Federal Aviation Administration

AVS Work Plan for NextGen 2013

Update from the Associate Administrator for Aviation Safety

June 2013

Dear Members of the Aviation Safety Community:

As you know, NextGen – the biggest overhaul of our National Airspace System since the 1950s – continues to be a top priority for the agency and for Aviation Safety (AVS). This year, AVS is releasing the fourth edition of the AVS Work Plan for NextGen. As a supplemental plan to the FAA's overall NextGen Implementation Plan, this document continues to align our NextGen efforts with those of the FAA while driving the strategic deployment of our many critical NextGen initiatives. We are proud of the progress we have made, while looking forward to the advances we plan in the years ahead.

AVS is responsible for developing the aircraft safety standards and operational approvals for safe and efficient aircraft operations within the National Airspace System (NAS). We believe the only way we can ensure the continued safety of our NAS and meet the increased demands in air traffic is for us all to work together to implement NextGen. This means we need to be forward thinking when we develop and implement safety standards; oversee manufacturers, operators, and changes to the NAS; and implement Safety Management Systems in FAA and industry.

On a monthly basis, I review AVS progress on the initiatives listed in this Work Plan. Whether it's publishing policy, approving operations, or overseeing continued operational safety, I challenge all of us to identify ways to improve our efficiency and continue to perform at the highest standard. I am always interested in your ideas and suggestions on ways to increase our effectiveness in increasing or maintaining aviation safety. Feedback on this plan can be sent to 9-AWA-AVS-NextGen.

Thank you for all your continued hard work as we go about transforming our nation's air transportation system, and for your professionalism and continued commitment to safety. This year, we are operating in a very challenging fiscal environment, the impact of which could continue into the future. The Budget Control Act of 2011, also known as sequestration, cut $637 million from the FAA budget this fiscal year and contains a provision for 10 years of across-the-board cuts in federal spending. Despite the potential uncertainty associated with these cuts, our number one priority at the FAA will always be safety.

Margaret Gilligan
Associate Administrator for Aviation Safety

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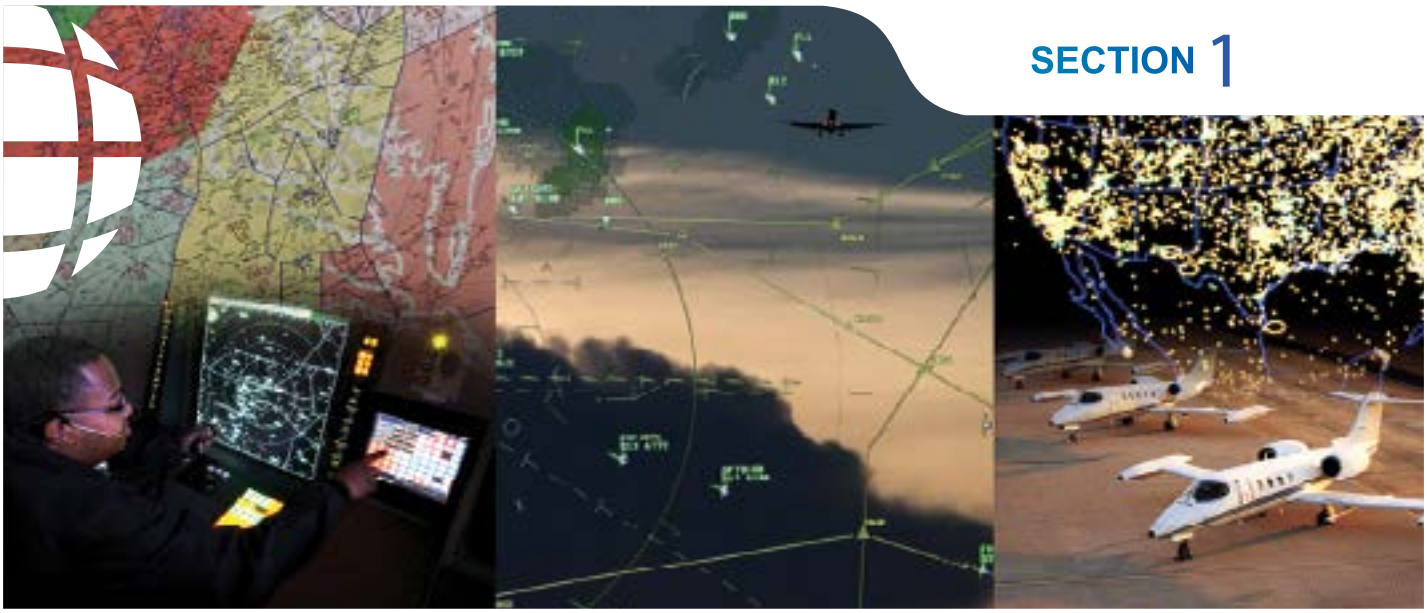
ACRONYMS ABBREVIATIONS

14 CFR	Title 14 of the Code of Federal Regulations
AAM	Office of Aerospace Medicine
AAtS	Aircraft Access to System Wide Information Management (SWIM)
AC	Advisory Circular
ACO	Aircraft Certification Office
ADA	FAA Deputy Administrator
ADS-B	Automatic Dependent Surveillance–Broadcast
AFC	Aviation Fuel Committee
AFS	Flight Standards Service
AIR	Aircraft Certification Service
AIS	Aviation Information System
AMS	Acquisition Management System
ANG	FAA Office of NextGen and Operations Planning
ANG-1	Assistant Administrator for NextGen and Operations Planning
ANSP	Air Navigation Service Provider
AOV	Air Traffic Safety Oversight Service
APNT	Alternative Position, Navigation, and Timing
AQS	Office of Quality, Integration and Executive Services
AR	Authorization Required
ARC	Aviation Rulemaking Committee
ARM	Office of Rulemaking
ARP	Office of Airports
ASDE-X	Airport Surface Detection Equipment Model X
ASIAS	Aviation Safety Information Analysis and Sharing
ATC	Air Traffic Control
ATJ	Alcohol to Jet
ATNB2	Aeronautical Telecommunication Network Baseline 2
ATO	Air Traffic Organization
ATS	Air Traffic Service
Avgas	Aviation Gasoline
AVP	Office of Accident Investigation and Prevention
AVS	Aviation Safety
AVSMT	AVS Management Team
CAAFI	Commercial Aviation Alternative Fuel Initiative
CAMI	Civil Aerospace Medical Institute
CAVS	CDTI-Assisted Visual Separation
CDTI	Cockpit Display of Traffic Information
CEDS	CDTI-Enhanced Delegated Separation
CFR	Code of Federal Regulations
COS	Continuous Operational Safety
CSPO	Closely Spaced Parallel Operations
DCL	Departure Clearance
EA	Enterprise Architecture
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
EFVS	Enhanced Flight Vision System
EUROCAE	European Organization for Civil Aviation Equipment
EVS	Enhanced Vision System
EWR	Newark Liberty International Airport
FANS	Future Air Navigation System
FIM-DI	Flight-Deck-Based Interval Management-Defined Interval
FIM-S	Flight-Deck-Based Interval Management-Spacing
FIR	Flight Information Region
FIS	Flight Information Services
FIS-B	Flight Information Services - Broadcast
FMS	Flight Management System
GBAS	Ground-Based Augmentation System
GIM-S	Ground-Based Interval Management-Spacing
GLS	(Ground Based Augmentation System) Landing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HEFA	Hydroprocessed Fatty Acid Esters and Fatty Acids
HUD	Head-Up Display
I2I	Idea to In-Service

ACRONYMS ABBREVIATIONS

IAH	George Bush Intercontinental Airport
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedures
IFPP	Instrument Flight Procedures Panel
ILS	Instrument Landing System
IM	Interval Management (ADS-B)
IMS	Integrated Master Schedule
ITP	In-Trail Procedures
JPDO	Joint Planning and Development Office
LOA	Letter of Authorization
LOB	Line of Business (AVS, for example)
LPV	Localizer Performance with Vertical Guidance
MIT	Massachusetts Institute of Technology
MOPS	Minimum Operational Performance Standards
MSpec	Management Specification
NAC	NextGen Advisory Committee
NARP	National Aviation Research Plan
NAS	National Airspace System
NAV Lean	Navigation Procedures Project
NextGen	Next Generation Air Transportation System
NGIP	NextGen Implementation Plan
NGPT	NextGen Policy Team
NIEC	NextGen Integration and Evaluation Capability
NMB	NextGen Management Board
NOTAM	Notice to Airmen
NSIP	NextGen Segment Implementation Plan
OI	Operational Improvement
OPSP	ICAO Operations Panel
PBN	Performance Based Navigation
R&D	Research and Development
REB	R&D Executive Board
RNAV	Area Navigation
RNP	Required Navigation Performance
RNP AR	RNP Authorization Required
S/O	AVS Services and Offices
SA	Situation(al) Awareness
SBAS	Satellite-Based Augmentation System
SC	Special Committee
SESAR	Single European Sky ATM Research
SMART	Safety Management Action Review Team
SMR	Safety Management Review
SMS	Safety Management System
Spec	Specification
SSA	System Safety Assessment
STC	Supplemental Type Certificate
SVS	Synthetic Vision Systems
SWIM	System Wide Information Management
TBO	Trajectory-Based Operation
TCAS	Traffic Alert and Collision Avoidance System
TCRG	Technical Community Representative Groups
TOps	Trajectory Operations
TSAA	Traffic Situation Awareness with Alerts
TSO	Technical Standard Order
TSOA	Technical Standard Order Authorization
UAS	Unmanned Aircraft System
UAT	Universal Access Transceiver
UAT ARC	Unleaded Avgas Transition Aviation Rulemaking Committee
VDL	VHF Digital Link
VFR	Visual Flight Rules
VNAV	Vertical Navigation
VOR	VHF Omnidirectional Range
WAAS	Wide Area Augmentation System
WebOPSS	Web Based Operations Safety Subsystem
WG	Working Group



SECTION 1

The Next Generation Air Transportation System, better known as NextGen, is the most significant overhaul of the National Airspace System (NAS) in U.S. history. NextGen is a set of technologies, and a set of actions enabled by those technologies, that transforms the way the aviation system operates. The contributions of the Office of Aviation Safety (AVS) contributions are vital to the successful implementation of NextGen because efficiency, capacity, and environmental benefits will not occur without the successful integration of new technologies into the existing operational structure. Efficient safety oversight, aircraft-centric operations, and aircraft equipage are keys to NextGen's success.

INTRODUCTION

This Work Plan explains the AVS alignment with NextGen and charts a course for our involvement during a period of significant change. This year's AVS Work Plan for NextGen will guide our planning activities and focus on AVS-specific responsibilities and deliverables to support the overall FAA NextGen Implementation Plan (NGIP). The AVS Work Plan for NextGen not only details AVS's commitment to NextGen, but how AVS will carry out these tasks critical for the ultimate success of the NextGen program.

In December 2012, the FAA NextGen Management Board (NMB) approved the NextGen Segment Implementation Plan (NSIP) 5.0. This version of the NSIP lays out the FAA's plan for implementing the NextGen capabilities through 2020. Using the NSIP 5.0 and the broader 2013 NGIP as our guide, this Work Plan captures the AVS activities. In the following pages, you can check the status of streamlining initiatives from 2012; learn our plans for 2013; review for the AVS organization for NextGen; see our updated communications and training program; and review planned demonstrations and research, as well as a new discussion of AVS's efforts in global harmonization.

NextGen is dependent on our core safety initiatives, as AVS continues to ensure system safety is either maintained or improved. Safety improvements must accompany the expected increase in traffic and new operations flown in increasingly demanding conditions. AVS will achieve this through a Safety Management System (SMS) using Aviation Safety Information Analysis and Sharing (ASIAS). The SMS is a proactive approach for managing and evaluating all aspects of system safety, specifically monitoring the level of safety achieved in the air transportation system, and evaluating changes to the system. In 2010, we established our AVS SMS initial operating capability in fulfillment of our FAA strategic goal. As we move to an interoperable FAA SMS, it is paramount that we continue to mature our SMS. While SMS implementation is critical to NextGen, it is also a more broad initiative that is encompassing legacy programs and operations. As such, this work plan does not reflect the SMS details and implementation. The *Aviation Safety Organization Safety Management System (SMS) Implementation Plan*, released on February 2013, has details on SMS implementation.

The plans reflected in this Work Plan are impacted by changes in the FY2013 budget due to sequestration. We are striving to minimize those impacts, and will reflect revised plans as necessary in the 2014 AVS Work Plan.

SECTION 2

OVERVIEW OF AVS ACTIVITIES FOR NEXTGEN

The 2012 AVS Work Plan for NextGen identified a number of initiatives in the areas of developing standards and streamlining approvals processes. This section reviews the accomplishments since the publication of the 2012 plan and summarizes the objectives for future activities. You can find detailed descriptions of future activities in:

Appendix A: Planned policy for NextGen enablers (technology or operational procedures that enable new operations).

Appendix B: Planned policy to further improve the aircraft certification and operational approval processes for NextGen.

Appendix C: Planned activities supporting NextGen operational demonstrations.

Appendix D: Plans for additional studies, policies, or other activity relating specifically to an increment of an operational improvement.

A. NEXTGEN STANDARDS

NextGen includes a number of different operational capabilities. Operational Improvement (OI) planning documents describe these capabilities, sometimes further refined into several increments. To fully realize the benefits of these OIs, the aircraft and operator must enable certain capabilities through aircraft equipage and an operator's procedures. NextGen planning documents use the term "enabler" to describe the aircraft and operator capabilities required to achieve a given OI or increment.

Appendix A of the NGIP provides a complete description of all the NextGen enablers. Tables 1 through 4 contain a condensed version of the NGIP Appendix A material, with a description of the icons below. To facilitate tracking of our future work, Appendix A of this Work Plan lists enablers which are under development.

For each enabler, icons provide a quick look at the key information, including:

- Target Users: The target users for each enabler can include air carriers, business jets, general aviation fixed-wing and rotorcraft. These categories of target users represent generalized modes of operation and may not apply exactly to every civil or military operator. The FAA does not limit the NextGen capabilities to these targeted users groups. In addition to the specified user groups, some users may still find it worthwhile to invest in a particular enabler in order to meet their specific operational objectives.
- Target Areas for Implementation: The general strategy for deployment can include nationwide, in oceanic areas or in Metroplex terminal areas with large and medium hub airports and satellite airports.
- Maturity: An enabler may already be available for operator investment, in development (including standards development) or in concept development.

The entire NGIP is posted on the FAA's NextGen website: http://www.faa.gov/nextgen/

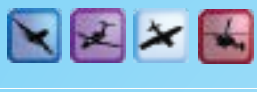
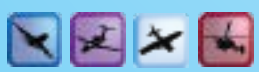
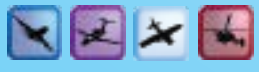
AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
PERFORMANCE BASED NAVIGATION (PBN)						
RNP 10	Order 8400.12C	Complete	Reduces oceanic separation			
RNP 4	Order 8400.33	Complete	Further reduction of oceanic separation (in conjunction with FANS-1/A)			
RNAV 1, RNAV 2	AC 20-138C AC 90-100A	Complete	Enables more efficient routes and procedures			
RNP 1 with Curved Path	AC 20-138C AC 90-105	Complete	Enables precise departure, arrival and approach procedures, including repeatable curved paths			
Vertical Navigation	AC 20-138C AC 90-105,	Complete	Enables defined climb and decent paths			
LPV	AC 20-138C, AC 90-107	Complete	Improves access to many airports in reduced visibility, with an approach aligned to the runway			
RNP Approaches (Authorization Required)	AC 20-138C AC 90-101A	Complete	Improves access to airports in reduced visibility with an approach that can curve to the runway; improves procedures to separate traffic flows			
Advanced RNP, RNP 0.3, RNP 2	AC	2014	Enables more accurate and predictable flight paths for enhanced safety and efficiency			
Trajectory Operations Navigation Standard	TSO, AC	2015	Enhances PBN capabilities			
Alternative Position, Navigation & Timing (APNT)	TSO, AC	2018	Provides global positioning system (GPS)-independent APNT capability			

Table 1. Performance Based Navigation (PBN) Enablers

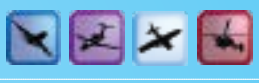
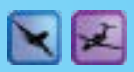
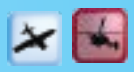
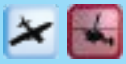
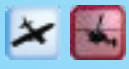
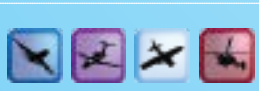
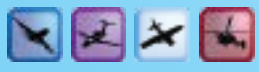
AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
ADS-B CAPABILITIES						
ADS-B Out	AC 20-165, AC 90-114, TSO-C166b, TSO-C154c	Complete	Enables improved air traffic surveillance and automation processing			
ADS-B IN APPLICATIONS						
Airborne/ Ground CDTI	AC 20-172 TSO-C195	Complete	Improves awareness of other traffic			
In-Trail Procedure (ITP)	AC 20-172A, AC 90-114 Chg 1 TSO-C195a	Complete	Improves oceanic in-trail climb/descent			
Interval Management	TSO, AC	2015	Displays along-track guidance, control and indications, and alerts			
Traffic Situational Awareness and Alerting (TSAA)	TSO, AC	2014	Displays and alerts crew to airborne conflicts independent of TCAS alerting			
Closely Spaced Parallel Operations	TSO, AC	2017	Provides guidance information for aircraft participating in paired approaches to closely spaced runways			
Advanced Flight Interval Management	TSO, AC	2017	Provides higher performance along-track guidance, control and indications, and alerts for terminal operations			

Table 2. ADS-B Enablers

Table 3. Data Communications, Low Visibility & Flight Deck Enhancements Enablers

AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
DATA COMMUNICATIONS						
FANS 1/A (Sat Comm)	AC 20-140A, AC 120-70B,	Complete	Provides oceanic data communications and surveillance, transfer of communications			
FANS-1/A+ (VDL mode 2)	AC 20-140B, AC 120-70B TSO-C160a	Complete	Provides for domestic data link clearances			
ATN Baseline 2	AC	2015	Provides clearances, terminal information, and Initial Trajectory Operations			
LOW VISIBILITY						
HUD/ILS	Order 8400.13D	Complete	Reduces minimums at qualifying runways			
EFVS	AC 20-167 AC 90-106	Complete	Uses enhanced flight visibility to continue approach below minimums			
	AC	2014	Expand operational use of EFVS			
GLS III	Project specific Policy	2016	Provides autoland in very low visibility			
FLIGHT DECK ENHANCEMENTS						
FIS-B	TSO-C157a, TSO-C154c	Complete	Provides weather and aeronautical information in the cockpit			
	TSO	2015	Provides UAT link-specific requirements for weather and aeronautical info to the cockpit			
EFB	AC 20-173 AC 120-76B AC-91-78	Complete	Allows electronic access to paper products			
Synthetic Vision Systems	AC 20-167	Complete	Displays a synthetic vision image of the external scene topography to the flightcrew			
AAtS	AC 20-177	Complete	Provides flightcrews with access to SWIM over nonaeronautical frequency bands			
ACAS-X	TSO, AC	2020	Improves airborne collision avoidance performance with fewer nuisance alerts			

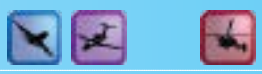
AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
AIRCRAFT (AIRFRAME AND ENGINE) AND FUEL TECHNOLOGIES						
Drop-In Alternative Jet Fuel Blends with Jet A	ASTM standard D7566	Complete	Expands jet fuel specification to allow use of Jet A blended with up to 50% of Synthetic Paraffinic Kerosene from Fischer-Tropsch or Hydroprocessed Esters and Fatty Acids (HEFA) processes			
Additional Drop-In Alternative Jet Fuels	ASTM standards alcohol-to-fuel pathways	2014	Expands jet fuel specification to allow use of Jet A blended with up to 50% of alternative jet fuels from novel processes and feedstocks, e.g. alcohol-to-jet (ATJ), pyrolysis,			
	ASTM standards pyrolysis	2015				
New Airframe Technologies	Technology available for product development	2015	Provides demonstrated and certifiable airframe technologies with lower fuel burn, emissions, and noise			
More Efficient Engines	Technology available for product development	2015	Provides demonstrated and certifiable airframe technologies with lower fuel burn, emissions, and noise			
Electric Propulsion	ASTM standards (electric propulsion)	2014	Enable certifiable electric propulsion technology with zero fuel burn and lower noise			

Table 4. Aircraft (Airframe and Engine) and Fuel Technologies Enablers

COMPLETED ENABLER POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2012 WORK PLAN SCHEDULE	STATUS
PERFORMANCE BASED NAVIGATION (PBN)					
RNP	Operational Rule	Draft rulemaking for changes to 14 Code of Federal Regulations (14 CFR), Sections (§§) 121.579, 125.329, and 135.93 regarding autopilot minimum use height operating rules to further enable the operational use of advanced autopilot and navigation systems, while continuing to allow for the utilization of legacy systems.	AFS-470	September 2013	Completed NPRM issued-December 2012
	AC	Airworthiness guidance for installed position and navigation equipment	AIR-130	Not Previously Listed	AC 20-138C May 2012
	Instrument Flight Procedure Design Guidance	Publish Order 8260.PBN to incorporate and supersede Order 8260.42B, 8260.44, 8260.52, and 8260.54A	AFS-420	December 2012	Order 8260.58 Completed September 2012
AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST (ADS-B)					
In-Trail Procedure (ADS-B In)	Operational guidance	Update AC 90-114A *Automatic Dependent Surveillance-Broadcast Operations*	AFS-406	September 2012	Completed September 2012
	Implementation Guidance	*Revised Order 8900.1 for standard Operations Specifications*	AFS-430	September 2012	Completed September 2012
DATA COMMUNICATIONS					
Dual Stack Data Comm	Installation Guidance	AC 20-140B *Guidelines for Design Approval of Aircraft Data Link Communications Systems Supporting Air Traffic Services (ATS)*	AIR-130	October 2012	Completed September 2012

Table 5. Completed Enabler Policy

PBN/RNP

In 2012, we consolidated the instrument flight procedure guidance relating to PBN into a single document. This eliminated duplication of guidance, as well as resolved several inconsistencies that had developed between different types of operation. This consolidation was a prerequisite to improving our ability to improve criteria as we gain more operational experience or add new operations, so that now only a single document will need to be updated.

This year's plan reflects several new initiatives in PBN. As we have continued to gain operational experience with the existing operations, we have identified new operations that would provide benefits. Advanced RNP operations include a set of new capabilities that are grouped together in our schedule for equipment, operational and instrument procedure design criteria. Advanced RNP will enable increased use of radius-to-fix (RF) legs by enabling this type of operation without the stringent equipment and training requirements for RNP AR (required for terrain avoidance but not relevant to when RF legs are used for other reasons). It will also, allow for procedures with scalable accuracy values as low as 0.3 nm for terminal procedures, and leverage currently fielded aircraft navigation technologies. We will also introduce the criteria for RNP 2 en route operations, which we are currently evaluating to see if there are appreciable benefits in a flexible en route environment with limited published route structure. For helicopters, we are developing material for RNP 0.3 departure and en route operations in congested environments, taking advantage of the slow speed and high maneuverability of the rotorcraft. We have already developed high level criteria for Advanced RNP in coordination with the International Civil Aviation Organization (ICAO) PBN study group. These criteria will promote more accurate and predictable flight paths, especially during turns, allowing for even greater efficiency. It will also facilitate streamlined navigation system and operational approvals.

Another new enabler is A-PNT. This project is still in research, but is evaluating candidate technologies that could provide a back-up position source for navigation and surveillance when GPS is not available. The current back-up strategy is to leverage the ground and airborne investment in legacy systems (VORs, ILS, and secondary surveillance radars). However, these systems have operational limitations and the ground systems are very old and will be increasingly expensive to maintain as a backup. The FAA has already initiated a reduction in the legacy systems that is not dependent on A-PNT (for additional information reference Federal Register Notices on Proposed Provision of Navigation Services for the Next Generation Air Transportation System (NextGen) Transition to Performance-Based Navigation)

As we introduced last year, the FAA is working with RTCA/Special Committee (SC)-227 *Standards of Navigation Performance* to develop standards that will incorporate lessons learned from PBN implementations over the last decade and include necessary capabilities to support future trajectory operations in the NAS. Development of a TSO and AC are now planned for 2015 to allow time for continued standards development.

ADS-B

AVS continues to support and review development of new policy and guidance for emerging ADS-B in applications. Our plans considered the recommendations received from the ADS-B In Aviation Rulemaking Committee (ARC), and continue to be reviewed (see sidebar on ADS-B In Aviation Rulemaking Committee). Standards for situation awareness applications are complete, as are the standards and FAA approval guidance for ADS-B In In-Trail Procedure (ITP). Air Traffic Safety Oversight Service (AOV) has approved and is monitoring the FAA ADS-B In ITP Trial, in the Pacific Oceanic Flight Information Region (FIR) airspace (ECD 2014). We continue to work with industry, through RTCA Special Committee 186, on internationally harmonized standards for the Interval Management application. This enabler will provide

the CAVS, FIM-S, FIM-DI and CEDS operations that have been requested by the ADS-B In ARC (see insert).

The Massachusetts Institute of Technology (MIT) is conducting applied research to investigate requirements and algorithms for a low-cost alternative to TCAS I for general aviation, with alerting logic compatible with typical traffic patterns under visual flight rules (VFR). We have broadened this application to include helicopters, in response to the increasing risk of collision in mixed-use environments.

Early operational trials of surface applications identified a number of technical challenges; most notably, multipath interference and line-of-sight blockage on the airport surface inhibit the reliable reception of same-link ADS-B data while taxiing on the airport. Therefore, although we mentioned the surface indications and alerting in last year's Plan, we are deferring it after the higher priorities of the ADS-B In ARC are complete.

We added Advanced Flight Interval Management in this year's Plan. Where the current Interval Management would provide spacing on a single arrival stream, Advanced Flight Interval Management would allow more consistent spacing for merging from various directions and flight paths. We are also continuing research on use of ADS-B for paired approaches to parallel runways, where aircraft stay close enough together to avoid wake while maintaining safe separation.

AVS will continue to develop policy, guidance, and training, enabling our personnel to approve and monitor ADS-B avionics performance. We continue to support the development of the ADS-B Service Availability Prediction Tool and Compliance Monitor to prepare our personnel and aviation community for the ADS-B Out mandate in 2020.

ADS-B IN AVIATION RULEMAKING COMMITTEE

The ADS-B In ARC delivered its recommendations to the FAA in November 2012, identifying the applications on which funding should be focused to accelerate the development of equipment standards, certification and operational approval guidance, and ground automation modifications implementation. The applications identified in the report include:

1. CDTI-Assisted Visual Separation (FY 2012 using ADS–B Out legacy equipage targets and FY 2013 additionally using TIS–B targets)
2. Flight deck-based Interval Management–Spacing (FIM–S) (Defined Interval (DI) based on current separation standards, to include merging of different traffic streams while increasing arrival throughput) (FY 2015)
3. Traffic Situation Awareness with Alerts (TSAA) (FY 2013)
4. Oceanic In-Trail Procedures (ITP) (FY 2013)
5. CDTI-Enabled Delegated Separation (ending in a visual approach) (FY 2016)
6. Ground-based Interval Management–Spacing (GIM–S) with Wake Mitigation (Establish provisioning by calendar year (CY) 2013, ADS–B Out Link MOPS by CY 2015, ADS–B In platform MOPS by CY 2015, GIM–S with Wake Mitigation at core airports by the end of CY 2018)
7. Flight deck-based Interval Management–Defined Interval (FIM–DI) (Operational trial by FY 2017 with a push to be operational 2 years following completion of the trial)
8. FIM–DI for Closely Spaced Parallel Runway Operations (CSPO) (FY 2017)
9. Oceanic Interval Management (IM) (FY 2015)
10. Airport Traffic Situation Awareness with Indications and Alerts (SURF–IA) at airports with surface multilateration system (FY 2017)

The term Delegated Separation and the concept it encompassed was opposed by the Air Traffic Controller's union and the Airline Pilots' union. The ARC recommended that ATC delegate a spacing task to the flightcrew while ATC maintained separation responsibility for all ADS-B applications. This change in concept has been renamed "Defined Interval (DI)."

DATA COMMUNICATIONS

In 2012, the FAA launched the initial NAS DataLink Segment 1 Phase 1 program that builds on aircraft FANS 1/A existing equipage. AVS completed the policy to support this implementation in the aircraft, and we are currently working with the data communications program to address any implementation issues. Europe is proceeding with the deployment of the Aeronautical Telecommunications Network Baseline 1 (ATNB1), and ICAO has agreed to require FANS 1/A in the North Atlantic track system in 2015. Aircraft equipped after January 2014 that will operate in the North Atlantic and in Europe will need to equip with both FANS 1/A and ATNB1, commonly called a "dual stack". In 2012, we updated our guidance to address these aircraft to provide a stable development and certification basis.

We continue to work with industry to develop standards for Aeronautical Telecommunication Network Baseline 2, or ATNB2, through RTCA Special Committee 214. As endorsed by industry through the RTCA NextGen Advisory Committee (NAC), ATNB2 is the objective for the transformational operations of NextGen. The FAA is evaluating the input from the NAC concerning the appropriate transition plan and detailed scope of ATNB2. As part of our program validation, we are compiling and finalizing the communication needs in support of three other NextGen initiatives: ADS-B, trajectory operations, and improved AIS and meteorological information. We are working with other lines of business within the FAA to consolidate the master schedule for these capabilities, taking into account the challenges that operators face in equipping with interim solutions such as FANS and ATNB1.

The appropriate transition plan or recommended schedule is still under development. We expect to achieve NextGen and Single European Sky ATM Research (SESAR) convergence through ATNB2. The joint SC214-WG78 activity is compiling and finalizing the communication needs in support of three other joint subcommittees (navigation SC227-WG85, surveillance SC186-WG51, and Aeronautical and Information Services and Meteorology Information SC 206-WG76) in a programmatic approach to maximize ATNB2 benefits.

SYSTEM WIDE INFORMATION MANAGEMENT

System-wide information management (SWIM) is a program to provide internet-based access to various aeronautical information to authorized users. Rather than the FAA broadcasting large volumes of data to everyone, SWIM is a subscription-based service where operators or other users can pull desired data from the FAA information systems. While the SWIM program is still in development, we have completed the policy and guidance for airborne access to SWIM (AAtS) by providing certification and operational guidance. We were able to complete this guidance because the applications envisioned for SWIM are enhancements to those already enabled by our policy on electronic flight bags. The EFB policy describes how we will evaluate the use of AAtS for various applications, and other policy on the use of non-required communication networks addresses how industry can provide internet-based connectivity to the cockpit.

In order to evaluate the benefits of AAtS, we are working with other FAA offices to conduct conceptual demonstrations in advance of SWIM becoming operational. The FAA will support conceptual demonstrations along with standards development enabling Aircraft Access to System Wide Information Management system (AAtS). Aircraft need specific interface standards to access SWIM, but we do not envision applying those standards as requirements as the safety hazards associated with their use should be minor or have no effect.

LOW-VISIBILITY OPERATIONS

Low-visibility operations continue to leverage new technologies and advanced procedures. For example, the EFVS rulemaking activities are considering enabling operational credit to commercial operators using an approved EFVS by allowing it during flight planning and prior to initiating an approach. This benefit is already available to general aviation. The FAA continues to work with industry, through RTCA SC-213, to reduce progressively the natural visibility needed to land using EFVS technology and operations.

Synthetic Vision Systems (SVS) also continue to proliferate and can add to the pilot's overall situation awareness. Since current approved uses of SVS are for improving the pilot's situation awareness, we moved current SVS technologies to the Flight Deck Enhancements group of enablers. We will continue to explore SVS for operational credit and further implementation as the technology advances. We do not have a specific program for SVS, as we do not consider it a surrogate for natural vision.

Ground-Based Augmentation System (GBAS) Landing System (GLS) Category I precision approaches at Newark Liberty International Airport (EWR) are complete and in revenue service while operations at George Bush Intercontinental Airport (IAH) are awaiting final approval. Modifications to the ground facility at Newark were completed to mitigate GPS L1 frequency interference in the local environment. The GBAS at IAH will have this same robust capability. The FAA developed a tool to identify periods of unavailability and is now available for operational use at EWR and IAH. A relatively small GBAS service volume is planned at IAH, consistent with the current ground system capability. We are working with the office of NextGen to research the use of GLS for Category II/III operations.

FLIGHT DECK ENHANCEMENTS

In September 2011, we completed the revision to Flight Information Services-Broadcast (FIS-B's) technical standard order (TSO)-C157a. This TSO updated the standards for FIS-B receivers to ensure compatibility with the information supplied over the ADS-B network on the Universal Access Transceiver (UAT) frequency. *The Surveillance and Broadcast Services Description Document*, SRT-047, dated October 24, 2011, provides supplemental information to assist FIS-B manufacturer.

Electronic Flight Bags (EFBs) continue to impact both general and commercial aviation by providing improved access to information on the flight deck. General aviation pilots may use these technologies at their discretion, and may use them to replace paper as addressed in AC 91-78. For all operators with operations specifications (OpsSpecs)or management specifications, the operator must have an FAA approved EFB program in place. In June 2012, we updated AC 120-76B, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags. This AC clarified EFB language and brought our EFB guidance up to date with portable tablet computing technology being utilized by today's operators. The FAA also released AC 120-76B Change 1 for public comment in December 2012. This policy will allow operators to utilize own-ship position on the ground as a Type B software application, utilizing an installed or commercial-off-the-shelf (COTS) GPS with an appropriate qualification program. We recognize the utility of EFBs to support advanced flight planning and provide improved access to information in the cockpit. However, we do not recommend the use of portable devices to comply with any required equipment under the operating rules, as the portable equipment does not have the reliability or quality control that is inherent in installed systems.

ACAS X is a family of collision avoidance systems. ACAS XA is intended to fill the role of current Traffic Alerting and Collision Avoidance Systems (TCAS_, serving as a collision avoidance system for large transport and cargo aircraft. ACAS XO is intended for specific flight operations of those same users when normal separation may result in excessive nuisance alerts, such as closely-spaced parallel operations.

ENGINE AND FUEL TECHNOLOGIES

The use of new fuels is a critical issue, and the Aircraft Certification Service established a new office in 2012 to address the use of new fuels. The AIR Fuels Program Office is the advocate and focal point for regulations, policies and certification programs for fuel related activities. This office is responsible for addressing the Unleaded Avgas Transition Aviation Rulemaking Committee (UAT ARC) recommendations to meet the Destination 2025 goal of having an unleaded replacement fuel that is usable by most general aviation aircraft.

Drop-In Renewable Jet Fuel: ASTM D7566 dated July 1, 2011, specifies the first type of renewable drop-in jet fuel called hydroprocessed fatty acid esters and fatty acids (HEFA). HEFA fuel meets the approved operating limitations for aircraft and engines certificated to operate on Jet A or Jet A-1 fuel, and it is therefore acceptable for use on existing aircraft and engines. The Commercial Aviation Alternative Fuel Initiative (CAAFI), with FAA sponsorship, played a key leadership role in the qualification of this new renewable jet fuel.

CAAFI and the FAA will continue to support the qualification of new renewable fuel pathways. Currently, an ASTM Task Force is developing specification criteria for alcohol to jet (ATJ) fuels. The CAAFI would convert fermented sugar or cellulosic feedstocks into a hydrocarbon jet fuel product. Other pathways beginning the qualification process include fuels made from pyrolysis of cellulosic feedstocks, or Direct Sugar to Hydrocarbon fuels, which utilize advanced fermentation processes to convert sugar directly to a hydrocarbon fuel product.

Unleaded Aviation Gasoline (avgas): The Unleaded Avgas Transition Aviation Rulemaking Committee (ARC) was established in January 2011 to develop recommendations for a government-industry collaborative to facilitate the development and deployment of an unleaded replacement avgas. The Unleaded Avgas Transition ARC issued its final report and recommendations on January 31, 2012. The AIR Fuels Program Office will issue a plan to address the recommendations from the report in March 2013.

The FAA and industry qualified and approved a very low lead avgas in May 2011 for use on existing piston engines and aircraft.

STREAMLINING INITIATIVES

NextGen involves unprecedented changes to the NAS. As the FAA moves forward with implementing these changes, we must ensure new systems are reliable, safe, and address all of the operational aspects of normal and abnormal operation.

We must efficiently fulfill these safety responsibilities, prioritizing our involvement in areas more likely to have safety risks and seeking ways to streamline our approval processes. The themes from our previous work plans remain valid, which include:

1. Ensure effective coordinaton within AVS (including AIR and AFS).
2. Ensure we receive appropriate and timely training.
3. Improve tracking of applications and ease of applying through the better use of information technology.
4. Make effective use of delegation.

Last year, we continued the streamlining initiatives originated in the 2010 AVS Work Plan for NextGen. Table 6 shows the status of 2012 AVS activities.

INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2011 SCHEDULE	COMPLETION STATUS
Nav Lean Rec 1	Identify conditions and amend Policy (FAA Orders 8260.19 & 8260.43) to allow expedited processing and clear definition of minor revisions to Instrument Flight Procedures (IFPs).	AFS-400	September 2013	Complete (FAA Order 8260.19 & 8260.46 Updated August 2012)
Nav Lean Rec 2	Approve Terminal Area Route Generation, Evaluation, and Traffic Simulation-developed STAR output for electronic transfer of data to the National Aeronautical Services Group procedure production database.	AFS-400	September 2013	Complete (Authorization Memo Signed September 2012)
Nav Lean Rec 14	Revise FAA Order 8260.19 to define clearly the responsible Federal official authorized to sign applicable environmental documents. *This represents the AVS portion of Rec 14.	AFS-400	September 2013	Complete (FAA Order 8260.19 Updated March 2012)
Nav Lean Rec 15	Establish the United States Instrument Flight Procedure Panel (US-IFPP) as the focal point for criteria changes and new requests. Submit FAA Order 8260.IFPP for formal coordination.	AFS-400	September 2012	Complete (Charter signed January 2013)
Expansion of Approved Model Lists	Notice describing use of approved model lists for all aircraft product types.	AIR-110	September 2012	Complete
Field Approval Process	Establish online Job Aid for field approvals (currently Figure 4-68 in 8900.1, Volume 4, Chapter 9, Section 1). Allowance for qualifying ADS-B Out installations to be approved as a major alteration.	AFS-360	August 2012	Completed October 2012 (Online Job Aid and Policy Memo)
Training	Develop NextGen avionics design approval course	AIR-130	Contingent on Funding	In Progress (Funded in September 2012)

Table 6. Streamlining Initiatives from 2012

There were four items in last year's Work Plan that were contingent on funding. These items included two WebOPSS Enhancements for streamlining applications and data reporting, and two training classes on NextGen avionics design approval and avionics maintenance. Funding was identified in 2012 for the training initiatives, and the other items remain contingent on funding.

In addition to the policy, we supported a number of key aircraft certification and operational approval projects. In 2011, Flight Standards Service (AFS) Principal Operations Inspectors (POI) completed RNP Authorization Required (RNP AR) applications for four air carriers (including one foreign carrier), and nine part 91 operators. These procedures increase access and capacity with more fuel-efficient approach procedures through the NAS. The United Parcel Service certified the first rule-compliant ADS-B Out aircraft using a Rockwell Collins GPS receiver and a Mode S transponder from ACSS, Inc. United Airlines' approval of equipment and a special operations specification enable ADS-B In trials of ITP.

STREAMLINING CERTIFICATION AND INSTALLATION

Streamlining the certification of NextGen technologies in aircraft begins with clear criteria for approval, described in Table 6. With clear standards, we can make better use of our resources for effective certification of aircraft. In addition, we have a number of initiatives underway associated with the procedures and methodology of certification:

1. Recognition of the priority of NextGen projects. Our criteria for prioritizing applications with significant workload recognizes NextGen projects when determining priority. Safety-enhancing projects remain our highest priority, but this change recognizes that NextGen projects are in the national interest. The NextGen Policy Team annually submits a list of eligible NextGen technologies to the Standards Management Team (SMT) for approval. The SMT posts the list on the Certification Project Notification website for reference.

2. Assessment of our involvement on projects. We have begun to use risk-based resource targeting in reviewing applications to focus our resources on areas of higher risk.

3. Enabling effective re-use of data from one project to another. The re-use of data can reduce development times, but does not change the responsibility of each applicant to show compliance with the regulations, and to establish applicability of the data being re-used to the project. The FAA has affirmed several means of creating data to support multiple approvals, including the use of TSO authorizations (TSOAs) and the use of a supplemental type certificate (STC) with an approved model list. The FAA updated certification procedures to more clearly address the use of data created under a TSOA, including features or functions not specifically called out in the standard itself. In addition, we published a Policy Memo (AIR-100_2012-09-14) affirming the use of approved model lists for each product type, and plan to publish a new AC for industry to help them understand the data required to support approval in multiple models.

4. With the goal of streamlining airworthiness approvals, AFS coordinated with AIR in providing an online job aid for field inspectors and engineers on whether an aircraft modification was eligible for a Field Approval or needed a STC. This job aid clarified the classifications and definitions of some major alterations. For more information, go to http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs300

In some cases, aircraft equipment installers can accomplish the installation of NextGen equipment as an aircraft alteration with a simple approval process. Last year we implemented a new online job aid to help decide what types of installations can be accomplished as field approvals. This activity, along with the joint order on major repair and alterations planned for December 2013, is replacing the original NextGen initiative of publishing policy defining major and minor changes in type design. By providing this job aid, we allow the consideration for the scope and complexity of an alteration in deciding if it is eligible for a field approval, but many other factors must also be considered such as the similarity of equipment that was previously installed or the applicability of data from a similar project. We can easily change the new job aid, and inspectors or industry can provide recommendations on material the FAA should update. Separately, in October 2012, we published a Policy Memo on approving ADS-B so that certain types of ADS-B Out installations could be accomplished as field approvals (AIR-100_12-10-10).

Finally, we must recognize that people are the strength of aviation safety, providing oversight of a huge and diverse industry to ensure safety. We must give our people the tools to do their jobs effectively, which starts with training on the new technologies and initiatives that NextGen brings. We have updated a number of other courses as shown in Table 7.

As we look to continued introduction of new technologies and policies, we are developing a more complete NextGen training program, which we will readily update. We will provide refresher training upon receipt of an application for a NextGen technology the AVS employee has not recently worked. We must also recognize the migration of avionics architecture and address innovations in integration, and provide compliance guidance to manufacturers. For example, with integrated systems and broadband communication, it is technically feasible to update avionics software with remote maintenance. Part of the avionics training curriculum roadmap determines potential gaps in preparing for new technology and associated airworthiness considerations.

STREAMLINING OPERATIONAL APPROVALS

AVS commits to streamlining operational approval practices and procedures, and to provide transparency to applicants on the status of their applications by implementing a structured reporting process. The major strategies that we continue to use include:

1. Bringing operational experience closer to the field. Through the aircraft evaluation groups and the NextGen branches in the regions, we are able to bring subject-matter expertise on new projects and initiatives to assist in handling operator projects.

2. Tracking and reporting application status. Provide both an internal mechanism (SharePoint) and an on-request status of the application to keep an applicant aware of the progress of their request for operational approval.

3. Integrating and leveraging supplier/original equipment manufacturer (OEM) approvals. Our experiences with reduced vertical separation minima and RNP have illustrated the value of clearly establishing aircraft qualification for each enabler by the supplier, so the operator only has to focus on the operation and maintenance of the capability. For RNP AR approaches, the OEMs who have established compliance under a certification project have dramatically reduced the time for their customers to obtain operational approvals, sometimes within weeks of application.

4. Use information technology to improve tracking and visibility of projects. Given the scope of NextGen and the number of operators involved, a robust IT infrastructure is essential to tracking and managing applications and approvals. We identified our initiative to improve WebOPSS as key components of the Navigation Procedures Project (NAV Lean).

THIRD-PARTY PROCEDURE DESIGN PROGRAM

The FAA has established a program to enable third parties to accomplish procedure development of RNP AR instrument approach procedures.

In 2011, AVS published AC 90-110, *Authorization Guidance for Development of Required Navigation Performance Procedures with Authorization Required by Third Party Instrument Flight Procedure Service Providers* and AC 90-113, *Instrument Flight Procedure Validation (IFPV) of Satellite-based Instrument Flight Procedures (IFP)*, were published. These two documents provide policy and guidance for the development of RNP AR instrument flight procedures by nongovernmental third party IFP service providers. This end-to-end process includes: IFP design, quality assurance, environmental analysis, flight validation and maintenance, while complying with the principles of the SMS process. Two companies qualified under this program. To date, we have developed and implemented four RNP AR approaches into the NAS under this guidance (2 at Deadhorse, AK; 1 at Savannah, Ga; and 1 at Windsor Locks, CT), with several more expected in the next thirteen months. AFS accomplished comprehensive and ongoing FAA safety oversight of these service providers.

PBN INITIATIVES

In response to recommendations from the RTCA NextGen Mid-Term Implementation Task Force Report (Task Force 5), AVS and Air Traffic Organization (ATO) charted and jointly sponsored the NAV Lean in January 2010. The purpose of this project was to review and make recommendations to improve and streamline all processes used to request, prioritize, develop, improve, and implement performance-based and conventional IFP. A team of more than 100

FAA subject matter experts across three lines of business (LOB) analyzed the issues and developed recommendations to streamline IFP production. The team included Lean/Six Sigma experts whose goal was to identify ways to provide maximum value to its customers through an optimal process with minimal waste.

In September 2010, AVS and ATO approved the NAV Lean Team's final report containing 21 specific recommendations. For a fullfull report, go to http://www.faa.gov/nextgen. In June 2011, the FAA approved the Navigation Procedures Implementation Plan (NAV Lean Implementation Plan), thus initiating a methodology to ensure full implementation of all recommendations. Execution of this plan is a cross-agency effort, led by ATO and AVS. We have already implemented many recommendations, and the expected completion date of the final recommendations is FY 2015.

One of the initiatives completed in 2012 is the allowance for minor revisions to instrument flight procedures to go through an expedited process. The initial sample shows an average of 25 days from submission to publication for the abbreviated process compared to the standard 174 day pipeline for the full development process. While this is a notable improvement, it is even more significant as it frees up resources to work on more extensive changes.

C. OPERATIONAL DEMONSTRATIONS

Demonstrations are an important tool for the FAA in moving new technologies from idea to implementation. AVS will work with partner FAA organizations or internally to ensure that the demonstrations designed will minimize the risk to the actual implantation of new operational capabilities. Appendix C lists those NextGen demonstrations that are of particular interest to the AVS.

D. OPERATIONAL IMPROVEMENTS AND INCREMENTS

Each NextGen operational improvement is a description of specific operational changes to the NAS that will provide an incremental improvement in one or more NextGen goals. The FAA divides operational improvements into their functional increments. An operational improvement may have only one increment or it may have several increments, as the FAA and industry identify ways to gain early benefits and early experience without compromising NextGen's longer-term objectives.

Appendix D identifies all the initial increments in the FAA plan, nominally providing capabilities by 2015, associates them with specific enabling aircraft technology or operational procedures (enablers), and with other supporting AVS activities. In some cases, Appendix D directly relates specific equipment or operational guidance to an increment. For example, one increment concerns a safety initiative to allow use of EFBs to display traffic on the airport surface. While TSO-C195 and AC 20-172 provided equipment standards and guidance for airport display of traffic, additional guidance/ supporting activities will be provided to explain how this particular application can be accommodated on a portable EFB.

Another important supporting activity is the use of AFS and Office of Accident Investigation and Prevention (AVP) simulators and computer modeling capabilities. These capabilities can evaluate the safety of some operations. One example is the potential reduction of the distance between independent parallel runways – based on replacing historical assumptions of flightcrew blunder characteristics with a data-driven model of blunders actually observed in the NAS. (A blunder occurs when an aircraft on an approach to a parallel runway intrudes into the established safety buffer between the two runways.)

A final example of AVS activities is the oversight of the ATO SMS, and the approval of certain mitigations through the SMS process and controls associated with changes to the NAS. AOV has the responsibility to monitor Air Navigation Service Provider NextGen initiatives as they proceed through the SMS processes. Our objective is to assist in the early identification of potential safety risks or issues associated with the risk analysis for the FAA to implement NextGen improvements safely on schedule.

The most substantial supporting activity that AVS provides to these NextGen initiatives is not listed in Appendix C, i.e., the evaluation, approval, and oversight of manufacturers and operators. This core service remains one of our most important activities, applying both to NextGen as well as non-NextGen operations. Since these activities are part of our core mission, we do not track or list them separately in this Work Plan. However, we continue to update our forecast of the level of aviation activity, based on NextGen and other factors, to ensure that we have the resources to assure aviation safety for the American public.

AVS METRICS FOR NEXTGEN

We have implemented a dashboard for tracking all the initiatives in this Work Plan, providing visibility on these program objectives throughout AVS management. However, the activities in the Appendices are only a small portion of the overall support to NextGen that we provide. Our normal jobs provide the majority of our support, such as evaluating applications for type certification and supplemental type certification, and reviewing operators' training and procedures for NextGen operations. The standards, guidance, and training initiatives outlined in this Work Plan support these activities, and we will monitor the overall review and approval system to identify any possible deficiencies in policy, training, or execution.

In an effort to allow operators to quickly and safely implement NextGen operations, AFS-400 and AIR-130 develop policy to allow aviation stakeholders to adopt NextGen technologies. To better understand the "effectivity" of its policy, and focus limited resources in an economically constrained environment, we continue to develop means to measure and improve NextGen policy. We're exploring our options to collect internal and external data that can identify ways to increase NextGen adaptation. By analyzing current data and possibly changing the way data is input in the field, the goal is to find ways to streamline NextGen approvals and equipage.

EQUIPAGE LEVELS

The Current Equipage Level of Available Enablers Table 7 summarizes equipage levels of mature avionics enablers among air transport operators (14 Code of Federal Regulations (14 CFR) part 121 operators), air taxis (14 CFR part 91K and 135 operators), and helicopters (14 CFR part 135 operators). The high penetration of PBN enablers reflects the maturity of those capabilities in various forms for more than 10 years. While the general aviation fleet continues to experience significant adoption of advanced technologies, especially with Wide Area Augmentation System (WAAS) avionics, precise equipage numbers are difficult to obtain and are not included. We base the equipage number in Table 7 on documented operational approvals for air carriers, air taxis, and helicopters. The reported number represents the upper bound of all aircraft under the holder's authorized Operations Specification, but the holder doesn't have to equip all aircraft. Since these equipage levels are sensitive to changes in fleet composition, the estimate aggregates our understanding of fleets in the three categories.

FOUNDATIONAL EQUIPAGE

The FAA recognizes the holder can install a variety of aircraft architectures and different equipment to achieve a given capability. Conceptual metroplex and general capabilities are listed below. The FAA selected the metroplex foundational enablers, because they provided the greatest impact on Metroplex operations and presume high levels of equipage. The general foundational enablers target the minimum NextGen capabilities outside of metroplex areas. The Foundational NextGen Enablers chart displays capability levels. (Refer to ADS-B operational requirements in 14 CFR 91.225 and 91.227.)

ENABLER	AIR	AIR TAXI	HELICOPTER
RNP 10 - Oceanic	90%	8%	N/A
RNP 4	90%	8%	N/A
RNAV 1	96%	57%	19%
RNAV 2	98%	72%	23%
RNP 1 with Curved Path	50%	6%	3%
VNAV	68%	34%	N/A
LPV Approach	<1%	N/A	N/A
RNP AR Approach	50%	10%	3%
ADS-B Out (Rule Compliant)	<1%	N/A	N/A
Airborne/Ground CDTI (ADS-B In)	2%	0%	0%
ITP, ADS-B In	<1%	0%	0%
FANS 1A (SATCOM)	10%	12%	N/A
FANS 1A+ (VDL) Mode 2	2%	12%	N/A
HUD / ILS	17%	<1%	<1%
EFVS	2%	12%	0%
EFB	9%	36%	12%

Table 7. Current Equipage Levels of Available Enablers

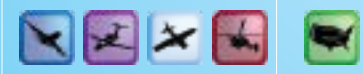
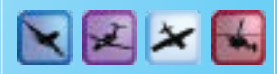
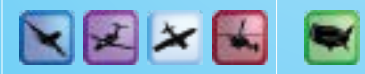
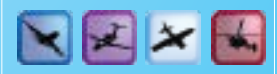
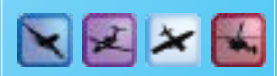
METROPLEX			GENERAL		
ENABLERS	TARGET USERS	TARGET AREA	ENABLERS	TARGET USERS	TARGET AREA
REQUIRED ADS-B CAPABILITIES					
ADS-B Out			**ADS-B Out**		
RECOMMENDED PBN					
RNAV 1, RNAV 2			**RNAV 1, RNAV 2**		
RNP 1 With Curved Path			**LPV**		
VNAV					
RNP AR Approach					

Table 8. Foundational Avionics Enablers

SECTION 3

This section provides an overview of AVS responsibilities in support of NextGen, highlights our safety oversight mission, and discusses our three core business areas:

1. Developing standards;
2. Managing approval processes and procedures; and
3. Overseeing continuous operational safety (COS).

It also reiterates the roles and responsibilities of the services and offices within AVS, as they relate to NextGen.

AVS RESPONSIBILITIES IN NEXTGEN

A. AVS AND THE NEXTGEN TRANSFORMATION

AVS plays an important role both in developing and implementing NextGen technologies and operations. Figure 1 portrays the lifecycle of technologies and operations, highlighting the role of the AVS Services. Generally, initiatives mature from an initial concept, through experimental prototyping, operational prototyping and then deployment. However, not all projects go through these stages – a concept may go directly to implementation without an experimental or operational prototype, if the technology and concepts involved are mature.

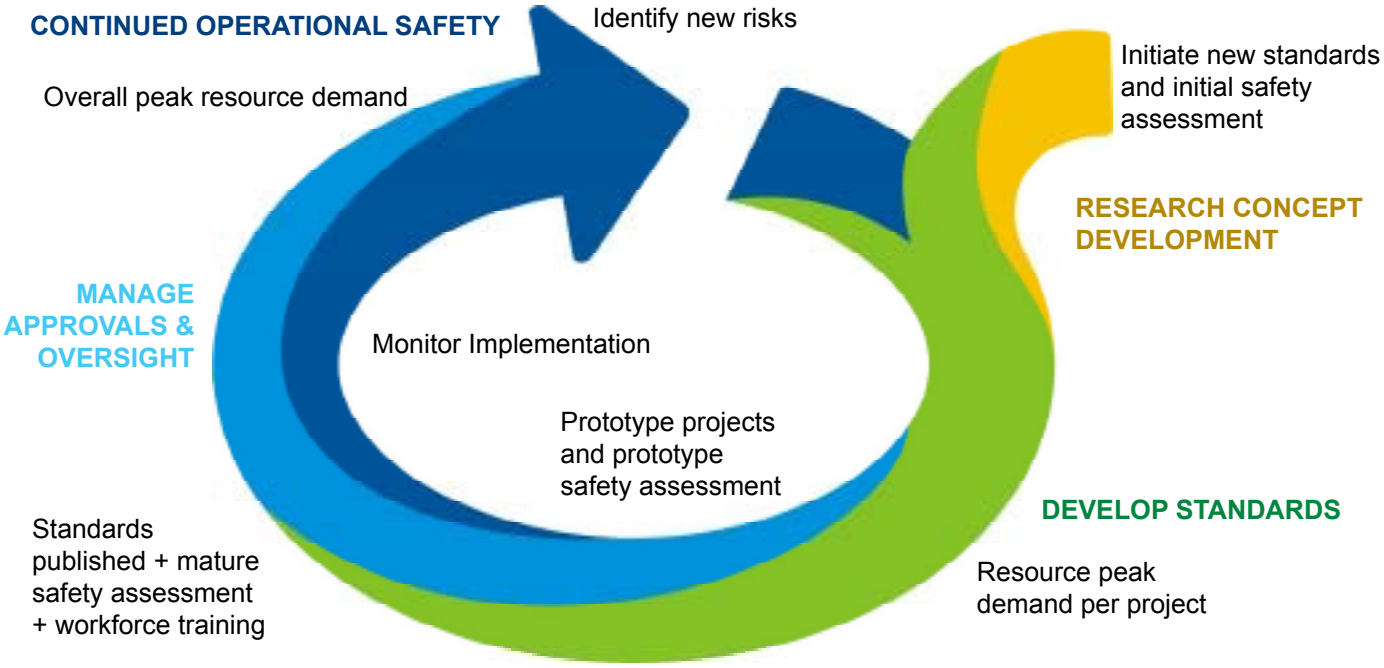


Figure 1. Policy Development Life-Cycle

Figure 1 shows the primary responsibilities of AVS -- collaboratively developing standards and overseeing safety assessment. This figure shows an ideal alignment of the development of standards with the technology itself. The standard should be initiated early in the concept development, with a baseline standard available for use by the operational prototype. In addition to prototypes the applicant may develop a proof of concept using new technology or technology in a new way. AVS will work with the applicant to prove and refine these new prototypes and/or concepts of operation. If an industry standard is not available in time for an operational prototype, the applicant and the FAA must determine the appropriate requirements to apply to the system to ensure safety and achieve the desired operation. This can be resource-intensive, as the level of safety to be achieved is the same for an operational prototype as it is for full deployment.

Figure 1 also illustrates the importance of safety assessment throughout the development lifecycle. Consideration of the safety aspects that must be embedded within the initial concept development – otherwise, whole aspects of the technology or operational concept may need revision in order to ensure safety.

The safety assessment must mature as the standards are developed, with a sufficient safety assessment available to enter the operational prototype into service. Typically, the operational prototype is approved with some unique operational limitations to address potential deficiencies in the requirements, until the requirements can be validated. Mature standards are aligned with a mature safety assessment, after which the initiative must be monitored in service to ensure that any assumptions or analyses are valid, and to identify any unanticipated risks.

The demand for AVS resources, on a *per-application* basis for each operational prototype, peaks during the standards development stage. This stage is where the initial standards and corresponding safety assessments must be accepted, and where it is crucial to mature the standards and concepts leading to a final standard.

The demand for AVS resources, as applied to an *entire initiative*, peaks in the approval and oversight phase as many applicants seek approvals and the scope of monitoring for safety continues to expand. Ensuring that standards are robust and simple can reduce the required resources for the implementation phase. In general, NextGen standards will be developed as performance-based standards when possible, due to the flexibility in implementation that they accommodate. However, this flexibility increases the workload for implementation, as the AVS workforce must be prepared to provide oversight of the technological and operational variations engendered by that flexibility. This is an important consideration when developing standards.

While Figure 1 describes generalized phases for the lifecycle of a NextGen initiative, it does not describe all of the necessary tasks. For example, aircraft requirements may begin with a special condition or rule, and standards development involve the equipment standard and installation guidance. Engineers may also need technical training on a specific technology. After standards are developed, flight operational requirements must be addressed, and maintenance requirements considered, ensuring COS.

Flight operational requirements involve several factors, depending on the complexity and maturity of the technology and the operating environment. The following factors apply to operational prototypes (including demonstrations or trials) and to NAS-wide implementations:

- Operating rule (e.g., 14 CFR part 91, 121, or 135);
- Simulation, modeling, and analysis;
- User information (e.g., Aeronautical Information Manual/Pilot Controller Glossary);
- Operational approval guidance (e.g., AC);
- Operational authorization method;
- Inspector guidance;
- Inspector training;
- Aeronautical information and charting;
- Procedure/Route design criteria; and
- Safety risk management/Operational safety assessment panel participation

B. SERVICE AND OFFICE ROLES AND RESPONSIBILITIES

NextGen involves implementing new, complex systems and flightcrew procedures. Our safety mission dictates we ensure those systems are reliable and safe, and we address the operational aspects of these systems. Our certification and operational approval processes provide the tools to address flightcrew procedures, maintenance procedures, training development, and continuous safety monitoring.

Title 14 CFR part 21 define the approval of modification to aircraft, including installations or upgrades to aircraft through the certification process. The use of specific navigation, surveillance, and communication equipment for a particular operation typically requires operational approval for *air carriers* and *air taxi* operators. *General* aviation may alo require operational approval if there are unique training or qualification requirements warranting additional FAA oversight. Following is an overview of service and office responsibilities as they apply to NextGen.

FLIGHT STANDARDS SERVICE (AFS) ROLES AND RESPONSIBILITIES

AFS supports NextGen implementation through aviation safety standards and oversight of the aircraft operators. AFS promotes the safety of flight of civil aircraft by establishing regulations and standards for operators and airmen. AFS accomplishes certification, inspection, surveillance, investigation and enforcement activities related to operators and airmen.

Operational approval for a *commercial* operator includes approving:

- Flight crew procedures;
- Maintenance procedures; and
- Training programs

For *general aviation* operations, AFS provides standards, guidance, and recommended practices and procedures for installing equipment and conducting flight operations. A unique operational approval is only required for operations where the complexity of the operation, or the level of risk associated with conducting the operation, warrants unique FAA oversight.

With respect to NextGen, operational approval focuses on all of the above areas and considers the ability of the aircraft to support the operation (aircraft qualification). Due to both the unique technologies and the new operations, flight crew and maintenance training and procedures require particular emphasis.

Operation Specifications (Ops Specs), Management Specifications (MSpecs for part 91 subpart K), and Letters of Authorization (LOAs for part 91) reflect the requirement of a specific approval. The approval identifies the operation, the aircraft, and any unique requirements or limitations.

Some of the new or revised regulations and standards enhancing NextGen capabilities and published by AFS in 2012 include:

- FAA Order 8000.94, *Procedures for Establishing Airport Low-Visibility Operations and Approval of Low-Visibility Operations/Surface Movement Guidance and Control System Operations;*
- FAA Order 8260.58, *United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design;* and
- [Operational Specification] OpSpec/MSpec/LOA C073, *Vertical Navigation (VNAV) Instrument Approach Procedures (IAP) Using Minimum Descent Altitude (MDA) as a Decision Altitude (DA)/ Decision Height (DH).*

AIRCRAFT CERTIFICATION SERVICE (AIR) ROLES AND RESPONSIBILITIES

AIR supports NextGen through administering safety standards governing the design, production, and airworthiness of civil aeronautical products. AIR promotes the safety of flight of civil aircraft by establishing regulations and standards for aircraft, engines, and enabling avionics.

Aircraft certification includes:

- Developing avionics equipment performance standards and installation guidance;
- Overseeing design, production, and airworthiness certification programs to foster compliance with the prescribed safety standards; and
- Working with aviation authorities, manufacturers, and other stakeholders to help them successfully improve the safety of the international air transportation system.

With respect to NextGen, the aircraft certification evaluation process considers the design of the system, potential failure conditions and crew interface issues to ensure that the equipment can support its intended function. The type certificate (TC) or STC reflects approval of installed equipment. A TSOA reflects approval of avionics (prior to installation). Both processes are in accordance with procedures defined in 14 CFR Part 21.

AIR TRAFFIC SAFETY OVERSIGHT SERVICE (AOV) ROLES AND RESPONSIBILITIES

AOV supports NextGen implementation by providing oversight of ATO NAS changes (new equipment, modifications to existing equipment, or procedural). NextGen's complexity demands safety risk management oversight and involvement early in the development process, to promote seamless integration into the existing NAS. AOV accomplishes this task through certification, inspection, surveillance, and compliance actions related to ATO operations.

Any new NextGen initiative will require certification of new equipment and requisite standards development. Once new equipment is certified and new standards are developed, the NextGen initiative must integrate safely into air traffic control operations. AOV seeks to avoid last minute non-approvals or non-acceptance actions through early, proactive engagement and mitigation of potential safety concerns. AOV minimizes potential operational disruptions by coordinating safety requirements for NextGen initiatives with the ATO, AIR and AFS.

ACCIDENT INVESTIGATION AND PREVENTION (AVP) ROLES AND RESPONSIBILITIES

AVP coordinates the implementation and utilization of the FAA Safety Management System, the backbone of proactive risk management and safe transition to NextGen. AVP takes an integrated approach to system safety management, providing a comprehensive strategy for building increased safety into the air transportation system. During NextGen implementation, AVP will evolve and define its emerging analytical requirements through a series of activities that include research, analysis, demonstrations, and acquisition. AVP will define the evolving role of system safety management for improving safety in the current and future NAS.

AVP develops safety data resources and analytical capabilities to support design and implementation of NextGen operational improvements. Capabilities such as data mining, operator benchmarks, metrics and systems modeling tools are available to all NextGen designers and implementers in ATO, AVS, and Office of Airports (ARP) to enhance their ability to meet NextGen goals in a timely and safe manner.

AVP conducts FAA major accident and incident investigations both as the FAA party representative to the National Transportation Safety Board investigations and as the Investigator-in-Charge for the FAA investigation. These investigations identify opportunities for safety improvement and are the foundation for recommendations for agency actions to avoid future events of the same nature. AVP is also responsible for managing safety recommendations brought forward by other sources, parties, or data analysis.

AVP will ensure that certain changes introduced with NextGen will maintain or enhance safety while delivering capacity and efficiency benefits to the FAA and stakeholders. In support of NextGen implementation, AVP roles and responsibilities are to:

- Lead in the policy and guidance development for the Agency's SMS and manage implementation of the AVS SMS.
- Define and coordinate the implementation of integrated system safety risk management capabilities, including system safety, information sharing, and risk modeling.
- Provide safety data, modeling tools, and analytical capabilities ensuring system safety performance improves as NextGen increases capacity and efficiency.
- Manage the AVS research requirements and budget process to support safety and other NextGen priorities. Coordinate NextGen-specific research requirements with the NextGen office for inclusion in the overall NextGen budget.
- Develop and manage ASIAS capabilities that enhance the system safety knowledge related to new NextGen capabilities. ASIAS tools have already identified potential safety issues addressed through procedural and airspace design incorporated into NextGen improvements. For example, ASIAS data can inform the Metroplex Prioritization process, while addressing Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness and Warning System safety concerns.

- Develop and manage System Safety Assessment (SSA) modeling capabilities using historical event attributes to identify and assess potential future exposures related to NextGen OIs. For example, SSA products are now being used to assess runway situational awareness using Airport Surface Detection Equipment Model X (ASDE-X) technology.

RULEMAKING (ARM) ROLES AND RESPONSIBILITIES

The ARM manages the Agency's rulemaking process. The Rulemaking Management Council determines priorities and allocates resources to individual rulemaking projects. ARM works with all FAA LOBs to facilitate drafting, reviewing, and expeditious processing of rulemaking documents. ARM provides these rulemaking services to NextGen initiatives. For example, ARM initiated rulemaking activity for EFVS in 2011.

QUALITY, INTEGRATION AND EXECUTIVE SERVICES (AQS) ROLES AND RESPONSIBILITIES

AQS manages the AVS budget for NextGen in support of the other offices. AQS also provides the information technology for the workforce to improve efficiency and the specific tools to be identified for NextGen communication and coordination.

AEROSPACE MEDICINE (AAM) ROLES AND RESPONSIBILITIES

AAM has not identified specific NextGen activities. AAM may involve the Civil Aerospace Medical Institute (CAMI) in future human factors studies. With the automation and integration of NextGen technologies, AAM will need to monitor the role of human-in-the-loop interaction. Incorporating new technologies into the cockpit will require a better understanding of how pilots actually use these devices.

SECTION 4

A. AVS INTEGRATION

Coordination within AVS is essential to effectively managing and executing NextGen initiatives. The specific initiatives within NextGen will continue to evolve as we learn from research, prototyping, and early in-service experiences. The following section describes how the AVS management structure coordinates NextGen activities.

AVS MANAGEMENT TEAM

The AVS Management Team (AVSMT) oversees all AVS NextGen activities. In order to effectively coordinate NextGen efforts across the agency, the AVSMT designated the AVS Deputy Associate Administrator, John Hickey (AVS-2), as the AVS representative to the FAA's NMB. AVS-2 has a critical role in representing the organization on core and sometimes controversial issues.

MANAGING NEXTGEN

The AIR, AFS and AOV services meet at least monthly with AVS-2 to review the status of initiatives in this Work Plan in order to coordinate ongoing NextGen projects and initiatives, and to prepare for NMB meetings.

SERVICE MANAGEMENT LEADS

NextGen has the greatest affect on the AVS Services (AIR, AFS and AOV). They are conducting research, developing policy, coordinating approvals, and monitoring NextGen operations. Each Service has identified a management lead for NextGen who is responsible for coordinating and monitoring NextGen developments.

The management leads are:

- Aircraft Certification Service: AIR-100 (Richard Jennings, AIR-130)
- Flight Standards Service: AFS-400 (Bruce DeCleene, AFS-400)
- Air Traffic Safety Oversight Service: AOV-300 (Tip Stinette, Acting, AOV-300)

NextGen focal points exist throughout AVS. The following focal points are responsible for monitoring NextGen developments and handling routine issues:

- Office of Rulemaking: ARM-100 (Ida Klepper)
- Office of Quality, Integration and Executive Services: AQS-400 (Charles Davis);
- Office of Accident Investigation and Prevention: AVP-220 (Warren Randolph)

AVS NEXTGEN WORKING GROUP

AVS established the AVS NextGen Working Group to share information and concerns on NextGen initiatives, with emphasis on the planning, resourcing, and policy – promoting NextGen coordination and integration. The AIR and AFS leads co-chair this working group, which also includes the other Service and office leads, and key AVS representatives to the Joint Planning and Development Office (JPDO), NextGen Integration and Implementation Office, and the Enterprise Architecture Board (EAB). This working group, which predominantly consists of headquarters personnel, is responsible for coordinating inputs provided by AVS to ATO in any of the following areas:

- NextGen Implementation Plan;
- NextGen Segment Implementation Plan; and
- Enterprise Architecture.

NextGen requires coordination among AFS, AIR, and AOV in the field is required. Fostered by the close coordination of the Headquarters offices, the AFS NextGen branches, AIR-130 NextGen focal points, and the AOV-330 Safety Management Action Review Teams (SMARTs) will work together on NextGen-related projects and applications (see Figure 2).

AFS has established NextGen Branches in each region to provide expertise in facilitating approvals of new technologies and operators and ensuring standardization and coordination among offices. These NextGen Branches are an efficient way to improve standardization, quality of service, support, and specialized training for NextGen capabilities. AFS also established a policy team consisting of the headquarters divisions to coordinate policy relating to NextGen.

The AIR Standards Management Team (SMT) created a NextGen Policy Team (NGPT) to coordinate policy and discussions across Directorates. In addition, AIR Offices with significant NextGen-related activity established NextGen focal points to work with the AFS NextGen Branches in the same region. These focal points are knowledgeable about NextGen issues and facilitate approval of new technologies in an efficient, consistent and standardized manner. These focal points work with AIR-130 and directorate standards staff developing policy for new and novel applications. In 2011, the NGPT posted an NGPT Technology List. The purpose of this list was to identify areas which were not adequately addressed by current policy (for example, issue papers). The goal was to migrate agreed-upon policy into published guidance (for example, ACs). The AVS NextGen website contains the NGPT charter (https://employees.faa.gov/org/linebusiness/avs/nextgen).

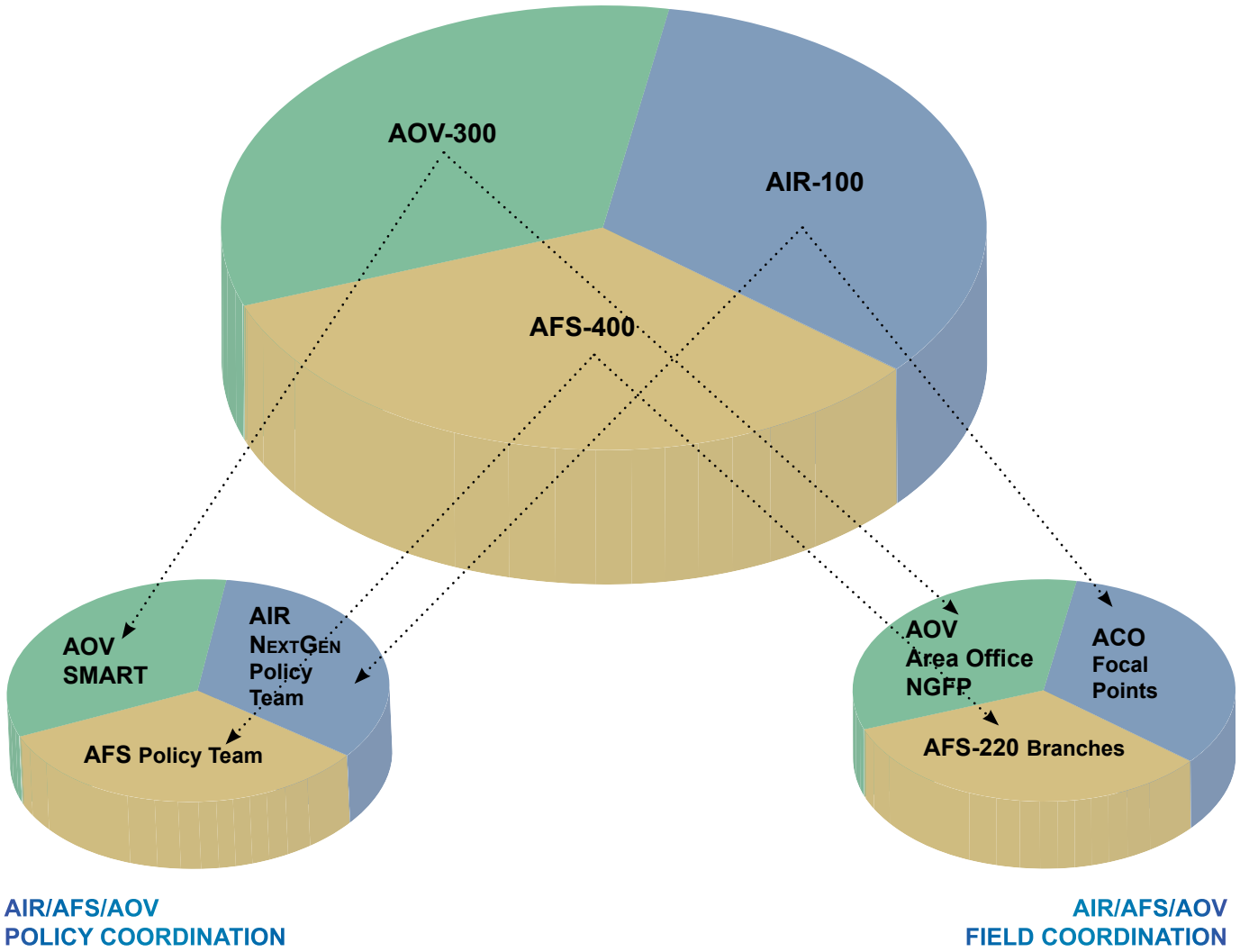


Figure 2. Coordination between Headquarters and other AVS Offices

AOV provides specialists from its Safety Management Review Action Teams (SMART) to support NextGen activities. Through this organization, AVS provides a leading-edge local presence in each office to monitor NextGen activities in other offices, maintain a rapport with other NextGen specialists and the policy offices, and facilitate flow of information within the organization.

B. OVERVIEW OF FAA NEXTGEN ORGANIZATIONAL STRUCTURE

The Agency lead for NextGen is the Deputy Administrator, and the Assistant Administrator for NextGen and Operations Planning (ANG-1) is responsible for planning and synthesizing NextGen across all the lines of business. This moves the Agency-level planning out of the ATO, affirming that NextGen is more than an air traffic initiative. Figure 4 has an illustration of the organization.

In order to more efficiently and effectively tackle the challenges in planning and implementation of NextGen more efficiently, the FAA developed a new process called the "Idea to In-Service Process" (also known as the I2I process). The I2I process will apply to all NAS changes, augmenting the acquisition process.

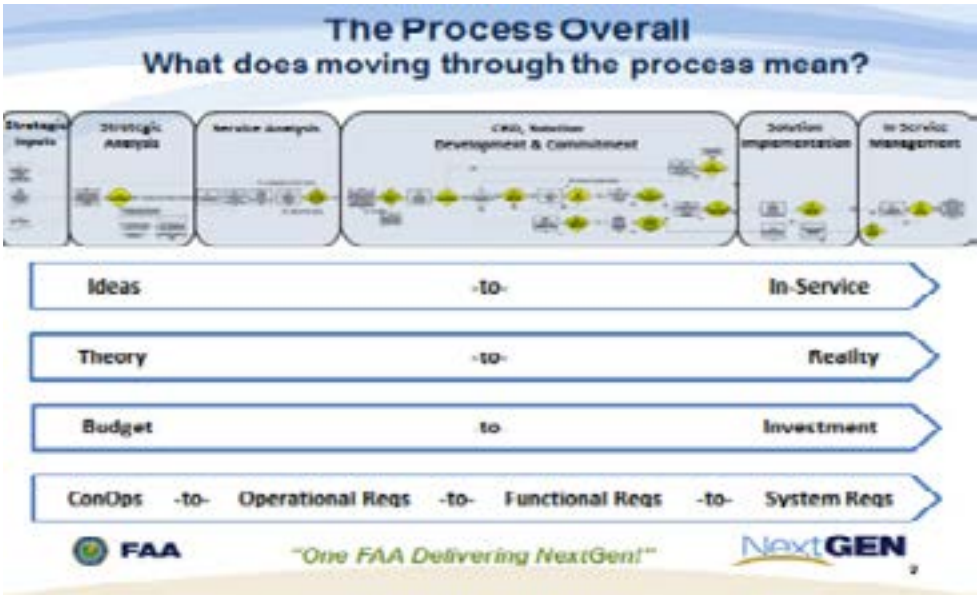


Figure 3. I2I Process

The I2I represents an FAA-wide collaborative effort initiated by the NextGen Office in response to senior FAA officials who recognized the need for a transformation that would result in “One FAA moving towards NextGen.“ As part of the Foundations for Success initiative, the FAA determined that a key part of this vision was the need for changes in process, governance and culture.

For NAS modernization to be successful, all parties involved must be aware of, involved in, and accountable for changes from idea inception to implementation in the field and continued in-service use. Central to this process is a structured, coordinated, collaborative way of doing business that crosses several LOBs. While the NextGen Office is the shepherd of this process, all FAA LOBs have clearly specified responsibilities throughout the process. The NextGen Office has been restructured to align with its enterprise stewardship and life cycle integration role.

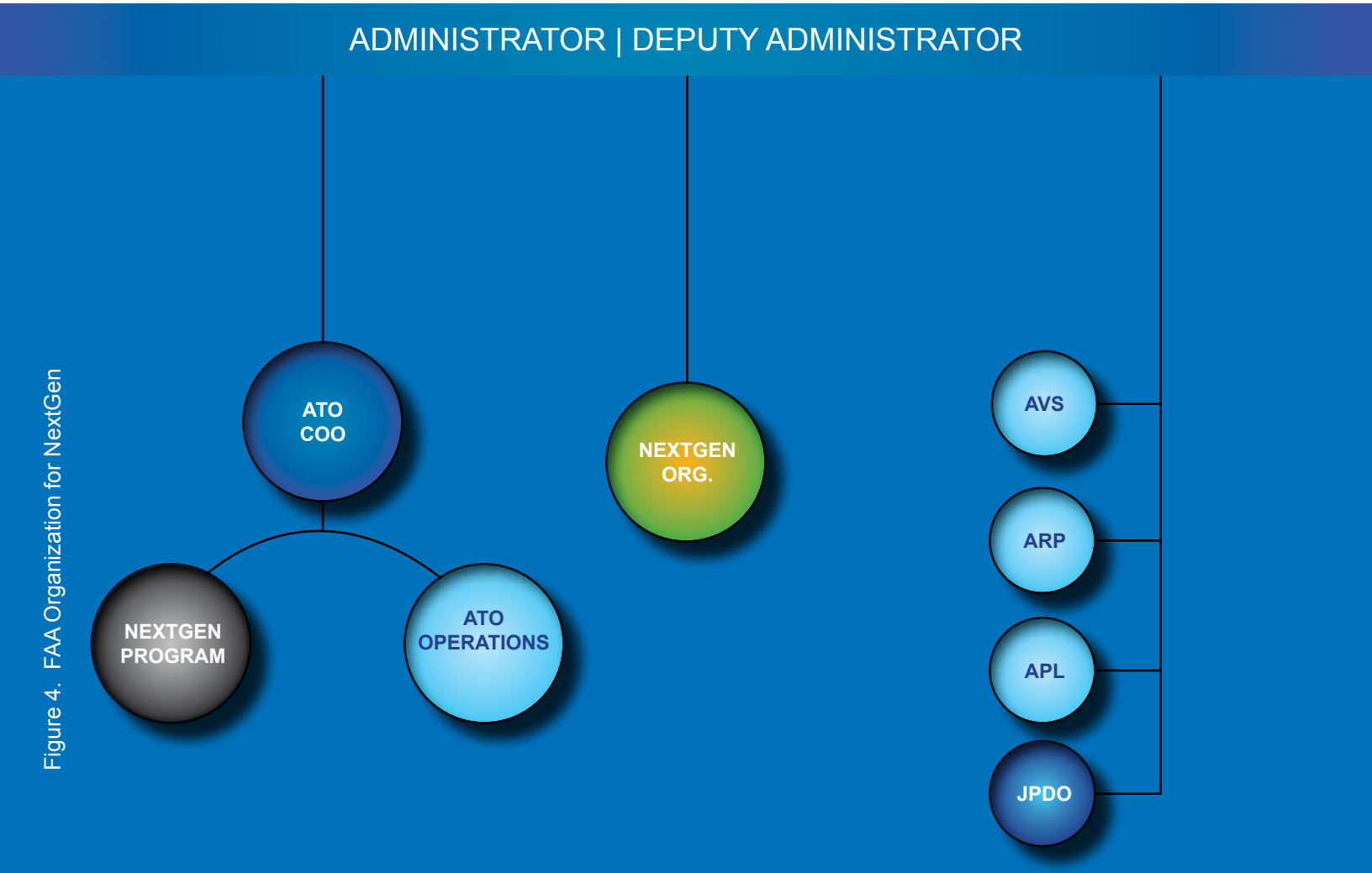


Figure 4. FAA Organization for NextGen

The I2I process (see Figure 3) seeks to provide the necessary structure and governance to address changes to policy, procedures, programs and systems within a NAS-wide context, allowing for the Agency to transition to a NextGen capability environment in a coordinated, coherent manner. Some overall features of the process that address these points include:

- **Ideas to In-Service:**
  The I2I process enables the NextGen organization, with input from all FAA lines of business and staff offices, to manage a single point of entry for inclusion of ideas into the NAS concept of operations.
- **Theory to Reality:**
  A line of sight into the NextGen work for individuals and their organizations' functions.
- **Budget to Investment:**
  A path towards institutionalization of portfolio management.
- **CONOPS to System Requirements:**
  Traceability of requirements from concept into programs.
- **A process that applies to all changes to the NAS.**

Last summer, the NextGen organization was moved outside of the ATO organization, with Associate Administrator Vicki Cox formally reporting to Assistant Deputy Administrator Michael Huerta. This reprogramming change became official in September 23, 2011, with the intent to achieve the goals of:

- *Elevating NextGen visibility within the FAA*
- *Reducing transactional distance between NextGen and non-ATO lines of business*
- *Validating stakeholders' requests for organizational change*

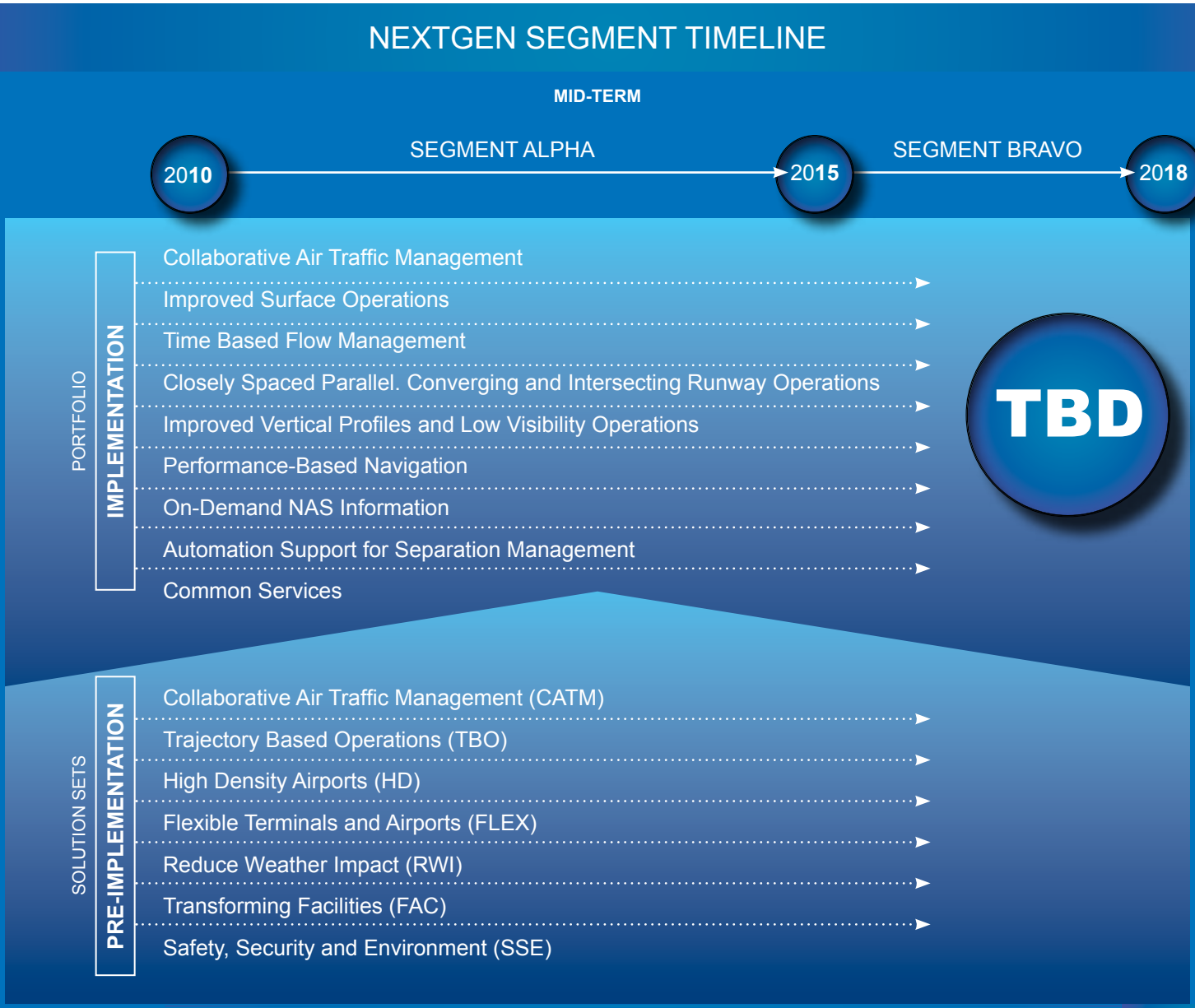


Figure 5. NextGen Segment Timeline

The FAA is responsible for planning and implementing the majority of NextGen's goals through 2020. The FAA uses several planning documents, described below, to provide the framework for all FAA NextGen activities. The FAA annually publishes an overview of the plan -- the NextGen Implementation Plan (NGIP). Internally, the more detailed NextGen Segment Implementation Plan (NSIP) is the master working document used to align all of our activities. The Integrated Master Schedule supplements the NSIP, which tracks the progress of NextGen implementation against the planned schedule. Furthermore, the NAS Enterprise Architecture (NAS EA) shows how all the NextGen infrastructure and operational capabilities fit together. Figure 5 shows the NextGen segment timeline and portfolios.

NEXTGEN IMPLEMENTATION PLAN

The NGIP is an overview of the FAA's ongoing transition to NextGen. This plan typically addresses results of the previous year's activities as well as FAA commitments through 2020. The NextGen Lifecycle Integration Office is the lead office for this document, released annually early in the calendar year.

NEXTGEN SEGMENT IMPLEMENTATION PLAN

The NSIP is the detailed planning document identifying increments of operational improvements to improve safety, efficiency, capacity, and the environment. The NSIP breaks NextGen up into several "segments" that represent planning horizons. The current NSIP covers Segment Alpha, which describes the activities we plan to implement from today through 2015. Segment Bravo, approved by the NMB in December 2012, will focus on the implementation of capabilities in 2016-2022.

In the NSIP, each increment is a discrete change in the NAS, delivering benefits in one or more of these areas. The NSIP currently focuses on high-priority, near-term activities and will expand to address other mid-term initiatives and related key issues. NSIP increments align with the OIs described in the FAA's NAS EA.

INTEGRATED MASTER SCHEDULE

The IMS is a new planning tool that was implemented in January 2011. This tool is a database that tracks all of the key milestones needed to successfully achieve the increments described in the NSIP. The status of these milestones will be tracked in IMS and updated on a monthly basis.

NAS ENTERPRISE ARCHITECTURE

The NAS EA establishes the foundation to model NAS evolution. The structure and discipline of ongoing NAS EA efforts aims to provide accurate and concise architecture information for NAS enterprise-level decision making. The NAS EA includes a comprehensive set of OIs, which are the specific operational changes that will deliver benefits under NextGen. The NAS EA also includes different ways to view the FAA's plans through operational depictions and technology roadmaps. The Aircraft Roadmap is one aspect of the NAS EA of particular interest to AVS since it concerns needed aircraft capabilities. The NAS EA is an online database of information, available at http://nasea.faa.gov.

The Joint Resource Council approves aspects of the EA, notably program funding (for baseline programs), and identifying key decision points.

AVS WORK PLAN FOR NEXTGEN

The AVS Work Plan for NextGen represents AVS's commitment to NextGen. The AVS Work Plan for NextGen describes both the nature of the activity to be completed and the expected date of completion.

D. KEY PLANNING ORGANIZATIONS

Since the implementation of NextGen involves organizations all across the FAA, understanding how all these organizations relate to each other is essential. The following paragraphs explain how FAA organizations fit into the NextGen managing structure.

NEXTGEN MANAGEMENT BOARD

The NMB, chaired by the FAA's Deputy Administrator, takes an enterprising approach to developing and executing the FAA's NextGen plan. With representatives from all key agency LOBs, the Board has the authority to force timely resolution of emerging NextGen implementation issues.
The Board's focus includes:

- Measuring deployment progress and key activities;
- Ensuring essential resources are available, including reprioritizing resources as necessary;
- Issuing policy and guidance; and
- Identifying leaders that are accountable for delivering system changes.

Additionally, the NMB manages a number of cross-agency issues, including:

- Accommodating aircraft at various levels of equipage during the mid-term;
- Increasing capacity on closely spaced parallel runways;• Managing priorities across our LOBs;
- Managing environmental challenges;
- Pursuing a global strategy; and
- Maintaining the integrity of information shared through NextGen systems.

As mentioned earlier in the AVSMT paragraph, John Hickey (AVS-2) represents AVS on the NMB.

The NMB receives an in-depth monthly status report on all NextGen programs. When the NMB identifies an issue, I can establish an ad hoc group to develop solutions to bring back to the NMB for adoption. For example, the NMB established three capture teams to evaluate complex programs and identify recommendations to reduce their risk and maximize their benefits. These capture teams are addressing the data communications program, performance-based navigation, and surface operations.

ASSISTANT ADMINISTRATOR FOR NEXTGEN

ANG-1 reports to the FAA Deputy Administrator (ADA-1) and is primarily responsible for developing and executing the NextGen plan. ANG-1 is also responsible for managing FAA's research and

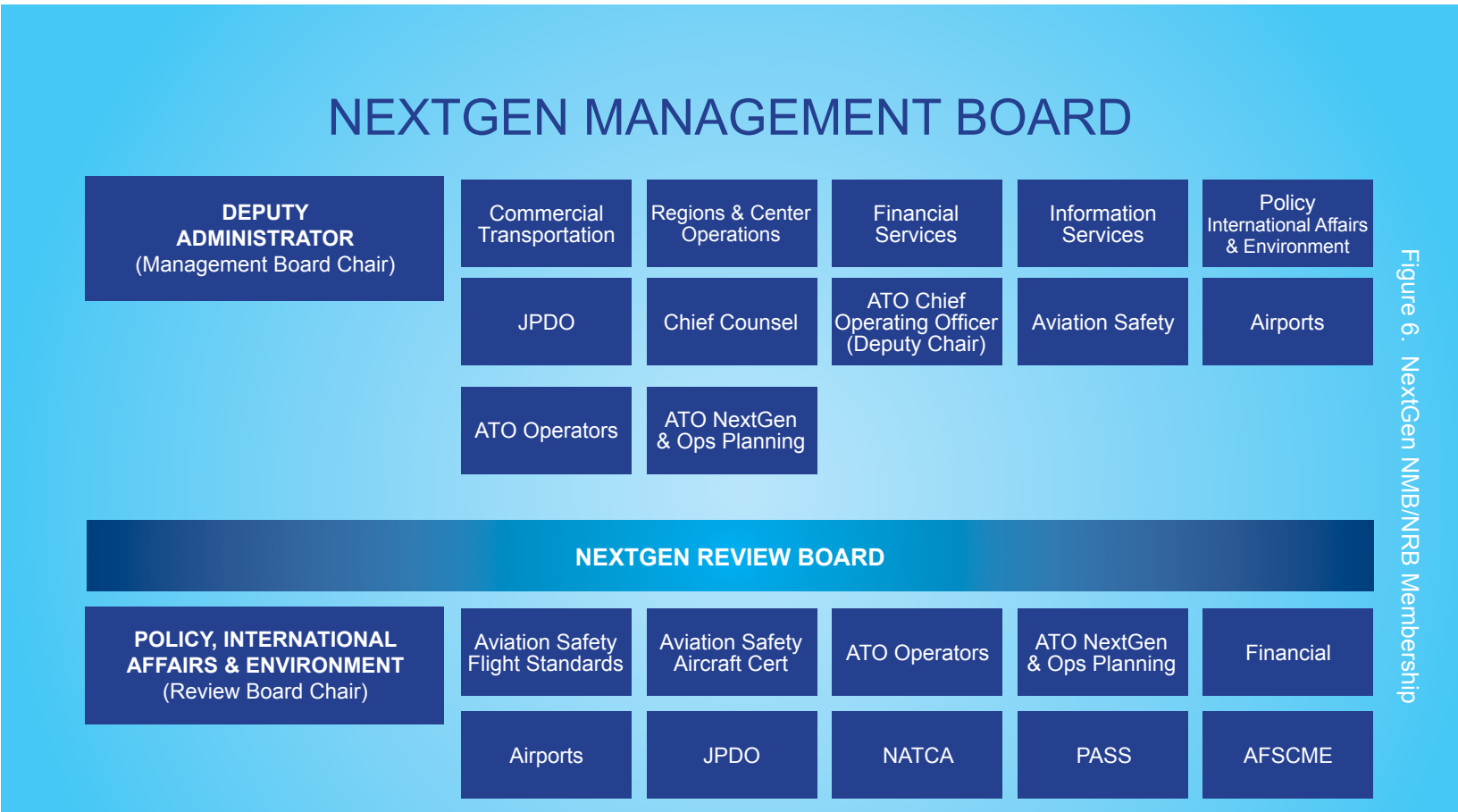


Figure 6. NextGen NMB/NRB Membership

development, NAS EA, systems engineering, and performance modeling.

NAS LIFE CYCLE INTEGRATION

The NextGen Lifecycle Integration Office develops and maintains the NGIP and NSIP. This office has daily management of NextGen system integration, coordinating, obligation of NextGen funds, monitoring the progress of NextGen development and implementation, and facilitating key collaboration processes.

NEXTGEN ADVISORY COMMITTEE (NAC)

In order to foster greater industry collaboration in the development and implementation of NextGen, the FAA worked with RTCA in 2010 to stand up the NAC. The AVS RTCA NAC member is John Hickey (AVS-2).

The NAC has a charter to develop a common understanding of NextGen priorities in the context of overall NextGen capabilities and implementation constraints, with an emphasis on the near-term and midterm (through 2020). The committee will foster a common understanding of success with joint performance objectives and development milestones. The NAC will focus on implementation issues, including prioritization criteria at a national level, joint investment priorities, location, and timing of capability implementation. The NAC comprises top-level executives representing operators, manufacturers, air traffic management, aviation safety, airports and environmental, civil and military, domestic and international. The NAC Subcommittee supports the NAC by providing technical advice and staff support. The subcommittee accomplishes the support through the establishment and sponsorship of standing Work Groups and ad hoc Task Groups

CURRENT NAC STRUCTURE

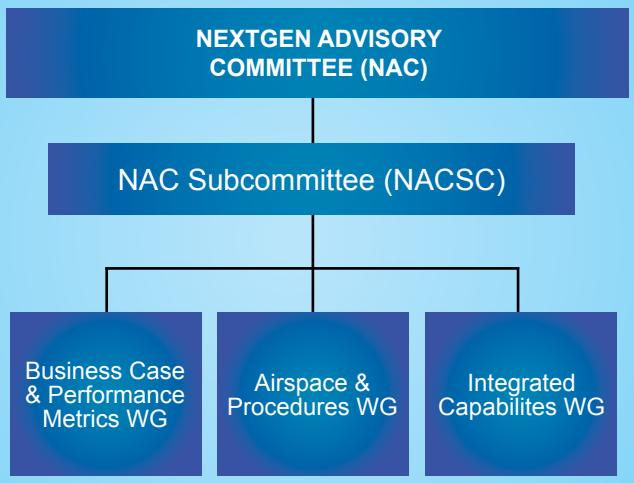


Figure 7. NAC Structure

SECTION 5

COMMUNICATIONS

AVS must ensure the safety of the new systems and operations as NextGen deploys. Our workforce must be aware of the changes taking place and be prepared to enhance safety standards and oversight. To assist in preparing the workforce to identify, mitigate and manage risk, we will provide information about NextGen throughout AVS and train the workforce to reach and sustain NextGen levels of safety and efficiency.

This section identifies the key messages of NextGen for AVS, as well as the communication strategies to ensure we are all informed of the latest NextGen developments, and describes the plan for training staff to keep them up to date on NextGen developments.

COMMUNICATIONS AND TRAINING

A. KEY MESSAGES

1. INTEGRATED COLLECTION OF INITIATIVES, NOT A SINGLE PROGRAM.

Individual inititiaves comprise NextGen to improve safety, efficiency, and the environment. It consists of different acquisition programs, operational changes, research projects, and prototypes. Some of the programs and initiatives are mature; other initiatives are still in research. These initiatives will take advantage of existing aircraft capabilities, empower the flightcrew by providing applicable information to the flight deck, and implement performance-based operations where practical. Many of the cockpit initiatives relate to the transformational programs of PBN, ADS-B, and ATC data communications. The NAS transformation will occur over time, not all in one year.

2. HELP IMPROVE SAFETY.

As the FAA implements NextGen, we will ensure the maintenance and improvement of system safety as we deploy NextGen capabilities. Safety improvements must accompany both the expected increase in traffic as well as new operations in increasingly demanding conditions. The evolution of practicing SMS principles will support a comprehensive, proactive approach for managing and evaluating all aspects of system safety. This approach will help as we monitor the level of safety achieved in the air transportation system and evaluate changes to the system. ASIAS is a tool that will play a significant role in supporting the tenants of SMS, including Safety Risk Management and Safety Assurance requirements.

3. EFFICIENT SAFETY OVERSIGHT IS VITAL.

Implementing NextGen requires a significant investment from industry and government. For those investments to continue, work must demonstrate a return on investment within a few years. We must use our resources effectively to identify and mitigate risks, while promptly introducing new systems and operations, we we tested and proved safe. In addition, we must ensure that industry understands the safety requirements and expectations through early involvement of AVS in developmental activities.

4. INTEGRATION OF AVS NEXTGEN ACTIVITIES.

We developed an AVS Work Plan for NextGen to capture the impact of NextGen on AVS Services and Offices. The field is the first to see the applications for approval of new technologies and operations. Increased communication through such groups as the NextGen Policy Team and the AFS NextGen Branches helps coordinate the integration of NextGen technologies and procedures. We have aligned resources to meet the challenges of NextGen, through the NextGen branches in AFS, NextGen focal points in AIR, and the NextGen Safety Management Review construct in airline operations.

5. PROMOTE SYNERGY BETWEEN FAA OFFICES.

In the last several years, we have worked more closely with other lines of business, such as the offices of Air Traffic, Airports, and Environment and Energy, to plan for NextGen. The aircraft applicant cannot achieve benefit for equipage if air traffic automation and the ATC workforce cannot implement the change. Many core NextGen changes for air traffic and airspace redesign rely on improved aircraft capability.

6. COORDINATE WITH STAKEHOLDERS.

The FAA alone cannot implement NextGen initiatives. Manufacturers will need to develop new aircraft systems, and operators will need to install those systems and train for their use. We must coordinate the planned capabilities to ensure that the other members of the aviation community can align their plans and focus their resources to achieve our goals. We must also coordinate with other agencies as appropriate and entities as appropriate(for example, the Department of Defense, JPDO).

B. COMMUNICATION STRATEGIES

We must all have an opportunity to review NextGen objectives and contribute to their refinement and overall program success. Staff throughout AVS have unique insights into the opportunities and challenges we face in implementing NextGen. AVS uses the following tools to inform and engage the workforce.

1. AVS TOWN HALL MEETINGS

AVS Town Hall meetings are held quarterly, and provide the AVSMT an opportunity to keep the workforce up to date on NextGen progress and issues. The Town Halls also provide a forum for staff to ask specific questions about NextGen since questions are solicited in advance of each Town Hall. Town hall meetings, conducted for the benefit of the entire AVS workforce, provide a forum for the AVSMT to discuss pertinent NextGen issues and to address questions.

2. AVS INTRANET SITE FOR NEXTGEN COMMUNICATION

The AVS intranet site contains AVS-specific documents, such as this plan: https://employees.faa.gov/org/linebusiness/avs/nextgen/. The AVS Web site includes enabler tutorials and an email box for feedback, which is checked regularly to answer AVS employee questions about NextGen. The address is: 9-AVS-AWA-NextGen. The FAA NextGen Web site at http://www.faa.gov/nextgen, has NextGen videos, a calendar of events, and more information.

3. IDENTIFY APPROPRIATE TARGET AUDIENCES FOR MESSAGING

AIR: NGPT AND AIRCRAFT CERTIFICATION OFFICE (ACO) FOCAL POINTS

The NextGen Policy Team is a cross-organization team that coordinates policy and initial issue papers relating to NextGen technologies and complex avionics issues. The primary focus is on developing consistent and coordinated approaches to the airworthiness approval of these systems. Initial issue papers include first installations of NextGen and related technologies. Some of these projects will require coordination with other organizations, such as AFS and ATO. Additionally, ACO focal points will work with AIR-130 and directorate standards staff in the development of policy for new and novel applications.

AFS NEXTGEN FIELD OFFICES

AFS has established NextGen branches in the AFS regional offices. These NextGen liaisons will facilitate understanding of the big picture and ensure the FAA's safety workforce sees, knows, and understands where the agency is headed with NextGen. If we understand NextGen, we are more likely to accept it and take advantage of its capabilities.

AOV

The Future Systems Branch is the NextGen focal point for AOV. The branch ensures systematic management of safety risks and serves as an information exchange for emerging systems. The Future Systems branch employs a matrixed architecture of safety system experts to collaborate and ultimately provide consultation and feedback to the ATO as they work NextGen systems through the AMS. The supporting AOV Safety Management Review (SMR) construct focuses on ensuring early and regular safety system collaboration with emphasis on risk mitigation, solution development, and control validation and verification. The SMR construct collects information and provides actionable systems awareness to the management team with updates on the progress of particular NextGen or future systems in the AMS lifecycle as well as the associated emerging risks being considered by the System Safety Working Group and the Safety Risk Management Panel. The overall goal of the SMR construct is the production of coherent, accurate, and comprehensive situational awareness, culminating in the timely processing of Safety Risk Management Documents (SRMDs) and High-Risk Hazard mitigation control strategies through AOV.

4. INTERNAL AWARENESS CAMPAIGN

In an announcement from the AVS Associate Administrator to the workforce, we rolled out messaging about the launch of the AVS NextGen Work Plan for 2010 linking to the Plan and encouraging the workforce to become familiar with it. Concurrently, articles posted on *Focus FAA* and the FAA NextGen website as well as in the AVS Flyer bolstered the launch. Town Hall meetings hosted by the Associate Administrator and Deputy Associate Administrator for Aviation Safety as well as periodic articles in the *AVS Flyer* on NextGen news help promote understanding and awareness of what NextGen is -- how it will improve aviation, and what the AVS role is in it. For the latest information available on NextGen, go to www.faa.gov/NextGen.

C. AVS NEXTGEN TRAINING PLAN

Implementing interdependent systems in various stages of development and maturity occurs over a variety of timeframes. There is continuous need for updated information. Training and communicating where to find current information is essential for successful NextGen implementation. Communicating where to find further information and providing appropriate training is important to supporting NextGen implementation. The AVS NextGen Training Plan is evolving over time and must continue to be flexible to serve a varied workforce.

Through training, AVS will ensure that everyone involved in and impacted by NextGen has a common understanding of what NextGen is and how to work in accordance with it. Additionally, training will provide both AVS employees and their managers the tools and skills necessary to meet NextGen requirements in their service or office.

Each Service and Office is responsible for identifying a specific NextGen training strategy for their workforce. To avoid duplication of effort and ensure a consistent message, a new training development should be undertaken in collaboration with the AVS NextGen Coordination Group and the AVS training community, specifically the AVS Training Council. When necessary, a training team can be established to develop cross-Service/ Office training. AFS and AIR, will manage the process for uploading these courses into the FAA's e-Learning Management System (eLMS) and assist in assigning the courses to the appropriate employees.

The AVS training strategy for NextGen consists of:

- Providing an overview of NextGen as it relates to AVS responsibilities;
- Conduct training needs analysis as it relates to the AVS NextGen business plan, and develop curriculum map(s) for AIR, AFS, and AOV, respectively.
- Developing new courses and training interventions;
- Revising current courses to incorporate NextGen concepts;
- Identifying and documenting the appropriate training for our technical specialties through training profiles; and
- Providing employees with resources on the latest NextGen technologies.

The AVS NextGen training plan is updated annually in this Work Plan.

TRAINING PLAN

The AVS NextGen training plan maintains the same process and procedure for workforce training currently used by AVS. However, it focuses on specific items deemed necessary for implementing NextGen.

AVS TRAINING PLAN

SERVICE/OFFICE	EXISTING COURSES	NEW COURSE DEVELOPMENT
Flight Standards Service (AFS)	• FAA21000082 NextGen Technologies for AFS • FAA21000088 Oceanic and International Operations	• NextGen avionics maintenance course (delayed due to funding, but tentatively planned for 2013) • NextGen Technologies Equipment (Dec 2013) • NextGen Technologies for AFS Avionics Inspectors (Dec 2013)
Aircraft Certification Service (AIR)	• FAA21018 Aviation Safety Engineer/Systems Job Functions • FAA25811 Advanced Communications • FAA25815 Advanced Navigation	• Based on results of training needs analysis and the identification of courses via curriculum mapping, develop NextGen Avionics curriculum (in progress). • Based on results from curriculum roadmap, update relevant content from FAA25811 Advanced Communications, FAA25815 Advanced Navigation, and FAA 27200024 ADS-B Out Installation and Airworthiness Guidance courses. • Develop specialized courses on certification of low visibility technology, EFBs, and discuss software and aircraft systems security (funding permitting).
Office of Quality, Integration, and Executive Services (AQS)	• New Manager Course • FAA 20000044 - AVS 101 webinar • FAA 27000022 NextGen Overview Course	
Office of Aerospace Medicine (AAM)	No specialized training needs identified at this time. AAM will address needs on an individual employee level.	
Air Traffic Safety Oversight Service (AOV)	AOV oversight of the ATO employs a systems safety approach requiring competency in safety surveillance, compliance and verification strategies. As NextGen programs are deployed, AOV will leverage targeted training opportunities provided across the FAA to obtain the necessary familiarization and expertise to support NextGen surveillance, compliance, and verification activities.	
Office of Accident Investigation & Prevention (AVP)	No specialized training needs identified at this time.	
Office of Rulemaking (ARM)	No specialized training needs identified at this time.	

Table 9. AVS Training Plan

SECTION 6

This AVS NextGen Work Plan focuses primarily on accomplishing NSIP Segment Alpha, which we will implement between today and 2015. Currently, AVS and NextGen research supports a number of these activities. Lead time for Research & Development (R&D) planning is approximately 2 to 3 years (current FY+2); therefore, AVS Services and Offices (S/Os) should focus on NextGen research requirements for Segment Bravo and beyond.

AVS R&D integrates the research requirements of the other FAA LOBs within the structure of the R&D Executive Board (REB) process, managed by FAA Office of NextGen and Operations Planning (ANG). The output of the R&D REB is an annual FAA R&D portfolio and budget request, ultimately submitted to Congress with the President's Budget Request.

The FAA assigned the NextGen budget responsibility to ANG, including funding for NextGen-related R&D needs. Facilities and Equipment monies fund some NextGen development and applied research through a separate budget development process from R&D.

RESEARCH AND DEVELOPMENT

A. AVS R&D REQUIREMENTS PROCESS

The aviation safety research community identifies, conducts, and delivers credible safety research products that respond to the regulatory and oversight needs of the FAA. The FAA's research program ensures that there is a clearly defined and understood R&D process to:

- Collect and evaluate research requirements;
- Identify and prioritize research requirements;
- Present prioritized research requirements;
- Evaluate the priority of pop-up requirements;
- Recommend redirection of research activities;
- Maintain current knowledge; and
- Communicate research results to the AVS organizations.

The AVS R&D Requirements Process defines the steps to develop the annual AVS R&D portfolio. The AVS R&D Requirements Process is both a top-down and bottom-up process. It starts with the release of strategic guidance from upper management early in the planning cycle. In the April-May period, the AVSMT will specify particular areas of research that are strategic to the LOB. Likewise, the S/O level and the Division/ Directorate level may also indicate areas that may be strategic from the Service, Office, Division, and Directorate level(s). This guidance is provided to the AVS R&D Technical Community Representative Groups (TCRG). The TCRGs are the initial point of origin (bottom-up) in AVS for identifying research requirements. TCRGs have a particular area of technical responsibility and are responsible for identifying the technical knowledge needed to support the subsequent delivery of AVS products within their area of expertise. Suggestions for new technical requirements, approaches, and technical solutions to meet those research requirements can come from almost any source within the various technical communities. On behalf of their respective AVS organization, TCRG representatives should develop NextGen research requirements needed to fulfill AVS NextGen responsibilities.

We define and recommend research requirements at the lowest levels of the organization, based on the trategic guidance and overall mission. The requirements are then reviewed and prioritized by the AVS R&D Group. This is followed by subsequent reviews and approvals by each S/O, the AVSMT, and final approval by AVS-1.

The AVS R&D Requirements Process identifies a clear line of sight between each issue or need, the R&D need to resolve it, and implementation of the research to achieve the intended sponsor outcome. The process also supports a framework for sponsor management of each project throughout the life cycle.

For a complete description of the FAA R&D Program, see the National Aviation Research Plan (NARP). The National Aviation Research Plan (NARP) is an integrated, performance-based plan for the FAA R&D Program supporting both the day-to-day operation of the NAS, including the vision and implementation of NextGen. For a complete description of the overall FAA R&D Program, see the NARP Web site at: http://www.faa.gov/about/office_org/headquarters_offices/ang/offices/ac_td/research_planning/narp/

B. NEXTGEN PORTFOLIO MANAGEMENT PROCESS

FAA NextGen R&D programs are subsets of the FAA R&D portfolio. ANG manages NextGen research investment. ANG ensures effective and efficient application, planning, programming, budgeting, and execution of the FAA NextGen portfolio, including the NextGen R&D Programs. ANG NextGen solution set coordinators meet regularly to review NextGen R&D, allocate resources, and manage the NextGen R&D.

FAA NextGen R&D submits requirements to ANG for consideration, which then prioritizes and programs funds. Within AVS, the AVS R&D Requirements Process identifies AVS provides the NextGEn Lifecycle Integration Office our NextGen requirements, which support AVS obligations to the NextGen goals. The REB does not prioritize these requirements.

C. NEXTGEN RESEARCH ASSETS

AFS FLIGHT OPERATIONS SIMULATION LABORATORY

The Flight Operations Simulations Branch (AFS-440) provides operational simulations of new, emerging, or modified communications, navigation, and surveillance technologies and procedures that support aviation safety. AFS-440 manages Boeing 737-800 and Airbus 330 (convertible to Airbus 340) flight simulators (Figure 8), along with air traffic controller radar monitors linked to provide real-time, realistic, dynamic virtual terminal operations, pilot/controller interface, and pilot/controller/aircraft data collection.

The Flight Systems Laboratory Branch (AFS-450) gathers data from real world aeronautical activities to create simulation models. High-speed computers use these models to generate millions of simulated flight operations and produce data representing years of actual flight operations. For example, Airspace Simulation and Analysis Tool (ASAT) is a software tool that simulates operational scenarios in realistic environments. RNAV-Pro is a screening tool to support the development of RNP/RNAV routes and procedures. AFS-450 analyzes and translates the data collected from these modeling tools, as well as from flight tests and flight simulator, into performance and safety parameters used to establish NextGen operational standards.

CIVIL AEROSPACE MEDICAL INSTITUTE (CAMI)

CAMI's principal concern is the human element in flight - pilots, flight attendants, passengers, air traffic controllers - and the entire human support system that embraces civil aviation. Under the guidance of the Federal Air Surgeon, the Aerospace Human Factors Research Division at CAMI conducts research that focuses on improving individual system effectiveness, efficiency, and safety. General Aviation and ATC are two of the broad interest areas of the researchers in the division.

NEXTGEN INTEGRATION AND EVALUATION CAPABILITY

The NextGen Integration and Evaluation Capability (NIEC) is located at the FAA William J. Hughes Technical Center, Atlantic City International Airport, New Jersey. The NIEC is the FAA's research platform to explore, integrate, and evaluate NextGen concepts through simulation activities resulting in concept maturation and requirements definition. For example, the research cockpit simulator is shown in Figure 9.

Figure 8. AFS-440 Laboratory Flight Simulators

D. AVS NEXTGEN RESEARCH NEEDS

Looking forward to the more advanced technologies and operations of NextGen, AVS will participate in the defining, prioritizing and conducting research to address core issues relating to future system safety. Other issues must be addressed through collaboration with industry or by refining internal processes and procedures. AVS plans to advocate for the following research requirements:

End-to-end safety analysis and performance allocation. Historically, allocating responsibility and requirements among the aircraft, the aircraft operator and the ANSP has been a pacing item in deploying new technologies and applications. It is critical to establish a process to accomplish this allocation with quantitative instead of qualitative criteria. The FAA is working with U.S. industry, European Aviation Safety Agency (EASA) and ICAO to address the challenge.

Identifying safety opportunities. Every NextGen OI has potential safety implications. Collection and analysis of quality data from across the FAA enterprise is critical to understanding system effects and interactions during and after NextGen implementation.We need research to ensure optimized data collection, storage, modeling, and analysis systems and to meet the needs of safety initiatives and priorities of each FAA LOB.

Regulatory framework. Mandates for certain operational capabilities or equipment may become a component of NextGen implementation. AVS expects that any such mandate be implemented as an airspace rule sponsored from within ATO, and will assist ATO in executing those rules. AVS should evaluate the airworthiness and operational regulations that are within its purview and identify any appropriate changes to implement NextGen. For example, some rules may need to transition from system-specific to performance-based. Another example is that the increased role of avionics in future operations may require changing the TSO program or developing new regulations to ensure appropriate avionics performance.

Figure 9. NIEC Simulator

Improving flight crew awareness. With the increased role of automation, maintaining flight crew awareness and effective intervention during failure and abnormal conditions is critical. Research has suggested that mode awareness is already a challenge, a trend that must be corrected as new technologies are introduced. New displays and alerting, as appropriate, need to be developed to improve awareness and retain the ability for the flight crew to manage the operation.

Trajectory Operations (TOps). These functions integrate the traditional functions of navigation (defining a path and creating path guidance) and flight control (steering the aircraft to that path). It adds additional capabilities for NextGen, including conformance monitoring, trajectory negotiation (a traditional "communication" function), and some functions to support trajectory planning (weather data, traffic data, fuel optimization, etc.). Strategic trajectory planning, or trajectory optimization (to optimize time or fuel within a given set of constraints such as aircraft performance and weather), may take place within the aircraft trajectory management function. We may alsoaccomplish trajectory optimization in a ground system and the result communicated to the aircraft. A common operational concept of use for midterm TOps is in development through ANG, and a parallel activity in JPDO defined the long-term Trajectory-Based Operations concept.

Unmanned Aircraft Systems (UAS). In 2013, UAS access to the NAS remains limited. The FAA allows UAS-NAS operations on a case-by-case basis through the issuance of a Certificate of Waiver or Authorization for public aircraft, or a Special Airworthiness Certificate - Experimental Category for civil users. Due to the diverse utility UASs offer, we expect their use to increase exponentially in a variety of key public and civil areas. Industry projections for 2018 forecast more than 15,000 UASs in service in the United States, with almost 30,000 deployed worldwide [World Unmanned Aerial Vehicle Systems, Market Profile and Forecast 2009-2010, The Teal Group]. From operational, infrastructure and safety perspectives, the increasing number of UASs presents a number of challenges, the solutions to which will involve and impact all NAS constituencies, but ultimately require a seamless integration of UASs into the NAS. Two steps planned for 2013 to meet these challenges include A Notice of Proposed Rulemaking for small UASs and an accompanying AC published in the Federal Register for public comment. Furthermore, the FAA is working to establish six UAS Test Sites, per the FAA Modernization and Reform Act of 2012. The FAA also continues to work with government, industry, and academic organizations on UAS R&D challenges to support the development of policy, standards, regulations, and procedures needed for safe integration of UASs in the NAS.

SECTION 7

It is an overarching goal for NextGen to harmonize with solutions used elsewhere in the world. Recognizing this, AVS engages actively in harmonizing NextGen enablers with foreign civil aviation authorities, bilaterally and through ICAO. This section provides an overview of those activities.

GLOBAL HARMONIZATION

Performance Based Navigation

The primary strategy for harmonizing all of the PBN enablers is through ICAO. The U.S. member of the ICAO PBN Study Group is Mark Steinbicker (AFS-470). Through the Study Group and related panels, we have already harmonized the criteria for all the existing PBN enablers. However, there are differences in the implementation of this criteria for certification and operational approval, notably between the FAA and EASA, and this remains an area of focus. We supported the ICAO PBN Operational Approval Tiger Team to improve the alignment of the operational approvals of different authorities; and new ICAO PBN operations approval guidance, which we will publish before FY2014

In 2012, we helped ICAO complete an update to the ICAO Manual on PBN, adding navigation (Nav) specifications (specs) for a number of new capabilities for various operations. These new operations should permit more flexible procedure designs, leveraging the same basic set of aircraft capabilities already defined for RNP AR, but without requiring unique authorization.

AVS is also involved in coordinating the implementation of these capabilities, primarily through regional planning groups. In conjunction with ATO and Oceanic Separation Reduction Working Group, AVS develops and advocates U.S. operational policy for ICAO North Atlantic, Cross Polar, Pacific, and Caribbean/South American Working Groups. We are also very active in coordinating implementation with Europe, working with SESAR and EUROCONTROL as the European Union considers a mandate for RNP capabilities.

To support harmonized implementation of PBN oversight and operations, the ICAO Operations Panel (OPSP) recently formed a new PBN Subgroup. The goal for the group is to create new guidance for the ICAO Annexes, particularly Annex 6, and for Procedures for Air Navigation Services – Aircraft Operations.

AVS is also actively working to harmonize future Global Navigation Satellite System (GNSS) standards tobe globally acceptable and interoperable, considering the multiple GNSS constellations under development. The United States has advocated use of a similar signal structure to modernized GPS satellites (the L1C and L5 signals) for all civil services, reducing the costs of integrating multiple constellations. The Department of State leads this initiative, since the issue affects all civil users of GNSS, not only aviation. The FAA is active in these forums, led by AIR-130. In addition to the ICAO Navigation Systems Panel, other groups that are specific to aviation include:

- SBAS IWG: A forum for providers of SBAS service, to promote harmonization and alignment of programs;
- International GWG: A forum of States and other entities interested in GBAS, promoting common resolution of program challenges and resolution of issues for Category III operations; and
- RTCA/SC-159 and EUROCAE working groups 28 and 62. The industry committees developing technical standards for modernized GNSS receivers.

Automatic Dependent Surveillance - Brodcast

In November 2011, the European Union (EU) published a European mandate for ADS-B in European airspace. The FAA worked with EASA and Eurocontrol during the development of this rule to harmonize their mandate with the U.S. mandate. The most significant issues were successfully resolved, but some differences remain since Europe does not plan to use ADS-B to reduce SSR coverage, including:

- U.S. has forward-fit and retrofit requirement effective in 2020; EU has a forward-fit mandate of January 2015, EU requires retrofit in 2017;
- U.S. affects all operators in designated airspace (See 14 CRF 91.225 and 14 CRF 91.227); EU affects aircraft over 5700 Kg or with maximum speed exceeding 250 knots;
- EU has no explicit performance requirements for the broadcast data;

- EU has expanded data requirements (vertical accuracy, vertical rate, antenna offset, selected altitude and barometric pressure setting); and
- EU requires a continuity of the system of 5000 hours mean-time between failures

There is also a large amount of joint work being conducted between the US and Europe to cover various aspects of ADS-B In. It is expected that the ICAO ADS-B work plan will reference the joint US/European documents created from the combined efforts of the Special Committees and European Working Groups.

RTCA Special Committee SC-186 and EUROCAE WG-51 is a joint committee whose structure and focus changes as applications are defined, and regulatory challenges are addressed with respect to ADS-B technology. The committee is tasked to develop ADS-B applications on the foundations set forth by the ADS-B rule. SC-186 and WG-51 have successfully published standards for the ITP application as well the basic situational awareness applications. Currently, this group is working on accomplishing the same for Traffic Situational Awareness with Alerting (TSAA) and Interval Management (IM) applications. In the future, the committee will work on the use of ADS-B to enable more advanced parallel approach operations.

RTCA Special Committee SC-209 is working jointly with EUROCAE WG-49 worked to officially harmonize the DO-181E and ED-73E Transponder Minimum Operational Performance Standards (MOPS). Additionally, there is work in progress by the ICAO Technical Subgroup (TSG) of the Aeronautical Surveillance Panel (ASP) to document this work in the ICAO literature.

ATS DATA COMMUNICATIONS

The joint SC-214 and EUROCAE WG-78 committees are addressing the data communication messages, and will reference the resultant standards as acceptable means of compliance to ICAO member state aviation regulations. Appropriate committees are working on data communication services and end-to-end requirements.

Harmonization of ATS data communication is key to avoid regional implementations that may result in increased risk due to dissimilar cockpit procedures and expensive multiple equipage solutions on aircraft. AVS is actively supporting the development of international data communication standards for ATNB2. Our objective is to be able to make available data communication services that will support operations beginning in the early 2020's in both EU and the US. We are advocating an integrated view of this timeframe and capabilities, considering navigation, ADS-B, and other AIS/MET enhancements under development but considered essential elements for trajectory based operations.

LOW VISIBILITY OPERATIONS

In expanding the operational capability for EFVS, the FAA works closely with the joint committee of RTCA SC-213 and EUROCAE WG-79 to develop common performance standards and implementation strategies for next generation of Enhanced Vision Systems (EVS) and SVS. Additionally, we are actively harmonizing our standards with EASA to ensure the operational benefit realized by this technology is maximized in Europe. It is important that AVS continues to monitor EU regulatory activities and remain engaged with those regulatory authorities as they proceed. This is primarily being accomplished through the All Weather Operations Harmonization ARC (AWOH ARC), which consists of U.S. and EU regulatory authorities as well as industry stakeholders.

FLIGHT DECK SAFETY

Portable EFB devices are being utilized by both domestic and international certificate holders. In an effort to standardize the various applications and interoperability of EFBs with aircraft systems, AFS and AIR continue to work with EASA and ICAO to develop EFB policy. This international harmonization is critical since these devices replace both required paper products and display an array of applications utilized on the flight deck. Flight Standards (AFS-430) is a member of the ICAO EFB WG. Their goal is to develop standards and recommended practices that EFB software and hardware manufacturers will utilize to create EFB solutions that industry will adopt. In 2012, this group drafted an EFB definition and Standards and Recommended Practices, which will be included in the ICAO Annex 6, to the *Convention on International Civil Aviation, Part I, International Commercial Air Transport – Aeroplanes.* In addition, a draft EFB Manual was created to provide ICAO member states guidance on how to evaluate both EFB hardware solutions and EFB software applications.

ENGINES AND FUELS TECHNOLOGIES

OPEN ROTOR ENGINE HARMONIZATION:

The Open Rotor engine offers significant improvements in fuel burned and carbon emissions. The technological advances in noise

reduction since this type of engine was first introduced in the 1980's now permit these designs to be introduced into service. However, new requirements are needed to address consequences of Uncontained Engine Rotor Failure. To accommodate an engine development program and product launch, EASA established an industry/authority stakeholder working group with the objective of recommending EASA/FAA harmonized draft requirements and advisory material for engines (14 CFR part 33/CS-E) and aircraft (14 CFR part 25/CS-25), respectively, and/or Special Conditions to address the novel features inherent in Open Rotor engine designs and their integration with the aircraft. These new provisions and associated means of compliance should ensure the safety levels of Open Rotor engine installations are consistent with those of the existing turbofan fleet. AIR is actively participating in this effort with the purpose of ensuring results can be implemented within the harmonized transport aircraft and engine regulations.

DROP-IN RENEWABLE JET FUEL:

Under the United States-Brazil Memorandum of Understanding, the FAA is supporting Brazil's efforts to develop alternative jet fuel qualification/certification procedures and conduct a fast-track approval of a narrowly focused drop-in renewable jet fuel produced from sugar. The project will require close coordination with both Brazilian and United States aerospace manufacturers. Through its sponsorship of the CAAFI, the FAA engages international stakeholders to identify collaboration opportunities. As a result, the FAA established cooperative agreements to facilitate and promote the approval of drop-in renewable jet fuels with Australia and Germany and is preparing an agreement with Spain.

The FAA actively participates in the standards-setting organization ASTM International and was instrumental in leading industry and government stakeholders to develop the first alternative jet fuel specification D7566-12, Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons. The FAA continues to lead stakeholders to test, certify, and qualify additional sustainable alternative jets fuels and pathways, such as alcohol-to-jet fuels.

The FAA supports the ICAO Global Framework for Aviation Alternative Fuels to facilitate global development and deployment of sustainable alternative jet fuels.

CAAFI and the FAA are coordinating with the United Kingdom's Ministry of Defense Aviation Fuel Committee (AFC) to develop specification requirements for alternative aviation fuels. The AFC publishes the DEF STAN 91-19 specification for jet fuel that is used by many countries in Europe and other areas of the world.

LOW-LEAD FUEL (PISTON ENGINE AVGAS):

The FAA is working closely with the EASA to coordinate avgas approval methods to facilitate the introduction of an unleaded alternative avgas.

The unleaded aviation gasoline transition ARC included a representative from Shell Aviation, which is a European company based in London, UK. This representative provides a European perspective during the UAT ARC deliberations.

US-EU HARMONIZATION:

The different compliance criteria and dates are a function of the individual nation's needs. The FAA works very hard to harmonize the equipment requirements (regardless of the technology) so a single solution is viable internationally. Below is a table providing results of the Avionics Roadmap harmonization activity supported jointly between SESAR and NEXTGEN as part of a Memorandum of Cooperation at the EU-U.S. level.

SESAR-NEXTGEN AVIONICS HARMONIZATION ROADMAP

SESAR & NEXTGEN	AIRCRAFT CAPABILITY	STATUS: SESAR & NEXTGEN
Navigation	RNP 10	Harmonized
	RNP 4	Harmonized
	RNAV 5 (BRNAV)	Europe Only
	RNAV 1, RNAV 2	Harmonized
	RNP with Curved Path	Harmonized
	Vertical Navigation	Harmonized
	LPV	Harmonized
	RNP AR	Harmonization in 2013
	Advanced RNP	Ongoing
	TBO with EU I-4D and U.S. Tops	Ongoing
	Automatic Optimized Braking	Europe Only
	Initial GBAS CAT II/III Using GPS L1 and U.S. GLS III	Harmonized
Surveillance	ADS-B Out	Compatible
	ADS-B In - CDTI	Harmonized
	Traffic SA on Surface	Harmonized
	ADS-B In Airport Traffic Situation Awareness (SURF) Alert	Harmonized
	ADS-B In Interval Management	Ongoing
	Closely Spaced Parallel Operations	U.S. Only
	ACAS-X	Ongoing
Communication	FANS 1/A Satellite Communication	Harmonized
	FANS 1/A (VDL m2)	US Continental Only
	ATNB1 (VDL m2)	Europe Continental Only
	ATNB2	Ongoing
On-Board Information and System Display	AAtS	Ongoing
	HUD/ILS	Ongoing
	EFVS	Ongoing
	EFB	Harmonized
	FIS-B	U.S. Only

Table 10. SESAR-NEXTGEN Avionics Harmonization Roadmap

APPENDIX A: NEW ENABLING POLICY

All Schedules Presume Industry Standards Setting Committees Conclude As Planned

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
PBN				
RNP	Operational Rule	Complete AVS coordination for issuing rulemaking for changes to 14 Code of Federal Regulations (CFR), Sections (§§) 121.579, 125.329, and 135.93 regarding autopilot minimum use height operating rules to further enable the operational use of advanced autopilot and navigation systems, while continuing to allow for the utilization of legacy systems.	AFS-470	September 2014
RNP 0.3, RNP 2, Advanced-RNP	Operational Guidance	Update AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System, to include new, internationally harmonized navigation specifications of Advanced RNP, RNP 0.3, and RNP 2.	AFS-470	September 2014
Trajectory Operations Navigation	Equipment Standard	TSO: Equipment standard for flight management system suited for trajectory operations	AIR-130	2015[1]
	Installation Standard	AC: Advisory circular for evaluating this capability as installed	AIR-130	2015[2]

[1] Schedule revised to accomodate publication of material after industry standards are developed.

[2] Schedule revised to accomodate publication of material after industry standards are developed.

APPENDIX A: NEW ENABLING POLICY

All Schedules Presume Industry Standards Setting Committees Conclude As Planned

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
ADS-B				
In-Trail Procedure (ADS-B In)	Operational Oversight	Order 1100.161. Approved and monitoring ADS-B In In-Trail Procedures Trial demonstration in the Pacific Oceanic FIR airspace	AOV-330	September 2014
ADS-B Traffic Situation Awareness (ADS-B In)	Equipment Standard	TSO-C195b: Equipment standard for non-TCAS equipped aircraft to obtain conflict detection capability that is compatible with typical VFR operations	AIR-130	May 2014
	Installation Guidance	AC 20-172B[1] *Airworthiness Approval for ADS-B In Systems and Applications:* Update installation guidance for ADS-B In Traffic Advisory System (ADS-B In)	AIR-130	June 2014
Interval Management (ADS-B In)	Equipment Standard	TSO-C195c, revised equipment standard for interval management	AIR-130	2015[3]
	Installation Guidance	AC 20-172C, revised AC on interval management installation	AIR-130	2015[4]
	Operational Guidance	AC 90-114, CHG 2, Automatic Dependent Surveillance-Broadcast Operations, Appendix for Interval Management	AFS-430	September 2014
	Implementation Guidance	Revise Order 8900.1, standard Operations Specifications	AFS-430	December 2014

[3] TSO Schedule revised to accomodate publication of material after industry standards are developed.

[4] AC Schedule revised to accomodate publication of material after industry standards are developed.

APPENDIX A: NEW ENABLING POLICY

All Schedules Presume Industry Standards Setting Committees Conclude As Planned

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
DATA COMMUNICATIONS				
FANS-1/A (over SatCom)	Equipment Standard	TSO-C159b, Avionics Supporting Next Generation Satellite Systems: Update TSO to invoke standards for new Inmarsat service SatCom (International Mobile Satellite Organization (Inmarsat) Swift broadband)	AIR-130	June 2014[5]
	Installation Guidance	AC 20-150B, Airworthiness Approval of Satellite Voice Equipment Supporting Air Traffic Service (ATS) Communication	AIR-130	September 2014
Data Link Recording	Installation Guidance	AC 20-160A, Onboard Recording of Controller Pilot Data Link Communication in Crash Survivable Memory	AIR-130	2015[6]
Baseline 2	Installation Guidance	AC 20-140C Guidelines for Design Approval of Aircraft Data Link Communications Systems Supporting Air Traffic Services (ATS): Update AC to support U.S. datalink program (dependent on funding for U.S. program)	AIR-130	2015[7]
	Operational Guidance	AC 120-70C, address operational use of data communications	AFS-470	2015[8]

[5] TSO schedule revised to accommodate publication of material after industry standards are developed.
[6] Finalizing requirements for data communications Baseline 2 criteria may impact the schedule.
[7] Finalizing requirements for data communications Baseline 2 criteria may impact the schedule.
[8] Finalizing requirements for data communications Baseline 2 criteria may impact the schedule.

APPENDIX A: NEW ENABLING POLICY

All Schedules Presume Industry Standards Setting Committees Conclude As Planned

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
LOW VISIBILITY OPERATIONS				
EFVS	Operational Rule	Publish final rule expanding the operational use of EFVS systems	AFS-410	December 2014
	Installation Guidance	AC 20-167A *Airworthiness Approval of EVS, SVS, CVS and EFVS:* Update AC to address use of EFVS for touchdown (depending on final operational concept and rulemaking).	AIR-130	December 2014
	Operational Guidance	AC 90-106A *Enhanced Flight Vision Systems:* Update AC to address use of EFVS for touchdown (depending on final operational concept and rulemaking).	AFS-410	December 2014
GLS Category III	Installation Guidance	Interim criteria (project specific policy)	AIR-130	2016[9]
FLIGHT DECK ENHANCEMENTS				
Flight Information System – Broadcast (FIS-B)	Equipment Standard	TSO: Updated equipment standard for FIS-B equipment	AIR-130	2015
ENGINES AND FUEL				
Drop-In Renewable Jet Fuel	ASTM standards (Alcohol to Fuel Pathways)	Expand jet fuel specification to allow production via alternative processes and feedstocks	AIR-20	December 2014
	ASTM standards (Pyrolysis)	Expand jet fuel specification to allow production via alternative processes and feedstocks	AIR-20	2015
Electric Propulsion	ASTM Standard (for the electric propulsion system components and their installation requirements)	Enables certifiable electric propulsion technology with zero fuel burn and lower noise for light sport aircraft.	ACE-100	December 2014
More Efficient Engines (Open Rotor)	Enabling policy through a Special Condition template and initiating action for new 14 CFR part 33 regulations	Address novel features in Open Rotor engine designs and their integration with the aircraft.	ANE-110	2015

[9] Date moved due to the need for further research to mature this technology

APPENDIX B: STREAMLINING INITIATIVES

INITIATIVE (ACTIVITY TITLE)	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
NAV Lean (Rec. 9 Milestone)	Establish interim policy for supplying World Geodetic System data (WGS84 is the reference coordinate system used by the Global Positioning System) .	AFS-400	September 2013
NAV Lean (Rec.9)	Standardize precision, resolution, and rounding values that are needed for each IFP application to alleviate disparity	AFS-400	September 2015
NAV Lean (Rec.19 Milestone)	Draft applicable changes to FAA Order 8260.19 (Flight Procedures and Airspace) and submit for coordination.	AFS-400	September 2013
NAV Lean Rec.19)	Amend FAA Order 8260.19 to define life cycle policy for IFP development, including: environmental requirements, SMS requirements, Operations and Aircraft Approval requirements, criteria revisions, revisions as necessary by other LOBs, and the definition of “minor amendments” for use when “fast-tracking” eligible IFPs	AFS-400	January 2014
NAV Lean (Rec.21)	Establish a Web-based Operations Approval entry portal and a Web-based work package to accommodate the needs of other LOBs and external stakeholders	AFS-200	September 2014
Update to Organization Designation Authorization (ODA) Procedures	Revise Order 8100.15A to provide improvements to maximize use of ODA delegation	AIR-100	June 2013
Expansion of Approved Model Lists	AC describing appropriate use of approved model lists and identified required data	AIR-100	September 2013
New Guidance for Major Repair and Alterations	Develop joint Order addressing process for approving major repairs and alterations	AFS-300/AIR-100	April 2014[10]
Develop NextGen avionics maintenance training course for Aviation Safety Inspectors	Work with AFS-500 to develop and implement avionics training courses	AFS-300	September 2014

[10] Extended due to additional internal coordination.

APPENDIX C: NEXTGEN DEMONSTRATIONS

DEMO	DESCRIPTION	PARTNERS	AVS ACTIVITY
4D Flight Management System (4D FMS)	Demonstrate operational capabilities and potential benefits of 4D FMS in Trajectory-Based Operations	Honeywell, GE Aviation, Alaska Airlines, SEA Center, United Airlines, HOU Center, FedEx, and MEM Center	AFS – Support safety assessments, risk analyses, and WGs to help develop a concept of operations AIR- Participate in requirements definition and technology evaluation
Greener Skies Initiative	RNP aircraft will fly consistent and controlled approach and departure paths with pinpoint accuracy to reduce aircraft emissions and noise exposure in the Puget Sound region.	Boeing, Port of Seattle, Alaska Airlines, and Horizon Airlines	AFS – Continue to establish criteria to maximize benefit while maintaining highest level of safety AOV – Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
Closely Spaced Parallel Operations (CSPO)	This program will investigate a number of CSPO-enabling activities to determine to what level, if any, runway spacing can be reduced. The only demonstration is scheduled for FY14 – FY16 using Paired Approach concept to fly simultaneous approaches to very closely spaced parallel runways. Working with Surveillance and Broadcast Services and AFS-407 to build upon IM concepts. This activity is not yet fully funded.	ANG, DOT Volpe, MITRE, United Airlines, MIT Lincoln Laboratory and NASA	AFS – Simulator and collision risk analysis of revised blunder assumptions on parallel ILS approaches. Simulator development for long-term CSPO evaluations AIR – Definition of requirements for long-term CSPO solutions AOV – Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
Ground Based Augmentation System (GBAS)	Demonstrate the use of PBN technology to improve arrival rates at airports	Houston Airport System (HAS) and United Airlines	AFS - Support for operational approval and project management AIR – Support resolution of technical issues relating to availability and continuity (including effect of interference)
Wide Area Augmentation System (WAAS)	Provide real-time data on NextGen to validate performance requirements for these technologies	Horizon Airlines, NetJets, and Evergreen Cargo	AFS & AIR - Support for operational approval of new WAAS applications
Tailored Arrivals (TAs)	Highly efficient arrival trajectories from Top of Descent (TOD) to the runway threshold	Multiple operators and ATC facilities	AFS – "Tailored Arrival Design and Operator Authorization" Notice to be released providing guidance and standardization for the design of TA and operator authorization to fly TAs. Released in conjunction with Air Traffic Organization's TA Notice AIR – Requirements definition for aircraft participating in demo

APPENDIX C: NEXTGEN DEMONSTRATIONS

DEMO	DESCRIPTION	PARTNERS	AVS ACTIVITY
Departure Clearance (DCL) Data Link Trials.	DCL is a prelude to the Terminal Data Link Service Data Communication upgrade planned for 2015. It includes sites and operators selection, ground implementation, and validation activities.	WJHTC, Airports, and industry partners under definition	AFS and AIR provide regulatory guidance to ensure alignment with future international Data Link standard (SC214/WG78) in support of Time-Based Operations.
Eddy Dissipation Rate and Graphical Turbulence Information Uplink and Display on the Flight Deck	Simulator and line flight operations using onboard WiFi to display near real time turbulence information on an iPad in the flight deck. Demonstrate the feasibility and analyze the benefits (safety and economic) of providing turbulence graphical information to the flight deck	ANG, NCAR, and Delta Airlines	AFS and AIR provides regulatory guidance, support for operational approval to use onboard technologies, and support safety assessments and risk analyses.
ADS-B IN In-Trail Procedure (ITP)	ADS-B In capability that enables flight-level changes using reduced separation standards in nonradar oceanic airspace.	Honeywell, Goodrich, and UAL	AFS & AIR - Support UAL CMO during conduct of ITP demonstration. AOV – Approved and monitoring ADS-B IN ITP Trial demonstrations being conducted in the Pacific Oceanic FIR airspace
ADS-B In IM	IM applications enable enhanced Visual Separation on Approach, SA in flight, and on airport surface.	USAIR, Goodrich, Astronautics, and ACSS	AFS & AIR - Develop supporting IM equipment certification standards and operational approval guidance
Aircraft Access to SWIM (AAtS) Operational Demonstrations	Aircraft Access to SWIM will conduct live operational flight demonstrations using common sourced data to demonstrate the feasibility and benefit of providing operational, weather, and regulatory data to pilots in-flight for improved coordination between air traffic control and the flight deck.	NetJets	AFS and AIR provide support for operational approval of AAtS applications and support to safety assessments and risk analyses.

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

This appendix will lay out the enablers that support each increment in Segment A of the NGIP that is still to be completed. Specific details of what guidance material supports a given enabler can be found on Tables 1-4 of the main document. Other activities, beyond the policies for particular enablers may be required in order to achieve full implementation of NextGen capabilities. Those activities are specified in the AIR, AFS, and AOV Activity columns.

COLLABORATIVE AIR TRAFFIC MANAGEMENT

OI-105208 Traffic Management Initiatives with Flight Specific Trajectories	Individual flight-specific trajectory changes resulting from TMIs will be disseminated to the appropriate Air Navigation Service Provider (ANSP) automation for tactical approval and execution. This capability will increase the agility of the National Airspace System (NAS) to adjust and respond to dynamically changing conditions such as impacting weather, congestion, and system outages.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
105208-12 Delivery of Pre-Departure Reroutes to Controllers	2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards
OI 105302 Continuous Flight Day Evaluation	Performance analysis, where throughput is constrained, is the basis for strategic operations planning. Continuous (real-time) constraints are provided to ANSP traffic management decision-support tools and NAS users. Evaluation of NAS performance is both a real-time activity feedback tool and a post-event analysis process. Flight day evaluation metrics are complementary and consistent with collateral sets of metrics for airspace, airport, and flight operations.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
105302-11 Collaborative Airspace Constraint Resolution	2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls defined to mitigate or eliminate initial high risk hazards
OI 101102 Provide Air Full Flight Plan Constraint Evaluation with Feedback	Timely and accurate NAS information enables users to plan and fly routings that meet their objectives. Constraint information that impacts the proposed route of flight is incorporated into ANSP automation, and is available to users. Examples of constraint information include Special Use Airspace (SUA) status, Significant Meteorological Information (SIGMETS), infrastructure outages, and significant congestion events.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
101102-11 Collaborative Trajectory Options Program	2012 2013	(AOC/FOC to ANSP) System Wide Information Management (SWIM)	No additional activity	Possible guidance/ policy for dispatch use.	Approve controls that are defined to mitigate or eliminate initial high risk hazards
101102-12 Route Availability Planning	2013	(AOC/FOC to ANSP) SWIM	No additional activity	Possible guidance/ policy for dispatch use.	Approve controls that are defined to mitigate or eliminate initial high risk hazards

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

IMPROVED SURFACE OPERATIONS

OI 103207 Improved Runway Safety Situational Awareness for Controllers	At large airports, current controller tools provide surface displays and can alert controllers when aircraft taxi into areas where a runway incursion could result. Additional ground-based capabilities will be developed to improve runway safety that include expansion of runway surveillance technology (i.e., ASDE-X) to additional airports, deployment of low-cost surveillance for medium-sized airports, improved runway markings, and initial controller taxi conformance monitoring capabilities. These ground-based tools will provide a range of capabilities to help improve runway safety for medium- to large-sized airports.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
103207-13 Expansion of Surface Surveillance	2013 2015	ADS-B for Surface Vehicles	No additional activity	No additional activity	Monitor Ongoing Trials
OI 103208 Improved Runway Safety: Situational Awareness for Pilots	Runway safety operations are improved by providing pilots with improved awareness of their location on the airport surface as well as runway incursion alerting capabilities. To help minimize pilot disorientation on the airport surface, a surface moving map display with own-ship position will be available. Both ground-based (e.g., runway status lights) and cockpit-based runway incursion alerting capabilities will also be available to alert pilots when it's unsafe to enter the runway environment. Additional enhancements may include cockpit displays of surface traffic (e.g., vehicles and aircraft) and the use of a cockpit display that depicts the runway environment and displays traffic from the surface up to approximately 1500 feet above ground level on final approach, and will be used by the flight crew to help determine runway occupancy."				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
103208-12 Cockpit Display of Traffic Information (CDTI) with Traffic Information Service Broadcast (TIS-B) and ADS-B for Surface	2010 2015	ADS-B Out/In	No additional activity	Authorization of U.S. Airways for Surface & Airborne situational awareness operations in PHL	No additional activity
OI 104209 Initial Surface Traffic Management	Departures are sequenced and staged to maintain throughput. ANSP uses automation to integrate surface movement operations with departure sequencing to ensure departing aircraft meet departure schedule times while optimizing the physical queue in the movement area. ANSP automation also provides surface sequencing and staging lists for departures and average departure delay (current and predicted). These functions will incorporate Traffic Management Initiatives (TMIs), separation requirements, weather data, and user preferences, as appropriate.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104209-17 Provide Initial Surface Management System	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

TIME BASED FLOW MANAGEMENT

OI 104120 Point In Space Metering	Air Navigation Service Provider (ANSP) uses scheduling tools and trajectory-based operations to assure smooth flow of traffic and increase the efficient use of airspace.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104120-11 Extended Metering	2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards
OI 104117 Improved Management of Arrivals/ Surface/Departure Flow Operations (IASDF)	This OI integrates advanced arrival/departure flow management with advanced surface operation functions to improve overall airport capacity and efficiency. ANSP automation uses arrival and departure scheduling tools and four-dimensional trajectory agreements to flow traffic at high-density airports. Automation incorporates Traffic Management Initiatives (TMIs), current and forecasted conditions (e.g., weather), airport configuration, user-provided gate assignments, requested runway, aircraft wake characteristics, and flight performance profiles. ANSP, flight planners, and airport operators monitor airport operational efficiency and make collaborative real-time adjustments to schedules and sequencing of aircraft to optimize throughout.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104117-11 Integrated Departure/Arrival Capability (IDAC	2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards
OI 104123 Time-Based Metering Using Area Navigation (RNAV) and Required Navigation Performance (RNP) Route Assignment	In addition to the en route RNAV routes, which are already used to calculate trajectories, the TRACON RNAV routes for both Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs) will be used to calculate the terminal component of aircraft trajectories.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104123-11 Use RNAV Route Data to Calculate Trajectories Used to Conduct TBM Operations	2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
OI 104115 Current Tactical Management of Flow in the En Route for Arrivals/Departures	Proper spacing and sequencing of air traffic maximizes NAS efficiency and capacity in the arrival and departure phases of flight. Controllers provide traffic synchronization to aircraft by monitoring the situation, making control decisions, and modifying flight trajectories to meet operational objectives and accommodate user preferences. They achieve this by applying manual controller optimization procedures. Traffic specialists and controllers use traffic displays (radar and enhanced traffic management system) and flight strips to establish flow initiatives, such as assignment to alternative arrival flows or miles-in-trial requirements.				

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

TIME BASED FLOW MANAGEMENT

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104115-11 Implement TMA's ACM Capability at Additional Locations	2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
104115-12 Implement TMA at Additional Airports*	2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

IMPROVED MULTIPLE RUNWAY OPERATIONS

OI 102141 Improve Parallel Runway Operations	This improvement will explore concepts to recover lost capacity through reduced separation standards, increased applications of dependent and independent operations, enabled operations in lower visibility conditions, and changes in separation responsibility between Air Traffic Control (ATC) and the flight deck.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102141-11 Additional 7110.308 Airports	2010 2015	ILS	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
102141-11a Wake Turbulence Mitigation for Arrivals-Procedures (WTMA-P) for Heavy/757 Aircraft	2013 2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
102141-12 Implement SATNAV or ILS for Parallel Runway Operations	2011 2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

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IMPROVED MULTIPLE RUNWAY OPERATIONS

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102141-13 Amend Independent Runway Standards in Order 7110.65 (include Blunder Model Analysis)	2010 2013	No Aircraft or Operator Enabler	No additional activity	Support SMS activity to draft document change proposals	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
102141-13a Enable Additional Approach Options for New Independent Runway Separation Standards	2012 2015	No Aircraft or Operator Enabler	No additional activity	Complete technical reports and support SMS activity to draft document change proposals.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
102141-14 Amend Dependent runway Separation Standards in Order 7110.65	2012 2015	No Aircraft or Operator Enabler	No additional activity	Complete technical reports and support SMS activity to draft document change proposals.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
OI 108209 Increase Capacity and Efficiency Using RNAV and RNP	Both RNAV and RNP will enable more efficient aircraft trajectories. RNAV and RNP, combined with airspace changes, increase airspace efficiency and capacity.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
108209-16 Use Converging Runway Display Aid (CRDA).	2010 2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high-risk hazards
OI 102140 Wake Turbulence Mitigation for Departures (WTMD): Wind-Based Wake Procedures	Changes to wake rules are implemented based on wind measurements. Procedures allow more closely spaced departure operations to maintain airport/runway capacity. Procedures are developed at applicable locations based on the results of analysis of wake measurements and safety analysis. During peak demand periods, these procedures allow airports to increase airport departure throughput during favorable wind conditions in VMC. A staged implementation of changes in procedures and standards, as well as the implementation of new technology, will safely reduce the impact of wake vortices on operations. This reduction applies to specific types of aircraft and is based on wind transporting an aircraft's wake away from the parallel runway's operating area.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
There are no increments under this OI	N/A	No Aircraft or Operator Enabler	No additional activity	AFS-430 has drafted a WTMD InFO for the planned operational demonstrations at IAH, MEM, and SFO.	No additional activity

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS

OI 107107 Ground-Based Augmentation System Precision Approaches	GPS/GBAS support precision approaches to Category (CAT) I and eventually CAT II/III minimums, for properly equipped runways and aircraft. GBAS can support approach minimums at airports with fewer restrictions to surface movement, and offers the potential for curved precision approaches. GBAS may also support high-integrity surface movement requirements.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
107107-11 GBAS Category I Non-Federal System Approval	2010 2014	CAT I GBAS Avionics	Support resolution of RFI issues	Support resolution of RFI issues	No additional activity

OI 107117 Low Visibility/Ceiling Approach Operations	The ability to complete approaches in low visibility/ceiling conditions is improved for aircraft equipped with some combination of navigation derived from augmented GNSS or ILS and other cockpit-based technologies or combinations of cockpit-based technologies and ground infrastructure.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
107117-11 EFVS to 100 Feet	2012 2015	EFVS	No additional activity	Complete rulemaking project to expand operational use	No additional activity

OI 107118 Low-Visibility/Ceiling Landing Operations	The ability to land in low visibility/ceiling conditions is improved for aircraft equipped with some combination of navigation derived from augmented GNSS or ILS, and head-up guidance systems, EFVS, SVS, advanced vision system, and other cockpit-based technologies that combine to improve human performance. Cockpit-based technologies allow instrument approach procedure access with reduced requirements on ground-based navigation and airport infrastructure. Due to onboard avionics, airport access is maintained in low visibility/ceiling conditions

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
107118-11 EFVS to Touchdown	2012 2015	EFVS	Complete RTCA SC-213 activity; update AC	Complete EFVS Rulemaking	No additional activity

PERFORMANCE BASED NAVIGATION

OI 108209 Increase Capacity and Efficiency Using RNAV and RNP	Both RNAV and RNP will enable more efficient aircraft trajectories. RNAV and RNP, combined with airspace changes, increase airspace efficiency and capacity."

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
108209-12 Optimization of Airspace and Procedures in the Metroplex	2013 2015	No Aircraft or Operator Enabler	No additional activity	NextGen branch participation on teams	No additional activity
108209-13 Large-Scale Redesign of Airspace Leveraging PBN	2010 2016	No Aircraft or Operator Enabler	No additional activity	Oversee the SA CAT I/II program	No additional activity
108209-14 Transition to PBN Routing for Cruise Operations	2010 2015	No Aircraft or Operator Enabler	No additional activity	Continue efforts to provide support to field inspectors on evaluating aircraft/ aircrew eligibility.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

PERFORMANCE BASED NAVIGATION

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
108209-18 PBN Route Eligibility	2012 2013	No Aircraft or Operator Enabler	No additional activity	Continue efforts to provide support to field inspectors on evaluating aircraft/ aircrew eligibility.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
108209-19 RNAV (GPS) Approaches	2010 2015	No Aircraft or Operator Enabler	No additional activity	Have begun work on updating AC90-105 and relevant guidance /supporting policy material.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
108209-20 Advanced and Efficient RNP	2013	No Aircraft or Operator Enabler	Update airworthiness guidance (AC)	Have begun work on updating AC90-105 and relevant guidance /supporting policy material.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
OI 107103 RNAV Standard Instrument Departures (SIDs), Standard Terminal Arrivals (STARs), and Approaches	Area navigation (RNAV) is available throughout the National Airspace System (NAS) using satellite-based avionics equipment and systems. GPS/WAAS avionics accept and process GPS position and other related waypoint data, supplemented by range-correction information received from the WAAS geostationary satellites and network, to facilitate improved availability and continuity of satellite navigation services. GPS/WAAS enabled RNAV will allow the removal of all but a minimum operational network of VOR and a full complement of DME stations within the navigation infrastructure to support aviation as backup. GPS/WAAS avionics provide an approach with lateral with precision vertical guidance (LPV) to airports previously without instrument approach services. All instrument approaches require approved runway lighting facilities.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
107103-12 RNAV (RNP) Authorization Required (AR) Approaches	2010 2015	No Aircraft or Operator Enabler	No additional activity	Recently updated Operations Specification to reflect improvements made to AC90-101A.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
107103-13 RNAV SIDs and STARs at Single Sites	2010 2015	No Aircraft or Operator Enabler	No additional activity	Continue to participate in OAPM airspace design initiatives and provide support on an as needed basis.	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

ON DEMAND NAS

OI 103305 On Demand NAS	NAS and aeronautical information will be available to users on demand. NAS and aeronautical information is consistent across applications and locations, and available to authorized subscribers and equipped aircraft. Proprietary and security-sensitive information is not shared with unauthorized agencies/individuals.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
103305-11 Broadcast Flight and Status Data to Pilots/AOCs	2010 2014	Airborne/ Ground CDTI FIS-B	No additional activity	AC 00-63, which addresses FIS-B and digital Notices to Airmen (NOTAMS)	No additional activity
103305-13 Provide NAS Status via Digital NOTAMs for Flight Operations Centers (FOCs)/ Airline Operations Centers (AOCs)	2009 2015	FIS-B	No additional activity	AC 00-63, which addresses FIS-B and digital Notices to Airmen (NOTAMS)	Approve controls that are defined to mitigate or eliminate initial high-risk hazards
OI 108212 Improved Management of Special Activity Airspace	Special Activity Airspace (SAA) assignments, schedules, coordination, and status changes are conducted automation-to-automation. Changes to status of SAA are readily available for operators and ANSP. Status changes are transmitted to the flight deck via voice or data communications. Flight trajectory planning is managed dynamically based on real-time use of airspace.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
108212-12 Improve SUA-Based Flow Predictions	2015	No aircraft or operator enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima
OI 103209 Enhanced Traffic Advisory Services	TSAA is an application of Automatic Dependent Surveillance-Broadcast (ADS-B) In application that is intended to reduce the number of mid-air collisions and near-collisions involving general aviation (GA) aircraft. TSAA provides voice annunciations to flightcrews to draw attention to alerted traffic and adds visual cues to the underlying basic traffic situation awareness application in installations where a traffic display is available. The TSAA application uses ADS-B information, and where available ADS-Rebroadcast and TIS-B information, to provide the flightcrew with indications of nearby aircraft in support of their see-and-avoid responsibility.				

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
103209-11 Traffic Situation Awareness with Alerts (TSAA)	2012 2015	ADS-B Traffic Situation Awareness with Alerts (ADS-B In)	Develop performance standard (TSO) and installation guidance (AC)	No additional activity	No additional activity

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

SEPARATION MANAGEMENT

OI 102137 Automation Support for Separation Management	The ANSP automation provides the controller with tools to manage aircraft separation in a mixed navigation and wake performance environment.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102137-15 Automated Terminal Proximity Alert	2010 2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high-risk hazards

OI 102108 Oceanic In-Trail Climb and Descent	ANSP automation enhancements will take advantage of improved communication, navigation, and surveillance coverage in the oceanic domain. When authorized by the controller, pilots of equipped aircraft use established procedures for climbs and descents.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102108-11 Automatic Dependent Surveillance Contract (ADS-C) Oceanic Climb/Descent Procedure (CDP)	2010 2012	ADS-C FANS-1/A RNP 4 (A056)	No additional activity	Awaiting ATO 7110.65 updates and release for implementation of ADS-CDP	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima s
102108-12 Enhanced Oceanic CDP via ADS-C Automation	2011 2015	ADS-C FANS-1/A RNP 4 (A056)	No additional activity	Under Review	Approve controls that are defined to mitigate or eliminate initial high-risk hazards
102108-13 ADS-Broadcast (ADS-B) Oceanic In-Trail Procedure (ITP) and Automation	2011 2015	ADS-B IN (A354)		UAL & US Airways trials.	Monitoring Trial. Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

OI 102154 Wake Re-Categorization	Legacy wake separation categories are updated based on analysis of wake generation, wake decay, and encounter effects for representative aircraft. Eventually, static wake separation standards are established that consider model-specific leader-follower aircraft pairings, replacing categorical standards and increasing capacity. Ultimately, dynamic wake separation standards are established that consider real-time atmospheric and aircraft configuration information as well. ANSP automation supports adjustment and application of standards.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102154-11 Wake Re-Categorization Phase 1 - Aircraft Re-Categorization	2012 2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve changes or waivers to provisions of handbooks, orders, and documents, including FAA Order 7110.65 Air Traffic Control, current edition, that pertain to separation minima

NAS INFRASTRUCTURE

OI 103119 Initial Integration of Weather Information into NAS Automation and Decision Making	Advances in weather information content and dissemination provide users and/or their decision support with the ability to identify specific weather impacts on operations (e.g., trajectory management and impacts on specific airframes, arrival/departure planning) to ensure continued safe and efficient flight. Users will be able to retrieve (and subscribe to automatic updates of) weather information to support assessment of flight-specific thresholds that indicate replanning actions are needed. In particular, the NextGen Network-Enabled Weather (NNEW) System with the National Oceanic and Atmospheric Administration's Four Dimensional (4-D) Weather Data Cube [including later the 4-D Weather Single Authoritative Source data] will support enhanced volumetric extractions, by timeframe of interest, of weather information by NAS users to quickly filter the enhanced weather content to the region of interest for impact analysis. This will streamline the process by which the user – with or without decision-support ATM tools – conducts system-wide risk management in planning for both individual flight trajectories and flows.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
103119-12a NextGen Common Weather: Information Base — Initial	2016	WX Reporting system	No additional activity	• Update AC 00-63 Cockpit Display of Digital Weather Information and Aeronautical Information • Update AC 00-45 Aviation Weather Services for weather in the cockpit guidance • Update AIM Section 7-1 for weather in the cockpit guidance • Write 8900.1 Volume 3 Chapter 26 Section 5 guidance for approving a certificate holder's weather in the cockpit program	No additional activity

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

ENVIRONMENT AND ENERGY

OI 109315 Implement NextGen Environmental Engine and Aircraft Technologies – Phase 1	Mature technologies to reduce noise, emissions, and fuel burn of commercial subsonic jet aircraft. Technologies are demonstrated at sufficient readiness levels to achieve goals of the FAA's Continuous Lower Energy, Emissions, and Noise (CLEEN) program.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
109315-11 Open Rotor	2015	No Aircraft or Operator Enabler	Develop standards and guidance for Open Rotor engine configuration certification and airframe installation	No additional activity	No additional activity
109315-13 Adaptive Trailing Edges	2013	No Aircraft or Operator Enabler	Technical support to AEE as required	No additional activity	No additional activity
109315-14 Ceramic Matrix Composite Turbine Blade Tracks	2013	No Aircraft or Operator Enabler	Technical support to AEE as required	No additional activity	No additional activity
109315-15 Ceramic Matrix Composite Acoustic Nozzle	2014	No Aircraft or Operator Enabler	Technical support to AEE as required	No additional activity	No additional activity
109315- 16 Engine Weight Reduction and High temperature Impeller	2015	No Aircraft or Operator Enabler	Technical support to AEE as required	No additional activity	No additional activity
109315-17 Dual-Wall Turbine Blade	2015	No Aircraft or Operator Enabler	Technical support to AEE as required	No additional activity	No additional activity
109315-18 FMS - Air Traffic Management (FMS-ATM) Integration	2015	Trajectory Operations Navigation Standard	Technical support to AEE as required	No additional activity	No additional activity

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

SYSTEM SAFETY MANAGEMENT

OI 109304 Enhanced Aviation Safety Information Analysis and Sharing	Aviation Safety Information Analysis and Sharing will improve system-wide risk identification, integrated risk analysis and modeling, and implementation of emergent risk management

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
109304-17 Expanded ASIAS Participation	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-18 ASIAS Data and Data Standards	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-19 Enhanced ASIAS Architecture	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-20 Upgraded and Expanded ASIAS Analytical Capabilities	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-21 Vulnerability Discovery	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-22 ASIAS Studies and Results	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA
109304-23 ASIAS Collaboration Capabilities	2015	No Aircraft or Operator Enabler	No additional activity	No additional activity	Execute 2013 ASIAS PLA