment Decision
45	2009 Q4	Y	Automation	Terminal Automation Modernization and Replacement (TAMR) Phase 3 Initial Investment Decision (Complete)
46	2012 Q3	Y	Automation	Tower Flight Data Manager 1 (TFDM1) Final Investment Decision
47	2012	Y	Communication	Final Investment Decision for NAS Voice Switch
57	2013	Y	Automation	TBFM/IES Final Investment Decision
61	2015	N	Weather	Investment Decision to add WT for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
65	2014	N	Automation	Common Information Display Systems (IDS) capability in En Route and Terminal Final Investment Decision
70	2012 Q4	N	Navigation	Final Investment Decision (FID) for the acquisition of CAT II/III Ground Based Augmentation System (GBAS)
74	2013	Y	Communication	Approve FTI Re-Compete Decision
75	2014	Y	Automation	En Route Automation NextGen Mid-Term Work Package Initial Investment Decision
76	2013	N	Surveillance	Final Investment Decision for removal or SLEP/replace ASDE surface primary radars (evolving requirements for safety and security may impact decision)
77	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
78	2016 Q1	N	Surveillance	Initial Investment Decision to implement a NextGen beacon/backup radar system for ATC
79	2010 Q1	Y	Weather	Investment Analysis Readiness Decision (IARD) for NextGen Wx Processor WP1 and NNEW WP1 to enter IA

# Safety Roadmap: Decision Points (2 of 8)

DP #	Target Date	High Priority	Domain	Name
83	2017	Y	Automation	Transition to NextGen Far Term automation platforms and display subsystem through convergence Initial Investment Decision
85	2013	N	Weather	Investment Decision (IARD) to Consolidate & Replace Automated Surface Observing Systems
86	2011 Q4	Y	Weather	Investment Decision (IID) for NextGen Wx Processor WP1 (includes CIWS functionality, NG WARP functionality & NNEW WP1 functionality (includes WARP WINS & FBWTG))
89	2012 Q4	Y	Weather	Final Investment Decision for NextGen Wx Processor WP1
95	2024 Q2	N	Surveillance	Decision for replacement of terminal primary radars (ASR-11 PSR) and removal of terminal beacons (ASR-11 MSSR)
96	2024	N	Surveillance	Decision for replacement of en route beacons (ATCBI-6)
97	2010 Q4	N	Surveillance	Initial Investment Decision for legacy radar (ASR-9) SLEP, through 2025
98	2010 Q4	N	Surveillance	Initial Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
100	2010 Q4	N	Surveillance	Initial Investment Decision for legacy beacon (Mode S) SLEP through 2025
102	2011 Q4	N	Surveillance	Final Investment Decision to implement SIM in terminal and en route legacy radar systems
103	2014	N	Surveillance	Final Investment Decision for technology refresh of beacons (ATCBI-6)
104	2017	N	Surveillance	Final Investment Decision to implement a NextGen Surveillance and Weather Radar Capability for ATC
105	2017	N	Surveillance	Final Investment Decision to implement a NextGen beacon/backup radar system for ATC
107	2010 Q4	Y	Automation	TAMR Phase 3 Final Investment Decision
110	2018	Y	Automation	Approve final investment for transition to NextGen automation platforms and display subsystem through convergence
111	2015	Y	Automation	En Route Automation NextGen Mid-Term Work Package Final Investment Decision
115	2011 Q3	Y	Automation	Approve Tower Flight Data Manager 1 Initial Investment Decision
119	2010 Q2	Y	Automation	Final Investment Decision for CATMT Work Package 3 contents
121	2011	Y	Automation	AIM Modernization Segment 2 Final Investment Decision
122	2017	Y	Automation	AIM Modernization Segment 3 Final Investment Decision
125	2010 Q1	N	Automation	Alaska Flight Service Modernization (AFSM) Segment 1 Final Investment Decision
126	2013 Q4	N	Facilities	Initial Investment Decision (IID) Flight Services Facilities
127	2015 Q4	N	Facilities	Final Investment Decision (FID) Flight Services Facilities
128	2009 Q2	N	Enterprise Services	Final Investment Decision for SWIM Segment 1B (Baseline for FY 11 - 13) (Complete)

# Safety Roadmap: Decision Points (3 of 8)

DP #	Target Date	High Priority	Domain	Name
129	2010 Q4	N	Communication	Final Investment Decision for Alaska Satellite Telecommunications Infrastructure (ASTI) Technical Refresh
143	2022	N	Weather	Investment Decision (FID) to Provide 10-Hour Convective Forecast Capability and In-Flight Icing Observation from Airborne Aircraft To NextGen Weather Processor WP3
144	2011 Q4	N	Weather	Investment Decision (IARD) to Tech Refresh ITWS systems (includes improved data quality, upgraded TWINDS & path-based wind shear), or transfer all functionality (TWINDS & path-based wind shear) to NWP WP2 or Tech Refresh ITWS
158	2011 Q3	Y	Communication	Data Communications Segment 1 FID (part 1 of a split FID)
177	2011 Q3	Y	Automation	Initial Investment Decision for SITS Air Domain Security Architectures
179	2013	N	Surveillance	Final Investment Decision for LCGS
180	2018	N	Surveillance	Final Investment Decision for ADS-B to assume LCGS function, or approve a Technology Refresh for LCGS
195	2010 Q1	Y	Automation	Time Based Flow Management (TBFM ) Final Investment Decision
198	2014	Y	Automation	Tower Flight Data Manager 2 (TFDM2) Final Investment Decision
201	2017	Y	Automation	En Route /Oceanic IES NextGen WP Initial Investment Decision
202	2018	Y	Automation	En Route /Oceanic IES NextGen WP Final Investment Decision
203	2012 Q1	N	Communication	Flight Service, AFSM Voice System Provisioning Coordination with NVS
206	2012 Q3	Y	Automation	Final Investment Decision for SITS Air Domain Security Architecture
207	2012 Q3	N	Automation	DUAT Continuation decision
208	2012 Q3	Y	Automation	Meteorological and Aeronautical Planning System (MAPS) Final Investment Decision
210	2008 Q4	N	Weather	Final Investment Decision to fund WARP contract maintenance until subsumed into NextGen Wx Processor Work Package 1 ( NWP WP1) (Complete)
212	2020	N	Weather	Investment Decision (IARD) to add WT Mitigation for Single Runway (WTSR) decision support capability
219	2016	N	Navigation	Completion of all WAAS instrument approach procedures (LPV and LP) for all qualifying runways in the National Airspace System (NAS), estimated to be 5500 runway ends. Original date of 2018 was accelerated to 2016.
220	2018	Y	Navigation	Completion of Dual Frequency (GPS L1 and L5) development & testing for the WAAS ground and space segment hardware, software, and user equipment standards and avionics, required by DoD Mandate, issued September 2008
230	2020	Y	Navigation	Cut-over to dual frequency operations
254	2010 Q3	N	Surveillance	In-Service Decision for SBS Critical Services (ADS-B) NAS wide implementation, including backup strategy

# Safety Roadmap: Decision Points (4 of 8)

DP #	Target Date	High Priority	Domain	Name
255	2010 Q2	N	Surveillance	In-Service Decision for WM/LAT (Alaska and Colorado)
256	2013	N	Surveillance	Final Investment Decision for ASR-11 Technology Refresh Segment 2 (through 2025)
257	2008 Q4	N	Surveillance	JRC FID (JRC 2B) Decision for acquisition of RWSL systems (Complete)
258	2012 Q4	N	Surveillance	Investment Analysis Readiness Decision for LCGS
259	2018	N	Surveillance	Final Investment Decision for RWSL Technology Refresh
275	2014	Y	Automation	Terminal Automation NextGen Mid-Term Work Package Initial Investment Decision
276	2015	Y	Automation	Terminal Automation NextGen Mid-Term Work Package Final Investment Decision
277	2010 Q3	N	Enterprise Services	Final Investment Decision for SWIM Segment 2 (Baseline FY12-16)
304	2015	Y	Communication	Data Communications Segment 2 FID
339	2010 Q3	Y	Communication	Initial Investment Decision for NAS Voice Switch
341	2015	N	Weather	Final Investment Decision to transition WMSCR Comms functionality to web access via SWIM Seg 3 & ALDARS Comms to NNEW WP2
346	2015	Y	Automation	Final Investment Decision for CATMT Work Package 4
350	2010 Q1	Y	Communication	FID for NEXCOM Segment 2 Modernization Phase 1
351	2011 Q2	Y	Communication	Approve RCE Replacement
352	2009 Q4	N	Communication	Approve IDLM Enhancement
353	2012 Q1	Y	Communication	Data Communications Segment 1 FID (part 2 of a split FID)
355	2013	N	Automation	CATMT Work Package 4 Investment Analysis Readiness Decision
356	2014	N	Automation	CATMT Work Package 4 Initial Investment Decision
357	2011 Q4	N	Automation	TBFM/IES Investment Analysis Readiness Decision
359	2016	N	Automation	En Route /Oceanic IES NextGen WP Investment Analysis Readiness Decision
361	2013	N	Automation	En Route Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
363	2013	N	Automation	Terminal Automation NextGen Mid-Term Work Package Investment Analysis Readiness Decision
365	2016	N	Automation	Transition to NextGen Far Term automation platforms and display subsystem through convergence Investment Analysis Readiness Decision
366	2010 Q2	N	Automation	Meteorological and Aeronautical Planning System (MAPS) Concept and Requirements Definition Readiness Decision
367	2010 Q4	N	Automation	Meteorological and Aeronautical Planning System (MAPS) Investment Analysis Readiness Decision
368	2011 Q4	N	Automation	Meteorological and Aeronautical Planning System (MAPS) Initial Investment Decision
370	2015	N	Automation	AIM Modernization Segment 3 Investment Analysis Readiness Decision

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# Safety Roadmap: Decision Points (5 of 8)

DP #	Target Date	High Priority	Domain	Name
371	2016	N	Automation	AIM Modernization Segment 3 Initial Investment Decision
374	2009 Q2		Automation	RMMS Technology Refresh Final Investment Decision (Complete)
385	2013	N	Automation	Initial Investment Decision of common Information Display Systems (IDS) capability in En Route and Terminal
387	2011 Q1	N	Automation	NextGen ATOP/Offshore Automation Investment Analysis Readiness Decision
388	2011 Q3	N	Automation	NextGen ATOP/Offshore Automation Initial Investment Decision
389	2012 Q3	N	Automation	NextGen ATOP/Offshore Automation Final Investment Decision
390	2011 Q4	N	Surveillance	Final Investment Decision for legacy beacon (Mode S) SLEP through 2025
391	2011 Q4	N	Surveillance	Final Investment Decision for legacy radar (ASR-8) SLEP, including a weather channel, through 2025
392	2011 Q4	N	Surveillance	Final Investment Decision for legacy radar (ASR-9) SLEP through 2025
393	2010 Q4	N	Surveillance	Initial Investment Decision for Technology Refresh of ATCBI-5 beacon system
394	2012	N	Surveillance	Final Investment Decision for Technology Refresh of ATCBI-5 beacon system
395	2013	N	Surveillance	Initial Investment Decision for Technology Refresh of ATCBI-6 beacon system
396	2010 Q2	N	Surveillance	Investment Analysis Readiness Decision for Precision Runway Monitor-Alternate
397	2011	N	Surveillance	Initial Investment Decision for migration of PRM to PRM-A (based on multilateralation)
398	2012 Q4	N	Surveillance	In-Service Decision for PRM-A (based on multilateralation)
399	2011	N	Surveillance	Investment Analysis Readiness Decision for removal or SLEP/replace ASDE surface primary radars
400	2012	N	Surveillance	Initial Investment Decision for removal or SLEP/replace ASDE surface primary radars
401	2015	N	Surveillance	In-Service Decision for Low Cost Ground Surveillance system
402	2010 Q4	N	Surveillance	In-Service Decision for Runway Status Light system
403	2012	N	Surveillance	Final Investment Decision for SBS Implementation of Advanced ADS-B Applications
405	2010 Q3	N	Surveillance	Investment Analysis Readiness Decision for SIM in terminal and en route legacy radar systems
406	2011 Q2	N	Surveillance	Initial Investment Decision for SIM in terminal and en route legacy radar systems
407	2013 Q4	N	Surveillance	Investment Analysis Readiness Decision for NextGen Surveillance and Weather Radar Capability
408	2023	N	Surveillance	In-Service Decision for NextGen Surveillance and Weather Radar Capability
409	2013 Q4	N	Surveillance	Investment Analysis Readiness Decision for New Beacon/Backup System
410	2023	N	Surveillance	In-Service Decision for New Beacon/Backup System
411	2011	N		ATO Concurrence with FAA-wide SMS Integration & Implementation Strategy
412	2011	N		Assess Current 2011-2015 Strategy to Reduce Commercial Air Carrier Fatality Rate

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# Safety Roadmap: Decision Points (6 of 8)

DP #	Target Date	High Priority	Domain	Name
413	2016	N		Assess Current 2016-2020 Strategy to Reduce Commercial Air Carrier Fatality Rate
414	2021	N		Assess Current 2021-2025 Strategy to Reduce Commercial Air Carrier Fatality Rate
415	2025	N		Develop New Strategy to Further Reduce Commercial Air Carrier Fatality Rate
416	2011	N		Refine ATSAP corrective action processes
417	2011	N		Develop and Implement an ASIAS Enterprise Architecture Interface between ATSAP and ASIAS
418	2011	N		Assess Current 2011-2013 Strategy to Reduce General Aviation Fatality Rate
419	2014	N		Assess Current 2014-2018 Strategy to Reduce General Aviation Fatality Rate
420	2018	N		Develop New Strategy to Further Reduce General Aviation Fatality Rate
421	2011	N		Assess Current Strategy to Reduce Alaska Part 135 and GA Accidents
422	2011	N		Assess Strategy to Reduce Runway Incursions
423	2013	N		Develop Strategy to Further Reduce Runway Incursions
424	2011	N		Assess Strategy to Reduce OEs
425	2013	N		Develop Strategy to Further Reduce Operational Errors
426	2010 Q1	N		SMS Implemented within ATO
429	2014	N		Mid-Term Integrated SRM Complete
430	2013	N		Determine Required Far-Term Integrated SRM Analyses to Complete
431	2020	N		Far-Term Integrated SRM Complete
432	2011	N		Strategy to Meet NextGen Safety Objectives/Develop Safety Management Service
433	2016	N		Integrated Core Safety Data Services Agreement
436	2010 Q1	N		Integrated NextGen Safety Analysis Report Completed
438	2011 Q1	N	Automation	Flight Data Interface Modernization Investment Analysis Readiness Decision
439	2011 Q4	N	Automation	Flight Data Interface Modernization Initial Investment Decision
440	2012 Q4	N	Automation	Flight Data Interface Modernization Final Investment Decision
441	2012 Q2	N	Communication	ATIS Technical Refresh FID
443	2010 Q3	N	Weather	IID to Tech Refresh/SLEP wind shear detection services of all WS systems
444	2012	N	Weather	FID to Tech Refresh/SLEP all low-level wind shear detection systems as part of wind shear detection service
445	2015	N	Weather	IID to consolidate and replace automated surface observing capability with multi-agency NextGen Surface Observing capability
446	2016	N	Weather	FID to consolidate and replace automated surface observing capability

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# Safety Roadmap: Decision Points (7 of 8)

DP #	Target Date	High Priority	Domain	Name
447	2022	N	Weather	ISD to replace all automated surface observing systems with NextGen Surface Observing capability
448	2013	N	Weather	IARD to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS to Comms to NNEW WP
449	2014	Y	Weather	IID to fund FAA portion of NNEW WP2 & transition WMSCR/ALDARS Comms to NNEW WP2
450	2018	Y	Weather	IARD to fund FAA portion of 4-D Weather SAS Tech Refresh
451	2019	Y	Weather	IID to fund FAA portion of 4-D Weather SAS Tech Refresh
452	2020	Y	Weather	IARD to provide 10-hour Convective Forecast capability to NWP WP3 and in-flight Icing Observation from airborne aircraft to NWP WP3
453	2021	Y	Weather	IID to provide 10-hour Convective Forecast capability to NWP WP3 and provide in-flight Icing Observation from airborne aircraft to NWP WP3
454	2024	Y	Weather	ISD to document final configuration of the NextGen Wx Processor Work Pkg 3 (NWP WP3)
455	2012 Q2	Y	Weather	FID to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
456	2014	Y	Weather	ISD to Acquire and Deploy Wake Turbulence for Mitigation for Departures (WTMD)
457	2016	Y	Weather	IID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
458	2017	Y	Weather	FID to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
459	2019	Y	Weather	ISD to Add Wake Turbulence for Mitigation for Arrivals (WTMA) from Closely Spaced Parallel Runways (CSPR)
460	2020	Y	Weather	IID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
461	2021	Y	Weather	FID to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
462	2024	Y	Weather	ISD to Add Wake Turbulence for Mitigation for Single Runway (WTSR)
482	2012	Y	Weather	IID to transfer most ITWS functionality to NWP WP2 or Tech Refresh ITWS
483	2014	Y	Weather	FID to transfer most ITWS functionality to NWP WP2 or Tech Refresh ITWS
486	2010 Q4	N	Communication	ATIS Technical Refresh IARD
487	2011 Q2	N	Communication	ATIS Technical Refresh IID
496	2012 Q1	N	Communication	Airport Wireless Communication System IARD
497	2012 Q4	N	Communication	Airport Wireless Communication System IID
498	2013 Q3	N	Communication	Airport Wireless Communication System FID
499	2011 Q3	N	Communication	FID for NEXCOM Segment 2 Modernization Phase 2
507	2014	N	Navigation	WAAS moves from Phase III to Phase IV

# Safety Roadmap: Decision Points (8 of 8)

DP #	Target Date	High Priority	Domain	Name
516	2011	N	Surveillance	Investment Analysis Readiness Decision (IARD) for a Mobile/Transportable Airport Surveillance Radar (MASR)
517	2011 Q4	N	Surveillance	Initial Investment Decision (IID) for a Mobile/Transportable Airport Surveillance Radar (MASR)
518	2012 Q1	N	Surveillance	Final Investment Decision (FID) for a Mobile/Transportable Airport Surveillance Radar (MASR)
519	2014 Q4	N	Surveillance	In-Service Decision (ISD) for a Mobile/Transportable Airport Surveillance Radar (MASR)
569	2014	N	HSI	Determine Enhanced Flight Deck Displays for Separation and Collision Avoidance
597	2015	N	Airport	RSA NAVAID Improvements (Complete)

# Appendix A: Acronym List

# Appendix A, Acronym List (1 of 6)

Acronym	Definition	Acronym	Definition
<b>3D</b>	Three dimensional (x, y, z)	<b>ASDE</b>	Airport Surface Detection Equipment
<b>4D</b>	Four dimensional (x, y, z, t)	<b>ASDE-3</b>	Airport Surface Detection Equipment - Model 3
<b>4DT</b>	4D Trajectory	<b>ASDE-3/X</b>	Airport Surface Detection Equipment - Model 3 and ASDE-Model X
<b>AC</b>	Advisory Circular or Aircraft	<b>ASOS</b>	Automated Surface Observing System
<b>ACAS</b>	Airborne Collision Avoidance System	<b>ASPIRE</b>	Asia and South Pacific Initiative to Reduce Emissions
<b>ACE IDS</b>	ASOS Controller Equipment-Information Display System	<b>ASR</b>	Airport Surveillance Radar
<b>ADAM</b>	Advanced Dynamic Airspace Management	<b>ASTI</b>	Alaska Satellite Telecommunications Infrastructure
<b>ADAS</b>	AWOS Data Acquisition System	<b>ATC</b>	Air Traffic Control
<b>ADS-B</b>	Automatic Dependent Surveillance-Broadcast	<b>ATCBI</b>	Air Traffic Control Beacon Interrogator
<b>ADS-C</b>	Automatic Dependent Surveillance-Contract	<b>ATCSCC</b>	David J. Hurley Air Traffic Control System Command Center
<b>AEFS</b>	Advanced Electronic Flight Strip	<b>ATCT</b>	Airport Traffic Control Tower
<b>AFSM</b>	Alaska Flight Service Modernization	<b>ATDS</b>	Air Traffic Dependent Sensor
<b>AFSS</b>	Automated Flight Service Station	<b>ATL</b>	Hartsfield-Jackson Atlanta International Airport
<b>A/G</b>	air-to-ground	<b>ATM</b>	Air Traffic Management
<b>AIM</b>	Aeronautical Information Management	<b>ATO</b>	Air Traffic Organization (FAA)
<b>AIRE</b>	Atlantic Interoperability Initiative to Reduce Emissions	<b>ATOP</b>	Advanced Technologies and Oceanic Procedures
<b>AISM</b>	Aeronautical Information System Modernization	<b>AWG</b>	Automation Working Group
<b>AIXM</b>	Aeronautical Information Exchange Model	<b>AWOS</b>	Automated Weather Observing System
<b>ALDARS</b>	Automated Lightning Detection and Reporting System	<b>AWSS</b>	Automated Weather Sensor System
<b>ALS</b>	Automatic Landing System	<b>AVS</b>	Office of Aviation Safety
<b>AMASS</b>	Airport Movement Area Safety System	<b>BCD</b>	Baseline Change Decision
<b>ANICS</b>	Alaska National Airspace System Interfacility Communication System	<b>BPT</b>	Beaumont/Port Arthur Southeast Texas Regional Airport
<b>ANSP</b>	Air Navigation Service Provider	<b>BUEC</b>	Backup Emergency Communications (VSCS)
<b>ARMS</b>	Airspace Resource Management System	<b>BWM</b>	Bandwidth Manager
<b>ARMT</b>	Airport Resource Management Tool	<b>C&amp;V</b>	Ceiling & Visibility
<b>ARSR</b>	Air Route Surveillance Radar	<b>CAP</b>	Chicago Airspace Project
<b>ARTS 1E</b>	Automated Radar Terminal System Model 1E	<b>CARF</b>	Central Altitude Reservation Function
<b>ARTS IIE</b>	Automated Radar Terminal System Model IIE	<b>CAS</b>	Collision Avoidance System
<b>ARTS IIIE</b>	Automated Radar Terminal System Model IIIE	<b>CAT III</b>	Category III (precision landing)

# Appendix A, Acronym List (2 of 6)

Acronym	Definition	Acronym	Definition
<b>CATM</b>	—Collaborative Air Traffic Management	<b>DSR</b>	—Display System Replacement
<b>CATMT</b>	—Collaborative Air Traffic Management Technologies	<b>DST</b>	—Decision Support Tool
<b>CAVS</b>	—CDTI Assisted Visual Separation	<b>DUATS</b>	—Direct User Access Terminal Service
<b>CDA</b>	—Continuous Descent Approach	<b>EA</b>	—Enterprise Architecture
<b>CDTI</b>	—Cockpit Display of Traffic Information	<b>EARTS</b>	—En Route Automated Radar Tracking System
<b>CERAP</b>	—Combined Center and Radar Approach Control	<b>EC</b>	—ATO Executive Council
<b>CIP</b>	—Current Icing Product	<b>ECG</b>	—En Route Communications Gateway
<b>CIWS</b>	—Corridor Integrated Weather System	<b>ED</b>	—EUROCAE document
<b>CHI</b>	—computer-human interface	<b>ED-X</b>	—Enhanced Data Services (ED-X)
<b>CLL</b>	—College Station Easterwood Field	<b>EFS</b>	—Electronic Flight Strip
<b>ConOps</b>	—Concept of Operations	<b>EFSTS</b>	—Electronic Flight Strip Transfer System
<b>CONUS</b>	—Conterminous United States	<b>EFVS</b>	—Enhanced Flight Vision System
<b>CRDR</b>	—Concepts and Requirements Definition Readiness	<b>ERAM</b>	—En Route Automation Modernization
<b>CSPO</b>	—closely spaced parallel operations	<b>ERIDS</b>	—En Route Information Display System
<b>CSPR</b>	—Closely Spaced Parallel Runways	<b>ETVS</b>	—Enhanced Terminal Voice Switch
<b>CY</b>	—Calendar Year	<b>EVS</b>	—Enhanced Vision System
<b>DAB</b>	—Daytona Beach International Airport	<b>FAA</b>	—Federal Aviation Administration
<b>DAC</b>	—Dynamic Airspace RTT	<b>FACES</b>	—Future Airspace Capacity and Efficiency Study
<b>DASI</b>	—Digital Altimeter Setting Indicator	<b>FANS</b>	—Future Air Navigation System
<b>DC</b>	—Data Communications or DataComm	<b>FBWTG</b>	—FAA Bulk Weather Telecommunications Gateway
<b>DCS</b>	—Data Communication System	<b>FCST</b>	—Forecast
<b>DEN</b>	—Denver International Airport	<b>FDIO</b>	—Flight Data Input/Output
<b>DFM</b>	—Departure Flow Management	<b>FDP2K</b>	—Flight Data Processing 2000
<b>DINS</b>	—Defense Internet NOTAM Service	<b>FEWS</b>	—Future En Route Workstation
<b>DME</b>	—Distance Measuring Equipment	<b>FID</b>	—Final Investment Decision
<b>DMER</b>	—Distance Measuring Equipment (TACAN 2 <sup>nd</sup> Gen)	<b>FIP</b>	—Forecast Icing Product
<b>DMN</b>	—Data Multiplexing Network	<b>FIPS</b>	—Federal Information Processing Standards
<b>DOTS+</b>	—Dynamic Ocean Track System Plus	<b>FIS-B</b>	—Flight Information Service-Broadcast
<b>DP</b>	—Decision Point	<b>FMS</b>	—Flight Management System
<b>DSP</b>	—Departure Spacing Program	<b>FNS</b>	—Federal NOTAM System

# Appendix A, Acronym List (3 of 6)

Acronym	Definition	Acronym	Definition
<b>FOC</b>	Full Operational Capability	<b>IFPA</b>	Instrument Flight Procedure Automation
<b>FP</b>	Flight Plan	<b>IID</b>	Initial Investment Decision
<b>FS21</b>	Flight Services for the 21st Century	<b>ILS</b>	Instrument Landing System
<b>FSS</b>	Flight Service Station	<b>Pv4</b>	Internet Protocol version 4
<b>FT</b>	Far Term	<b>IPv6</b>	Internet Protocol version 6
<b>FTI</b>	FAA Telecommunications Infrastructure	<b>IOC</b>	Initial Operational Capability
<b>FTWS</b>	Future Terminal Workstation	<b>IRU</b>	Inertial reference unit
<b>FY</b>	Fiscal Year	<b>ISD</b>	In-Service Decision
<b>GA</b>	General Aviation	<b>ITWS</b>	Integrated Terminal Weather System
<b>GBAS</b>	Ground-Based Augmentation System	<b>IVSR</b>	Interim Voice Switch Replacement
<b>GIS</b>	Geographic Information System	<b>JAWS</b>	Juneau Airport Wind System
<b>GNSS</b>	Global Navigation Satellite System	<b>JFK</b>	John F. Kennedy International Airport
<b>GNSS/INS</b>	Global Navigation Satellite System/Inertial Navigation System	<b>JPDO</b>	Joint Planning and Development Office
<b>GPS</b>	Global Positioning System	<b>JRC</b>	Joint Resources Council
<b>GS</b>	Glide Slope Indicator	<b>L5</b>	Frequency used by GPS for safety of life signals
<b>GTG</b>	Graphical Turbulence Guidance	<b>LAX</b>	Los Angeles International Airport
<b>HAAM</b>	High Altitude Airspace Management	<b>LCGS</b>	Low Cost Ground Surveillance
<b>HAATS</b>	Houston Area Air Traffic System	<b>LDRCL</b>	Low-Density Radio Communications Link
<b>HAD</b>	High Density Airport	<b>LED</b>	Light-emitting diode
<b>HADDS</b>	Host ATM Data Distribution System	<b>LIDAR</b>	Laser Identification Detection and Ranging
<b>HDA</b>	High-Density Airport	<b>LITE</b>	Local Integrated Tower Equipment
<b>HOST</b>	Host Computer System	<b>LLWAS</b>	Low-Level Windshear Alert System
<b>HRRR</b>	High Resolution Rapid Refresh (weather model)	<b>LOA</b>	Letter of Agreement
<b>H/W</b>	Hardware	<b>LOC</b>	Localizer
<b>IAPA</b>	Instrument Approach Procedures Automation	<b>LRR</b>	long range radar
<b>IARD</b>	Investment Analysis Readiness Decision	<b>M/LAT</b>	Multilateration
<b>ICAO</b>	International Civil Aviation Organization	<b>MALS</b>	Medium-intensity Approach Lighting System
<b>IDAC</b>	Integrated Departure Arrival Capability	<b>MALSR</b>	Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights
<b>IDS</b>	Information Display System	<b>MASPS</b>	Minimum Aviation System Performance Standards
<b>IES</b>	Integrated Enterprise Solution		

# Appendix A, Acronym List (4 of 6)

Acronym	Definition	Acronym	Definition
<b>MB</b>	Microburst	<b>NNCC</b>	National Network Control Center
<b>MMAC</b>	Mike Monroney Aeronautical Center	<b>NNEW</b>	NextGen Network-Enabled Weather
<b>MDCRS</b>	Meteorological Data Collection and Reporting System	<b>NOTAM</b>	Notice to Airmen
<b>MEA</b>	Minimum En Route Altitude	<b>NMR</b>	NADIN MSN Rehost
<b>MEARTS</b>	Micro EARTS	<b>NVS</b>	National Airspace System Voice Switch
<b>MFDS</b>	Multi-function Display System	<b>NWP</b>	NextGen Wx Processor
<b>MIA</b>	Miami International Airport	<b>NWS</b>	National Weather Service
<b>MIAWS</b>	Medium-Intensity Airport Weather System	<b>OASIS</b>	Operational and Supportability Implementation System
<b>MM</b>	Middle marker	<b>Obs</b>	Observation
<b>MODE S</b>	Mode Select	<b>OCC</b>	Operations Control Center
<b>MOPS</b>	Minimum Operational Performance Standards (RTCA)	<b>ODALS</b>	Omnidirectional Approach Lighting System
<b>MPAR</b>	Multifunction Phased-Array Radar	<b>OEAAA</b>	Obstruction Evaluation/Airport Airspace Analysis
<b>MSSR</b>	Monopulse Secondary Surveillance Radar	<b>OEP</b>	Operational Evolution Plan
<b>NADIN PSN</b>	National Airspace Data Interchange Network Packet Switched Network	<b>OFDPS</b>	Offshore Flight Data Processing System
<b>NAS</b>	National Airspace System	<b>OGC</b>	Open Geospatial Consortium, Inc.®
<b>NASA</b>	National Aeronautics and Space Administration	<b>OI</b>	Operational Improvement
<b>NASE</b>	NAS Adaptation Services Environment	<b>OM</b>	outer marker
<b>NASR</b>	National Airspace System Resource	<b>OMP</b>	O'Hare Modernization Plan
<b>NAVAID</b>	Navigational Aid	<b>OPD</b>	Optimized Profile Descent
<b>NCIME</b>	NAVAID Control, Interlock, and Monitoring Equipment	<b>Ops</b>	Operations
<b>NCV</b>	National Ceiling & Visibility	<b>ORD</b>	Chicago O'Hare International Airport
<b>NDB</b>	Non-directional Beacon	<b>OWS</b>	OGC Web Services
<b>NDS</b>	NOTAM Distribution Service	<b>PAM</b>	Path Arrival Management
<b>NEO</b>	Network Enabled Operations	<b>PAPI</b>	Precision Approach Path Indicator
<b>NextGen</b>	Next Generation Air Transportation System	<b>PIREPS</b>	Pilot Reports
<b>NEXRAD</b>	Next Generation Weather Radar	<b>PRM-A</b>	Precision Runway Monitor Alternate
<b>NG</b>	NextGen	<b>PRM-E/A</b>	Precision Runway Monitor Alternate and PRM Electronic Scan
<b>NLDN</b>	National Lightning Detection Network	<b>PRM-E-Scan</b>	Precision Runway Monitor Electronic Scan
<b>nmi</b>	Nautical Mile	<b>Qn</b>	Calendar Quarter n (n = 1-4)
		<b>R&amp;D</b>	Research & Development

# Appendix A, Acronym List (5 of 6)

Acronym	Definition	Acronym	Definition
<b>RAPT</b>	Route Availability Planning Tool	<b>SITA</b>	Société Internationale de Télécommunications Aéronautiques
<b>RCAG</b>	Remote Communications Air/Ground	<b>SITS</b>	Security Integrated Tool Set
<b>RCL</b>	Radio Communications Link	<b>SL</b>	STARS LITE
<b>RCLR</b>	RCL Repeater	<b>SLEP</b>	Service Life Extension Program
<b>RCLT</b>	RCL Terminal	<b>SMA</b>	Surface Movement Advisor
<b>RCO</b>	Remote Communications Outlet	<b>SNT</b>	Staffed NextGen Tower
<b>REIL</b>	Runway End Identifier Lights	<b>SSO</b>	Self-Sustained Outlet
<b>Rn</b>	Release n (n = 1, 2,...N)	<b>STARS</b>	Standard Terminal Automation Replacement System
<b>RNAV</b>	Area Navigation	<b>STL</b>	Lambert-St. Louis International Airport
<b>RNP</b>	Required Navigation Performance	<b>SUA</b>	Special Use Airspace
<b>RTA</b>	Required Time of Arrival	<b>SVS</b>	Synthetic Vision System
<b>RTR</b>	Remote Transmitter/Receiver	<b>S/W</b>	software
<b>RTT</b>	Research Transition Team (JPDO)	<b>SWIM</b>	System-Wide Information Management
<b>RVR</b>	Runway Visual Range	<b>TA</b>	Tailored Arrivals
<b>RWI</b>	Reduced Weather Impact	<b>TACR</b>	Tactical Air Navigation/VOR
<b>RWSL</b>	Runway Status Lights	<b>TAMR</b>	Terminal Automation Modernization and Replacement
<b>SACOM</b>	Satellite Communication Network	<b>TAWS</b>	Terrain Awareness and Warning System
<b>SAIDS</b>	Systems Atlanta Information Display System	<b>TBFM</b>	Time-Based Flow Management
<b>SAMS</b>	Special Use Airspace Management System	<b>TBM</b>	Time-Based Management
<b>SAR</b>	Search and Rescue	<b>TBO</b>	Trajectory-Based Operations
<b>SAS</b>	Single Authoritative Source	<b>TCAS</b>	Traffic Alert and Collision Avoidance System
<b>SAWS</b>	Standalone Weather Sensor	<b>TDDS</b>	Terminal Data Distribution System
<b>SBAS</b>	Satellite-Based Augmentation System	<b>TDLS</b>	Tower Data Link Services
<b>SBS</b>	Surveillance and Broadcast Services	<b>TDWR</b>	Terminal Doppler Weather Radar
<b>SDAT</b>	Sector Design and Analysis Tool	<b>TFDM</b>	Tower Flight Data Manager
<b>SDF</b>	Louisville International Airport	<b>TFDMn</b>	Tower Flight Data Manager Phase n (n = 1, 2,...N)
<b>SDS</b>	Safety Data System	<b>TFM</b>	Traffic Flow Management
<b>SE</b>	System Engineering	<b>TFMS</b>	Traffic Flow Management System
<b>Segmt.</b>	Segment	<b>TIS-B</b>	Traffic Information Service-Broadcast
<b>SID</b>	Standard Instrument Departure	<b>TMA</b>	Traffic Management Advisor

# Appendix A, Acronym List (6 of 6)

Acronym	Definition	Acronym	Definition
<b>TR</b>	Technology Refresh	<b>WATRS</b>	West Atlantic Route System
<b>TRACON</b>	Terminal Radar Approach Control	<b>WEP</b>	Wired Equivalent Privacy
<b>TSAFE</b>	Tactical Separation-Assisted Flight Environment (NASA)	<b>WestCar</b>	Western Caribbean
<b>TSO</b>	Technical Standard Order (FAA)	<b>WIN</b>	Weather Information Network
<b>TWINDS</b>	Terminal Winds	<b>WINS</b>	Weather Information Network Server
<b>TWIP</b>	Terminal Weather Information for Pilots	<b>WJHTC</b>	William J. Hughes Technical Center (FAA)
<b>UAS</b>	Unmanned Aircraft System	<b>WM/LAT</b>	Wide area multi-lateration
<b>UAT</b>	Universal Access Transceiver	<b>WME</b>	Wind Measurement Equipment
<b>URET</b>	User Request Evaluation Tool	<b>WMS</b>	Wide-area Master Station
<b>USNS</b>	United States NOTAM Service	<b>WMSCR</b>	Weather Message Switching Center Replacement
<b>VASI</b>	Visual Approach Slope Indicator	<b>WP</b>	Work Package
<b>VHF/UHF/HF</b>	Very High Frequency/Ultra High Frequency/High Frequency	<b>WPn</b>	Work Package n (n = 1, 2, ...N)
<b>VNAV</b>	Vertical Navigation	<b>WRS</b>	wide-area reference station
<b>VNTSC</b>	Volpe National Transportation Systems Center	<b>WSP</b>	Weather System Processor
<b>VOR</b>	VHF Omnidirectional Range	<b>WT</b>	Wake Turbulence
<b>VOT</b>	VOR Omnidirectional range Test	<b>WTMA</b>	Wake Turbulence Mitigation for Arrival
<b>VSCS</b>	Voice Switching and Control System (ARTCC)	<b>WTMD</b>	Wake Turbulence Mitigation for Departure
<b>WAAS</b>	Wide-Area Augmentation System	<b>WTMSR</b>	Wake Turbulence Mitigation Single Runway
<b>WARP</b>	Weather and Radar Processor	<b>Wx</b>	Weather
		<b>ZON</b>	FAA Resource Planning Document Code