U.S. Department of Transportation

Federal Aviation Administration

AVS Work Plan for NextGen 2012

March 2012

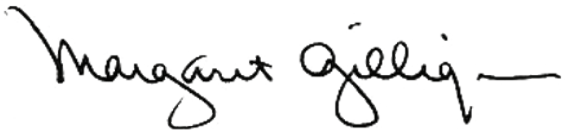
This continues to be a very exciting yet challenging time in the history of aviation. Last year, over 731 million people flew on US air carriers, and that number is projected to increase by 500 million over the next 20 years. We're also forecasting that US carrier traffic will nearly double by 2030. So we believe the only way we can ensure the continued safety of our National Airspace System and meet the increased demands in air traffic is for us all to work together to implement the Next Generation Air Transportation System (NextGen).

As NextGen continues to mature, Aviation Safety continues to align our NextGen efforts with those of the FAA while driving the strategic deployment of our many critical NextGen initiatives. Since 2010, we have released an annual Aviation Safety Work Plan for NextGen, outlining how we support NextGen implementation. In this year's plan, we report on the progress we have made since we began our NextGen journey, and we provide clear direction for what we plan to achieve next.

There's no question that NextGen is the FAA's highest priority when it comes to investing in the future of aviation safety, and while we are proud of the progress we have made, we are also very excited about the advances we're going to make in the years ahead.

So whether it's by increasing safety and efficiency by equipping aircraft with Automatic Dependent Surveillance-Broadcast (ADS-B), or by using Global Positioning System (GPS)-based Required Navigation Performance (RNP) approaches, or through the certification of new technology, together, with your help, we will figure out how to most effectively allocate resources, identify priorities, and support the FAA's NextGen goals.

Thank you for all of your help as we transform air transportation, and thank you for your professionalism and commitment to aviation safety. I look forward to continuing to work with you.



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
AC	Advisory Circular
ACO	Aircraft Certification Office
ACARS	Aircraft Communications Addressing and Reporting System
ADS-B	Automatic Dependent Surveillance–Broadcast
AFC	Aviation Fuel Committee
AFS	Flight Standards Service
AIR	Aircraft Certification Service
AML	Approved Model List
AMS	Acquisition Management System
ANG	FAA Office of NextGen and Operations Planning
AOV	Air Traffic Safety Oversight Service
AQS	Office of Quality, Integration and Executive Services
AR	Authorization Required
ARC	Aviation Rulemaking Committee
ARM	Office of Rulemaking
ASAT	Airspace Simulation and Analysis Tool
ASDE	Airport Surface Detection Equipment
ASIAS	Aviation Safety Information Analysis and Sharing
ASP	Aeronautical Surveillance Panel
ATC	Air Traffic Control
ATJ	Alcohol to Jet
ATN	Aeronautical Telecommunication Network
ATO	Air Traffic Organization
AVP	Office of Accident Investigation and Prevention
AVS	Aviation Safety
AVSMT	AVS Management Team
BLI	Budget Line Item
CAAFI	Commercial Aviation Alternative Fuel Initiative
CAMI	Civil Aeronautical Medical Institute
CAVS	CDTI-Assisted Visual Separation
CDTI	Cockpit Display of Traffic Information
CEDS	CDTI-Enabled Delegated Separation
COS	Continuous Operational Safety
CSPO	Closely Spaced Parallel Operations
DSHC	Direct Sugar to Hydrocarbon
EA	Enterprise Architecture
EAB	Enterprise Architecture Board
EASA	European Aviation Safety Agency
EFB	Electronic Flight Bag
EFVS	Enhanced Flight Vision System
F&E	Facilities and Equipment
FANS	Future Air Navigation System
FIM-DI	Flight-deck-based Interval Management-Defined Interval
FIM-S	Flight-deck-based Interval Management-Spacing
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
I2I	Idea to In-Service
ICAO	International Civil Aviation Organization
IIC	Investigator-in-Charge
ILS	Instrument Landing System
IM	Interval Management (ADS-B)
IMS	Integrated Master Schedule
ITP	In-Trail Procedures
JPDO	Joint Planning and Development Office
JRC	Joint Resources Council

ACRONYMS ABBREVIATIONS

LOA ..... Letter of Authorization
LOB ..... Line of Business (AVS, for example)
LPV ..... Localizer Performance with Vertical Guidance
MOPS ..... Minimum Operational Performance Standards
NAC ..... NextGen Advisory Committee
NARP ..... National Aviation Research Plan
NAS ..... National Airspace System
NAT ..... North Atlantic
NAV Lean ..... Navigation Procedures Project
NAC ..... NextGen Advisory Committee
NGI&I ..... NextGen Integration & Implementation Office
NGIP ..... NextGen Implementation Plan
NGPT ..... NextGen Policy Team
NIEC ..... NextGen Integration and Evaluation Capability
NMB ..... NextGen Management Board
NOTAM ..... Notice to Airmen
NRB ..... NextGen Review Board
NSIP ..... NextGen Segment Implementation Plan
NTSB ..... National Transportation Safety Board
ODA ..... Organization Designation Authorization
OGC ..... Open Geospatial Consortium
OI ..... Operational Improvement
OSRWG ..... Oceanic Separation Reduction Working Group
PARC ..... Performance-based Operations Aviation Rulemaking Committee
PBN ..... Performance Based Navigation
POI ..... Principal Operations Inspector
R&D ..... Research and Development
REB ..... R&D Executive Board
RE&D ..... Research, Engineering and Development
RNAV ..... Area Navigation
RNP ..... Required Navigation Performance
RNP AR ..... RNP Authorization Required
SARPS ..... Standards and Recommended Practices (ICAO)
SBS ..... Surveillance and Broadcast Services
SDA ..... System Design Approval
SESAR ..... Single European Sky ATM Research
SMART ..... Safety Management Action Review Team
SMR ..... Safety Management Review
SMS ..... Safety Management System
SMT ..... Standards Management Team
SRMD ..... Safety Risk Management Document
SSA ..... System Safety Assessment
STC ..... Supplemental Type Certificate
SURF-IA ..... Airport Traffic Situation Awareness with Indications and Alerts
SVS ..... Synthetic Vision Systems
SWIM ..... System Wide Information Management
TAWS ..... Terrain Awareness and Warning System
TC ..... Type Certificate
TCAS ..... Traffic Alert and Collision Avoidance System
TCRG ..... Technical Community Representative Groups
TF ..... Task Force
TOps ..... Trajectory Operations
TOT ..... Training Oversight Team
TSAA ..... Traffic Situation Awareness with Alerts
TSG ..... Technical Subgroup
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
VFR ..... Visual Flight Rules
VNAV ..... Vertical Navigation
WAAS ..... Wide Area Augmentation System
WebOPSS ..... Web Based Operations Safety Subsystem

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. Safety, aircraft centric operations, and aircraft equipage are keys to NextGen's success.

INTRODUCTION

This Work Plan explains the AVS organization for NextGen as well as charts a course for 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 2011, the FAA NextGen Management Board (NMB) approved the NextGen Segment Implementation Plan (NSIP) for segment Alpha, which provides more detail on activities within the FAA to deliver the capabilities scheduled for operational implementation by 2015. Using the NSIP and the broader NGIP as our guide, this Work Plan captures the AVS activities. In the following pages, you can check our 2011 status of streamlining initiatives; learn our plans for 2012; review how AVS is organized 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.

AVS will continue to ensure that 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). 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 well. As such, the detailed plans and implementation for SMS are not reflected in this plan. For details on SMS implementation, refer to the *Aviation Safety Organization SMS Implementation Plan*, which was released in February 2012.

SECTION 2

OVERVIEW OF AVS ACTIVITIES FOR NEXTGEN

The 2011 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 2011 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 new initiative this year is the development of a program to track our progress and support in implementing NextGen, including definition of key metrics. This is described in paragraph E in this document.

A. NEXTGEN STANDARDS

NextGen includes a number of different operational capabilities. These capabilities are described in planning documents as operational improvements (OIs), sometimes further refined into several increments. In order to fully realize the benefits of these OIs, the aircraft and operator must enable certain capabilities through aircraft equipage and procedural training. 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 FAA NextGen Implementation Plan provides a complete description of all the NextGen enablers. Tables 1-4 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 all the enablers which are not already completed.

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/

TARGET USERS


Air Transport


Business Aviation


General Aviation


Rotorcraft

TARGET AREAS


Nationwide


Oceanic


Metroplex Area or Major Airports

MATURITY


Available


Development


Concept Exploration

The icons describe the status of technologies from a standards and implementation perspective. Target user categories represent generalized modes of operation. Target areas describe the general deployment strategy. Maturity indicates availability for operator investment. 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 90-100A	Complete	Enables more efficient routes and procedures			
RNP 1 with Curved Path	AC 90-105	Complete	Enables precise departure, arrival and approach procedures, including repeatable curved paths			
Vertical Navigation	AC 90-105, AC 20-138B	Complete	Enable defined climb and decent paths			
LPV	AC 20-138B, AC 90-107	Complete	Improves access to many airports in reduced visibility, with an approach aligned to the runway			
RNP Approaches (Authorization Required)	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			
Trajectory Operations Navigation Standard	TBD	2014	Enhances PBN capabilities			

Table 1. Performance Based Navigation (PBN) Enablers

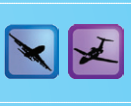
AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
ADS-B CAPABILITIES						
ADS-B Out	AC 20-165	Complete	Enables improved air traffic surveillance and automation processing			
ADS-B IN APPLICATIONS						
Airborne/ Ground CDTI	AC 20-172 TSO-C195	Complete	Improves awareness of other traffic			
In-Trail Procedure (ITP)	Policy Memo; AC 20-172A TSO C195a	Complete*	Displays and provides alerts based on non-normal traffic status			
Interval Management	AC 20-172B, TSO C195b	2014	Oceanic in-trail climb/descent			
Traffic Situational Awareness and Alerting (TSAA)[1]	AC 20-172B, TSO C195b	2014	Displays and alerts crew to airborne conflicts independent of TCAS alerting			
Surface Indications/ Alerts	AC 20-172C TSO-C195c	2016	Improves awareness of other traffic			
Closely Spaced Parallel Operations[3]	AC, TSO	2017	Guidance information for aircraft participating in paired approaches to closely-spaced runways			

Table 2. ADS-B Enablers

Table 3. Data Communications, Low Visibility & Safety 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 20-140A, AC 120-70B TSO-C160a	Complete	Expands FANS to domestic clearances			
ATN Baseline 2	AC 20-140B, AC 120-70C	2014	Provides clearances, terminal information, and Initial Trajectory Operations			
LOW VISIBILITY						
HUD/ILS	Order 8400.13D	Complete	Reduces minima at qualifying runways			
EFVS	AC 20-167 AC 90-106	Complete	Uses enhanced flight visibility to continue approach below minimums			
GLS III	Project specific Policy	2014	Provides autoland in very low visibility			
AVIONICS SAFETY ENHANCEMENTS						
FIS-B	TSO-C157a, TSO-C154c	Complete	Provides weather and aeronautical information in the cockpit			
EFB	AC 20-173 AC 120-76B AC-90-178	Complete	Allows electronic access to paper products			

AVIONICS ENABLERS	AIRCRAFT AND OPERATOR GUIDANCE GUIDAANCE | SCHEDULE		CAPABILITY OVERVIEW	TARGET AIRCRAFT	TARGET AREA	MATURITY
ENGINE AND FUEL TECHNOLOGIES						
Drop-In Renewable Jet Fuel	ASTM standards (50% HEFA-JET A)	Complete	Expands jet fuel specification to allow production via alternative processes and feedstocks			
Drop-In Renewable Jet Fuel	ASTM standards (Alcohol to Fuel Pathways)	2014	Expands jet fuel specification to allow production via alternative processes and feedstocks			
Drop-In Renewable Jet Fuel	ASTM standards (Pyrolsis)	2015	Expands jet fuel specification to allow production via alternative processes and feedstocks			
Engine Efficiencies	Technology ready for aircraft design	2015	Provides demonstrated engine technology with lower fuel burn, noise and emissions			

Table 4. Engine and Fuel Technologies Enablers

COMPLETED ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2011 SCHEDULE	STATUS
PERFORMANCE BASED NAVIGATION (PBN)					
RNP 1 with curved path	Update equipment standard for PBN operations	TSO-C115c, Multi-Sensor Navigation Systems: Update standard for navigation aspects of flight management systems (FMS) to align with PBN operations and streamline operational approvals for new equipment designs.	AIR-130	December 2011	January 2012
	Departure procedure design guidance	Update Order 8260.44.	AFS-420	December 2011	8260.PBN to incorporate and supersede Order 8260.42B, 8260.44, 8260.52, and 8260.54A.
	Operations specifications	Update C063 for this operation	AFS-470	August 2011	October 2011
AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST (ADS-B)					
ADS-B Out	Operational guidance	AC 90-114	AFS-406	August 2011	November 2011
		OpSpec A353, ADS-B Out Operations in the Hudson Bay Area		N/A	August 2011
In-Trail Procedure (ADS-B In)	Equipment standard	TSO-C195a: Harmonize CDTI with EASA, add requirements for oceanic in-trail climb and descend procedures	AIR-130	December 2011	April, 2012
	Installation Guidance	AC 20-172A: Update installation guidance for ADS-B In applications to support ITP.	AIR-130	March 2012	April, 2012
	Operational guidance	Update AC 90-ADS-B	AFS-406	August 2011	December, 2012*
	Operations specifications	Update A354	AFS-406	August 2011	August 2011
	Inspector Guidance	Order 8900.1 update (ITP)	AFS-406	August 2011	December, 2012*

Table 5. Completed Enabler Policy

COMPLETED ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2011 SCHEDULE	STATUS
DATA COMMUNICATIONS					
Satellite Voice	Installation Guidance	AC 20-150A: Update for new satellite capabilities.	AIR-130	September 2011	August 2011
FANS-1/A+ (VDL Mode 2)	VDL M2 Equipment standard	TSO-C160a: Update standard for radio to align with NextGen and SESAR requirements.	AIR-130	March 2012	March 2012
Airborne Access to SWIM	Installation Guidance	AC 20-177 Design and Installation Guidance for an Airborne System for Non-Required Telecommunication Service in Non-Aeronautical Frequency Bands	AIR-130	N/A	February 2012
SAFETY INITIATIVES					
FIS-B	Update equipment standard	TSO-C157a: Update TSO to align with final FIS-B service provided by SBS program.	AIR-130	August 2011	September 2011
ENGINES AND FUEL					
Drop-In Renewable Jet Fuel	Fuel standards	Complete validation of renewable fuels, identify updates to standards (as required)	ANE-111	2011-2015	July, 2011 (initial fuel)
Low lead fuel	Recommendations	Aviation Gasoline Transition Aviation Rulemaking Committee recommendations for the development and transition to unleaded avgas.	ANE-111	2011-2015	January 2012

* Guidance for the ITP trials was completed, but has not been published pending completion of the trials. The trials are scheduled to run through at least August, 2012.

PBN/RNP

We have updated the equipment and installation guidance for RNP systems, simplifying installations so that manufacturers and installers can use a single document rather than referencing multiple, overlapping standards. Manufacturers and installers who use this consolidated guidance can facilitate operational approval for PBN operations, as all of the aircraft-related aspects of the operations are addressed during certification.

Looking ahead, we are evaluating further enhancements to PBN, such as Advanced RNP operations. We have already developed general criteria for Advanced RNP in coordination with the International Civil Aviation Organization (ICAO) PBN study group. If these operations can provide additional benefits to the NAS, we will add enablers to the NextGen list and develop the schedule for their implementation in coordination with the Performance-based Operations Aviation Rulemaking Committee (PARC). Additionally, the FAA recently began work with RTCA/SC-227 to develop Trajectory Operations Navigation Standards. These new standards will support full implementation of trajectory operations in the NAS.

ADS-B

AVS also plans to develop new policy for an ever-increasing set of ADS-B In applications. Our plans for ADS-B have been updated based on the recommendations we received from the ADS-B In Aviation Rulemaking Committee (ARC), and continue to be under review (see sidebar). Standards for situation awareness applications and interim criteria for the use of ADS-B In oceanic airspace (In-Trail Procedure, or ITP) are already complete. Internationally-harmonized standards are in development for ITP and for interval management. MIT Lincoln Labs is conducting applied research to investigate requirements and algorithms for a low-cost alternative to TCAS I, with alerting logic compatible with typical traffic patterns under visual flight rules (VFR). Early operational trials of surface applications identified a number of technical challenges; most notably that 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.

ADS-B IN AVIATION RULEMAKING COMMITTEE

The ADS-B In ARC delivered interim recommendations in September 2011 on applications of greatest interest for implementation. In their priority order, the applications and associated aircraft enablers are:

1. Cockpit Display of Traffic Information (CDTI)-Assisted Visual Separation (CAVS)=CDTI;
2. Flight-deck-based Interval Management–Spacing (FIM–S)= Interval Management;
3. Traffic Situation Awareness with Alerts (TSAA)=Traffic Advisory System;
4. Oceanic ITP=ITP;
5. CDTI-Enabled Delegated Separation (CEDS) (ending in a visual approach)=CDTI or IM;
6. Ground-based Interval Management–Spacing (GIM–S) with Wake Mitigation=ADS-B Out;
7. Flight-deck-based Interval Management—Defined Interval (FIM–DI)=IM;
8. FIM–DI for Closely Spaced Parallel Runway Operations (CSPO)=undetermined;
9. Oceanic Interval Management (IM)=IM; and
10. Airport Traffic Situation Awareness with Indications and Alerts (SURF–IA) at airports with surface multilateration systems=undetermined.

The ARC provided numerous recommendations relating to the Surveillance and Broadcast Services (f) program and these applications. Based on their recommendations, we have adjusted our schedules for ADS B In enablers. The complete FAA response to the ADS-B ARC will be delivered in summer 2012. The state of the policy/guidance material for the ADS-B In applications is based on the current plans at the time this document is released. Those plans could change due to the final results of the FAA response to the ARC.

DATA COMMUNICATIONS

The area of air traffic data communications has seen significant developments since last year's work plan. In April 2011, RTCA SC-214/EUROCAE WG-78 agreed to change their data link standards development strategy in response to a request by the FAA. Aeronautical Telecommunication Network (ATN) Baseline 3 was discontinued and its capabilities were merged with ATN Baseline 2.

In February 2012, the RTCA NextGen Advisory Committee (NAC) approved a report from the operators on the NAC. The operators recommended that the FAA expand the domestic data communications program to provide departure clearance service to aircraft equipped with Aircraft Communications Addressing and Reporting System (ACARS, specifically ARINC 623-complant systems) and to provide numerous services to aircraft equipped to the ATN Baseline 1 standard which was developed for Europe. The aircraft manufacturers and ground system vendors did not support these recommendations, and they shared their concerns that ATNB2 should be accelerated instead of expanding the scope of the program. The entire community agreed that the objective for the transformational operations of NextGen is ATNB2, but they did not agree on the appropriate transition plan or recommended schedule on how to achieve it. The FAA is evaluating these inputs and will provide an update to the NAC later this year.

We have also published aircraft policy on using third-party (non-aeronautical) communications systems to support certain types of communication. This was published as AC 20-177, and describes the types of applications that can be supported over this type of network. As many of the applications are supported by accessing the data that the FAA plans to provide through system-wide information management (SWIM), we have indicated that this as a new enabler which has been completed. Unlike other enablers, there are no common standards for the access to this data as it is provided through third-party vendors.

From an aircraft enabler perspective, the plan confirms that the only enabler which is not yet completed is the standard for ATNB2. We are working with industry, through a joint RTCA and EUROCAE committee, to complete the standards for ATNB2 in 2013.

LOW-VISIBILITY OPERATIONS

Low visibility operations continue to leverage new technologies and advanced procedures. For example, the Enhanced Flight Vision System (EFVS) rulemaking activities are considering enabling operational credit to commercial operators using approved EFVS. This benefit is already available to general aviation. The FAA continues to work with industry, through RTCA SC-213/ EUROCAE WG-79, to progressively lreduce the minimum visibility needed to land using EFVS. Finally, synthetic vision systems may provide a new capability to depict the runway and aid in the visual acquisition of the required airport environment, particularly on a heads-up display.

Synthetic Vision Systems (SVS) also continue to proliferate and can add to the pilot's overall situation awareness. Future uses of SVS are currently being explored by industry. The use of SVS for operational credit was shifted to Segment Bravo (post 2015 time frame) due to overall program limitations, and the FAA will continue to monitor SVS technology developments and consider industry requests for operational credit in the near term.

Ground Based Augmentation System (GBAS) Landing System (GLS) Category I precision approaches at Newark (EWR) and Houston (IAH) are nearly here. At Newark, two issues have delayed operations: significant Global Positioning System (GPS) L1 interference in the local environment and the need for a tool to assist in NOTAM generation when service is expected to be unavailable (for example, due to a period of weak satellite geometry during satellite maintenance or repositioning). Modifications to the ground facility at Newark are underway to mitigate the interference. System Design Approval (SDA) on the modified system is expected later in 2012. A tool has been developed to identify periods of unavailability and its operational use is currently under evaluation by AVS, Air Traffic Organization (ATO), and the airport authority. This same tool will be used at Houston. The ground facility is being installed at Houston and is expected to be operational mid-2012 using the existing SLS-4000 design. A relatively small GBAS service volume is planned at Houston, consistent with the current SDA limits. With the aircraft using Area Navigation (RNAV) to transition to the GLS final approach and landing, operations are expected to mimic the current extended service volume Instrument Landing System (ILS) approaches. The use of GLS for Category II/III operations is being researched.

AVIONICS SAFETY ENHANCEMENTS

In September 2011, the revision to Flight Information Services-Broadcast (FIS-B's) technical standard order (TSO)-C157a was completed. This new 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. Supplemental information to assist FIS-B manufacturers was made available in the Surveillance and Broadcast Services Description Document, SRT-047, October 24, 2011.

New to this year's plan is the addition of Electronic Flight Bags (EFBs) to the Avionics Safety Enhancements. Recently, the FAA has seen a rapid rise in the use and interest in EFBs in both general and commercial aviation. We clarified our policy on the installation of components of EFBs and published updated guidance on the operational approval of EFBs (installed or portable) for commercial operations. We recognize the utility of EFBs to support advanced flight planning and other support applications as well as the expanding functionality of these devices in general aviation aircraft. As a result, AVS found it appropriate to track the policy guidance of these devices alongside all of the other NextGen enabling technologies.

ENGINE AND FUEL TECHNOLOGIES

Drop-In Renewable Jet Fuel: The first type of renewable jet fuel, called hydroprocessed fatty acid esters and fatty acids (HEFA), was added to drop-in fuel specification ASTM D7566 on July 1, 2011. 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. These fuels are derived from feedstocks such as sugar or cellulosic materials, which are fermented to alcohol and then converted to a hydrocarbon jet fuel product. Other pathways beginning the qualification process include fuels made from pyrolysis of cellulosic feedstocks, or Direct Sugar to Hydrocarbon (DSHC) fuels, which utilize advanced fermentation processes to convert sugar directly to a hydrocarbon fuel product.

Low Lead Fuel (avgas): The Unleaded Avgas Transition Aviation Rulemaking Committee (UAT ARC) issued its final report and recommendations on January 31, 2012. The UAT 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 report and recommendations will now be reviewed by the FAA and industry for implementation. The FAA will issue an implementation plan in September 2012.

In addition, the FAA and industry qualified and approved a very-low-lead avgas in May 2011 for use on existing piston engines and aircraft.

B. STREAMLINING INITIATIVES

NextGen involves unprecedented changes to the NAS. As the U.S. moves forward with implementing these changes, we must ensure new systems are reliable and safe, and ensure we 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 past years remain valid. We must be well-organized to coordinate within AVS, ensure we receive appropriate and timely training, improve tracking of applications and ease of applying through the better use of information technology, and 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 2011 AVS activities.

INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2011 SCHEDULE	COMPLETION STATUS
Procedures for Reporting Operational Applications	Order 8900.1: Define procedures for reporting application status to operators.	AFS-408	July 2011	July 2011
Coordination of Policy	Incorporate public comment interval into QMS AFS-100-01	AFS-140	December 2011	April 2012
Coordination of Policy	Develop guidelines on coordination times	AIR SMT	June 2011	June 2011
NextGen Overview Course for AVS	Provide Overview course to all AVS employees to provide basic awareness of NextGen and the AVS role in its implementation.	AFS-408	August 2011 – January 2012	Completed January 2012
WebOPSS Enhancement: Streamlining Applications (Workflow and Business Rules Engine)	Streamline application submission, tracking, and approval processes; allow greater use of digital signatures for application/approval at each FAA level; provide enhanced visibility on applications in progress; allow applicants to submit bundled applications for different operations electronically.	AFS-460	Contingent on funding	Included in NavLean initiative, funding requested for FY13
WebOPSS Enhancement: Data Reporting and Export (Operator Aircraft Data Expansion and Data Island Restructuring)	Expand the data collected by aircraft in standardized table(s) rather than embedded in OpSpecs, enabling tracking of NextGen authorizations and compatibility with the ATO Flight Object.	AFS-460	Contingent on funding	Included in NavLean initiative, funding requested for FY13
NavLean Implementation Plan	Based on the 21 recommendations in the 2010 NavLean report, develop an implementation plan. (2010 report at www.faa.gov/nextgen)	AFS-460	June 2011	Navigation Procedures Initial Implementation Plan, June 1, 2011
Seminar for RNP AR Approval Consultants	Conduct a seminar for the six approved consultant companies to update them on policy, changes, and share experiences in obtaining approvals.	AFS-470	September 2011	September 2011
Avionics Manufacturer: Updated procedures for non-TSO functions	Corrects policy to address that non-TSO function “data” is considered acceptable, but not approved, when the TSOA is granted by the ACO. It also addresses that any 21.305.d. “approvals” are coordinated with AIR-100.	AIR-110	May 2011	Order 8110.4, Change 4, March 24, 2011
Field Approvals of Avionics Installations	Update guidance to aviation safety inspectors on the approval of avionics installations under field approvals, including the use of approved data, and address integration with other avionics. This update will also address the approval authority of changes to the aircraft flight manual	AFS-360	September 2011	June 10, 2011

INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	2011 SCHEDULE	COMPLETION STATUS
Communication	Enabler descriptions and tutorials posted on AVS NextGen intranet.	AIR-130	August 2011	August 2011
Training	NextGen Technologies for AFS	AFS-408	July 2011	FAA21000082 July 2011
Training	Oceanic and International Operations	AFS-408	September 2011	FAA21000088 Prototype November, 2011
Training	Update FAA21018 Aviation Safety Engineer/Systems Job Functions	AIR-130	June 2011	June 30, 2011
Training	Update FAA25811 Advanced Communications	AIR-130	December 2011	November 2, 2011
Training	Update FAA25815 Advanced Navigation	AIR-130	December 2011	December 1, 2011
Training	Develop NextGen avionics design approval course	AIR-130	Contingent on funding	Initial activity deferred to FY12
Training	Develop NextGen avionics maintenance course	AFS-360	Contingent on funding	Initial activity deferred to FY12
Training	Update NextGen overview in AVS New Manager Course and AVS NextGen Overview Course	AQS-500	September 2011	January, 2012

There were four items in last year's Work Plan which 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. Unfortunately, we were unable to reprogram funding for these initiatives in 2011. Funding for the WebOPSS Enhancements is included in the President's FY13 budget as they also relate to the NavLean project, and we are working with the NextGen office in 2012 to fund the training initiatives.In addition to the policy, we supported a number of key aircraft certification and operational approval projects. In 2011, AFS Principal Operations Inspectors (POI) completed 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 first rule-compliant ADS-B Out aircraft was certified by United Parcel Service, using a Rockwell Collins GPS receiver and a Mode S transponder from ACSS, Inc. ADS-B In trials of ITP were enabled by the approval of equipment and a special operations specification for United Airlines.

STREAMLINING CERTIFICATION AND INSTALLATION

Streamlining the certification of NextGen technologies in aircraft begins with clear criteria for approval, which is described for specific enablers above. 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 that are associated with the procedures and methodology of certification:

1. Recognition of the priority of NextGen projects. In 2010, we modified our criteria for prioritizing applications with significant workload to recognize NextGen projects. Safety-enhancing projects remain our highest priority, but this change recognizes that NextGen projects are in the national interest.

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

3. Enabling effective re-use of data from one project to another. Industry must understand that the re-use of data does not change the responsibility of the applicant to show compliance with the regulations, and to establish that the data being re-used is applicable 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 (AML). Certification procedures have been updated to more clearly address the use of data created under a TSOA, including features or functions that are not specifically called out in the standard itself. In addition, we are publishing a Notice affirming the use of approval model lists for each product type, and plan to publish a new advisory circular (AC) for industry to help them understand the data that is required and how it can be used to support approval in multiple models.

The installation of NextGen equipment in aircraft, in some cases, can be accomplished as an aircraft alteration with a simple approval process. This year we are implementing a new on-line job aid to help decide what types of installations can be accomplished as field approvals. This activity is replacing the more limited initiative of defining major and minor changes in type design, the need for which is also being addressed through updated field approval guidance. The scope and complexity of an alteration must be considered 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. The new job aid can be changed more easily, and inspectors or industry can provide recommendations on material that should be updated. By next March, we will revise the guidance on approving ADS-B so that certain types of ADS-B Out installations can be accomplished as field approvals.

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 recently concluded a NextGen overview course for every employee in AVS, and have updated a number of other courses as shown in Table 6. As we look ahead to continued introduction of new technologies and policies, we are developing a more complete NextGen training program that can be updated readily and can provide refresher training when our people receive an application for a NextGen technology that they have not worked recently.

STREAMLINING OPERATIONAL APPROVALS

AVS is committed 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 are using 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. 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.

3. Use information technology to improve tracking and visibility of projects. Given the scope of NextGen and the number of operators that are involved, a robust IT infrastructure is essential to tracking and managing applications and approvals. Our initiatives to improve *Web-Based automated Operational Safety System* (WebOPSS) were identified as key components of the NavLean project, and funding has been requested for this in FY13.

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, ACs 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 have been qualified under this program and to date, four RNP AR approaches have been developed and implemented into the NAS under this guidance. Comprehensive and ongoing FAA safety oversight of these service providers is accomplished by the Flight Standards Service (AFS).

PBN INITIATIVES

In response to recommendations from the RTCA Task Force (TF) 5, AVS and ATO charted and jointly sponsored the Navigation Procedures Project (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 develop a procedure that would provide maximum value to its customers through an optimal process that has minimal waste.

In September 2010, AVS and ATO approved the NAV Lean Team's final report containing 21 specific recommendations (for the full report, go to http://www.faa.gov/nextgen). In June 2011, the Navigation Procedures Implementation Plan (NAV Lean Implementation Plan) was approved, 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. The expected completion date of this implementation process is FY 2015.

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. Operational improvements are further divided 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. When increments are combined, the synergism can enable full realization of their supported operational improvement.

Appendix D identifies all the mature increments in the FAA plan, associates them with specific enabling aircraft technology or operational procedures (enablers), and with other supporting AVS activities. In some cases, specific equipment or operational guidance is directly related to an increment. For example, one increment concerns a safety initiative to allow use of EFBs to display traffic on the airport surface. While equipment standards and guidance for airport display of traffic was provided through TSO-C195 and AC 20-172, 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 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 flight crew 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 SMS mitigations through the SMS process and controls associated with changes to the NAS. The Air Traffic Safety Oversight Service (AOV) has the responsibility to monitor all of these NextGen initiatives as they proceed through the Acquisition Management System (AMS) and SMS processes. Our objective is to provide early identification of potential safety risks or issues associated with the risk analysis so that NextGen improvements are safely implemented 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, they are not tracked or listed 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.

E. 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. The majority of our support is provided through our normal jobs, such as evaluating applications for type certification and supplemental type certification, reviewing operators' training and procedures for NextGen operations. These activities are supported by the standards, guidance and training initiatives outlined above, and we will monitor the overall review and approval system to identify any possible deficiencies in policy or training.

In order to provide this insight, we will begin tracking NextGen-significant projects in aircraft certification and NextGen operational approvals in AFS (only for operators with operations specifications). By reviewing the timelines for these projects, we will gain useful insights into how we can improve.

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.

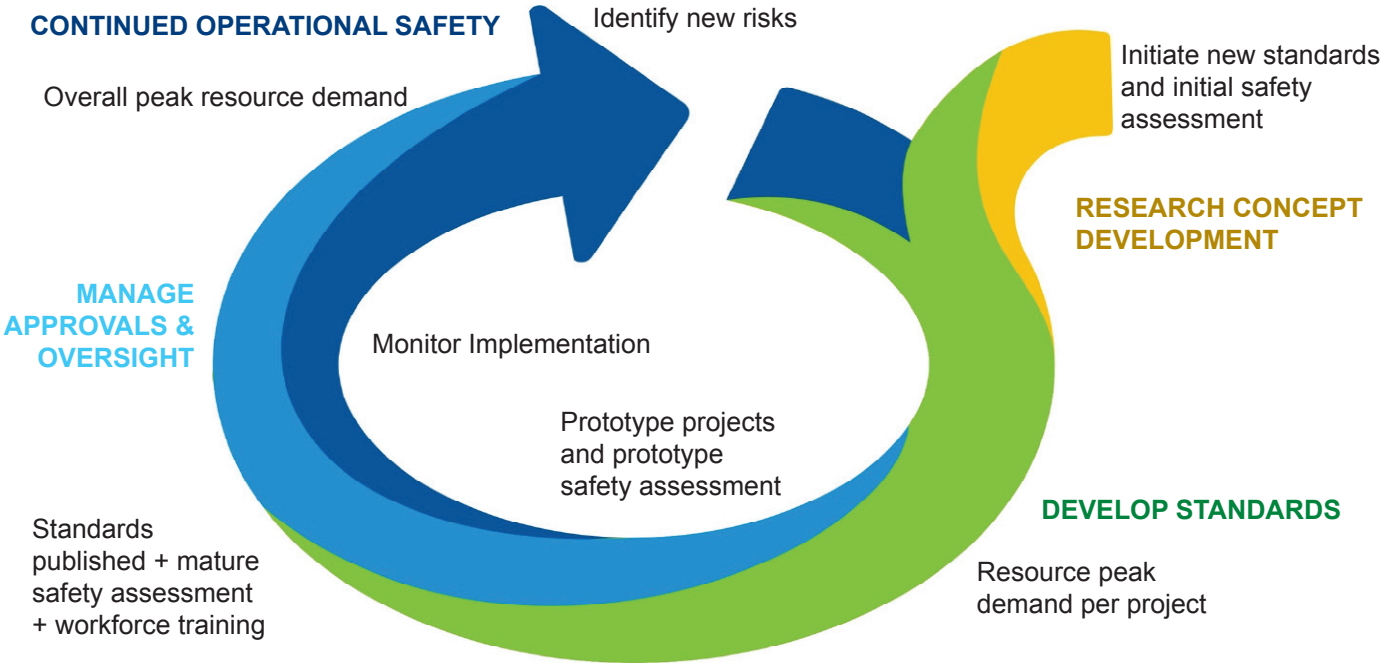


Figure 1. Policy Development Life-Cycle

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 standards are developed.

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 flight crew procedures. Our safety mission dictates that we ensure that those systems are reliable and safe, and that we address the operational aspects of these systems. Our certification and operational approval processes provide the tools to address flight crew procedures, maintenance procedures, training development, and continuous safety monitoring.

Modifications to aircraft, including installation or upgrades to aircraft avionics, are approved through the certification process as defined in 14 CFR part 21. The use of specific navigation, surveillance, and communication equipment for a particular operation typically requires operational approval for air carriers and air taxi operators. Operational approval may also be required for general aviation 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.

When a specific approval is required, it is reflected in Operations Specifications (Ops Specs), Management Specifications (MSpecs for part 91 subpart K), and Letters of Authorization (LOAs for part 91). The approval identifies the operation, the aircraft, and any unique requirements or limitations.

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 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 conducts FAA major accident and incident investigations both as the FAA party representative to the National Transportation Safety Board (NTSB) investigations, and as the Investigator-in-Charge (FAA IIC) 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 and manage the Agency's transformation to an SMS.
- Define and coordinate the implementation of integrated system safety risk management capabilities, including system safety, information sharing, and risk modeling.
- Manage the transformation process to ensure that 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 of NextGen capabilities. ASIAS tools have already identified potential safety issues that can be 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 (TAWS) 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 (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.

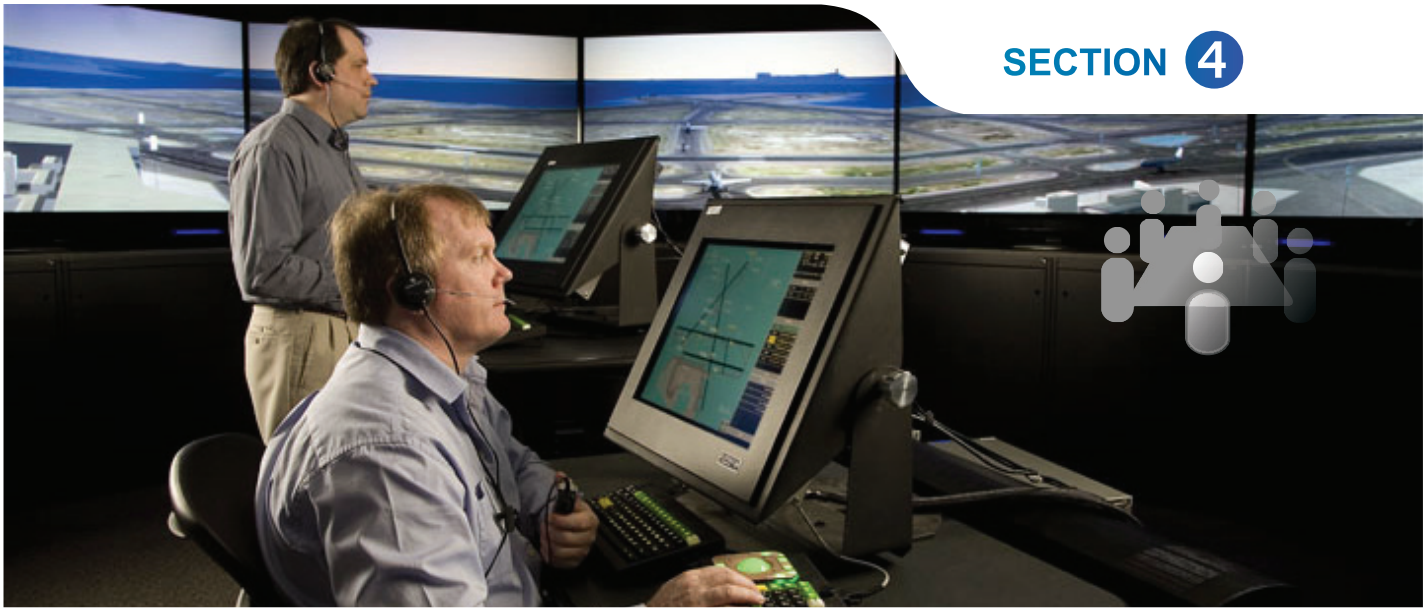
QUALITY, INTEGRATION AND EXECUTIVE SERVICES (AQS) ROLES AND RESPONSIBILITIES

AQS provide the AVS Quality Management System that supports the larger NextGen efforts in process streamlining. The ISO-certified AVS QMS provides awareness and tools to the services and offices, and those drive continuous process improvements. Those improvements are manifested in standardization enhancements and measures and metrics with which to determine improvements. The QMS is integrating with the SMS's safety risk management processes to illuminate risk and facilitate risk mitigation within the NextGen processes. AQS provides the AVS Environmental Management System (EMS) administration to inform and influence the NextGen processes' evolution.

The AQS manages the AVS budget for NextGen in support of the other offices. AQS also provides the information technology for the work force in order to improve efficiency, and the specific tools that will be identified for NextGen communication, coordination, and training.

AEROSPACE MEDICINE (AAM) ROLES AND RESPONSIBILITIES

At this time, specific NextGen activities for the Office of Aerospace Medicine (AAM) are not identified. However, the Civil Aerospace Medical Institute may be involved to support future human factors studies. Since NextGen technologies will be more automated and integrated, the role of human-in-the-loop interaction will need to be monitored. 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 the AVS management structure and how NextGen activities are coordinated.

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 three AVS 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 (Bruce DeCleene, AIR-130)
- Flight Standards Service: AFS-400 (Gary Powell, AFS-400 acting)
- Air Traffic Safety Oversight Service: AOV-300 (Alex McDowell, 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); Communication, AQS-300; Training, NextGen Training Oversight Team (Lou Volchansky and Vincent Chirasello)
- 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.

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).

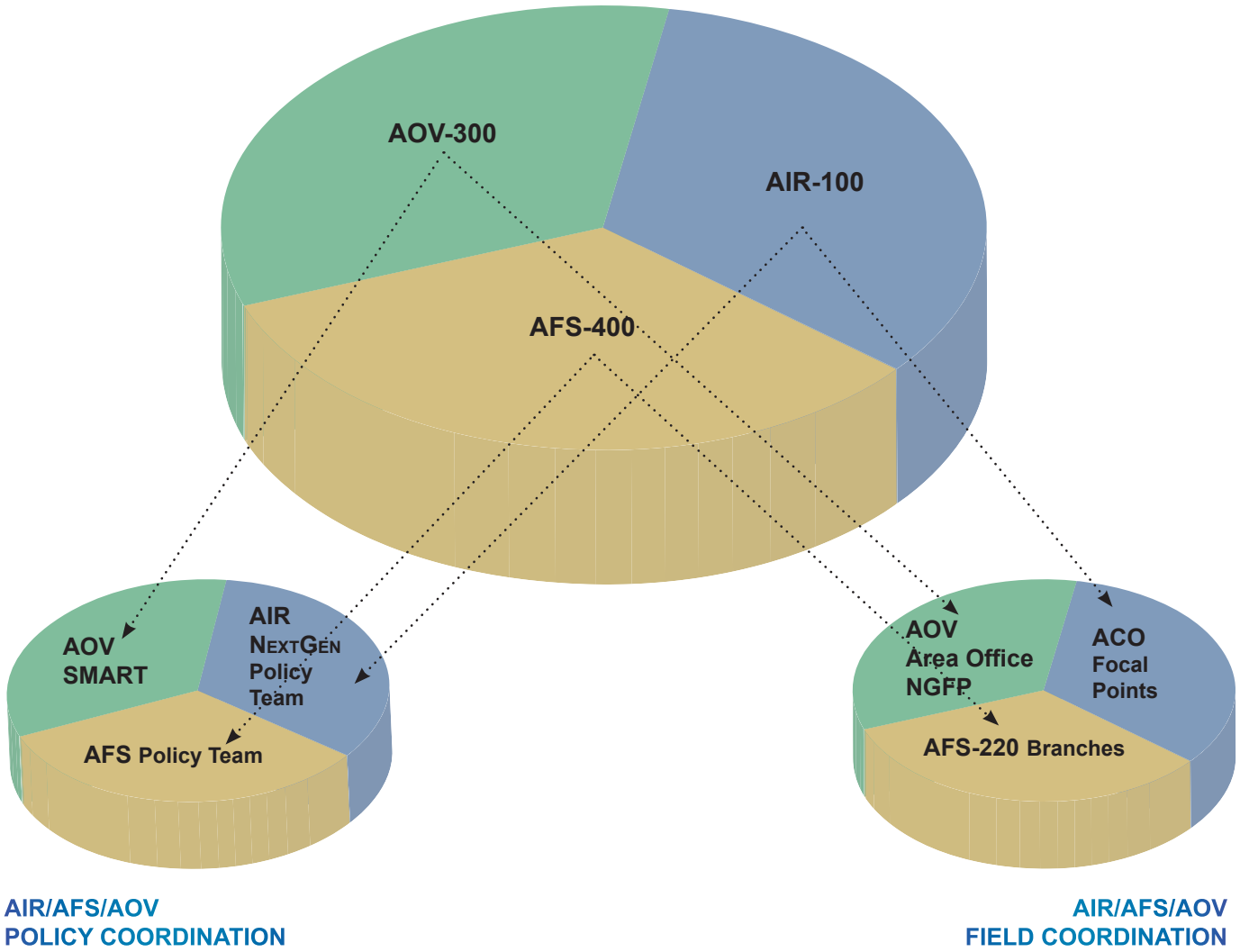


Figure 2. Coordination between Headquarters and other AVS Offices

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

There were several important changes to the FAA's management structure for NextGen in 2011. The Agency lead for NextGen was identified as the Deputy Administrator, and a new position was created for the Assistant Administrator for NextGen and Operations Planning (led by Victoria Cox, ANG-1). This moves the Agency-level planning out of the ATO, affirming that NextGen is more than an air traffic initiative. An illustration of this new organization can be found in Figure 5.

In order to more efficiently and effectively tackle the challenges in planning and implementation of NextGen, the FAA has developed a new process called the "Idea to In-Service Process" (also known as the I2I process).

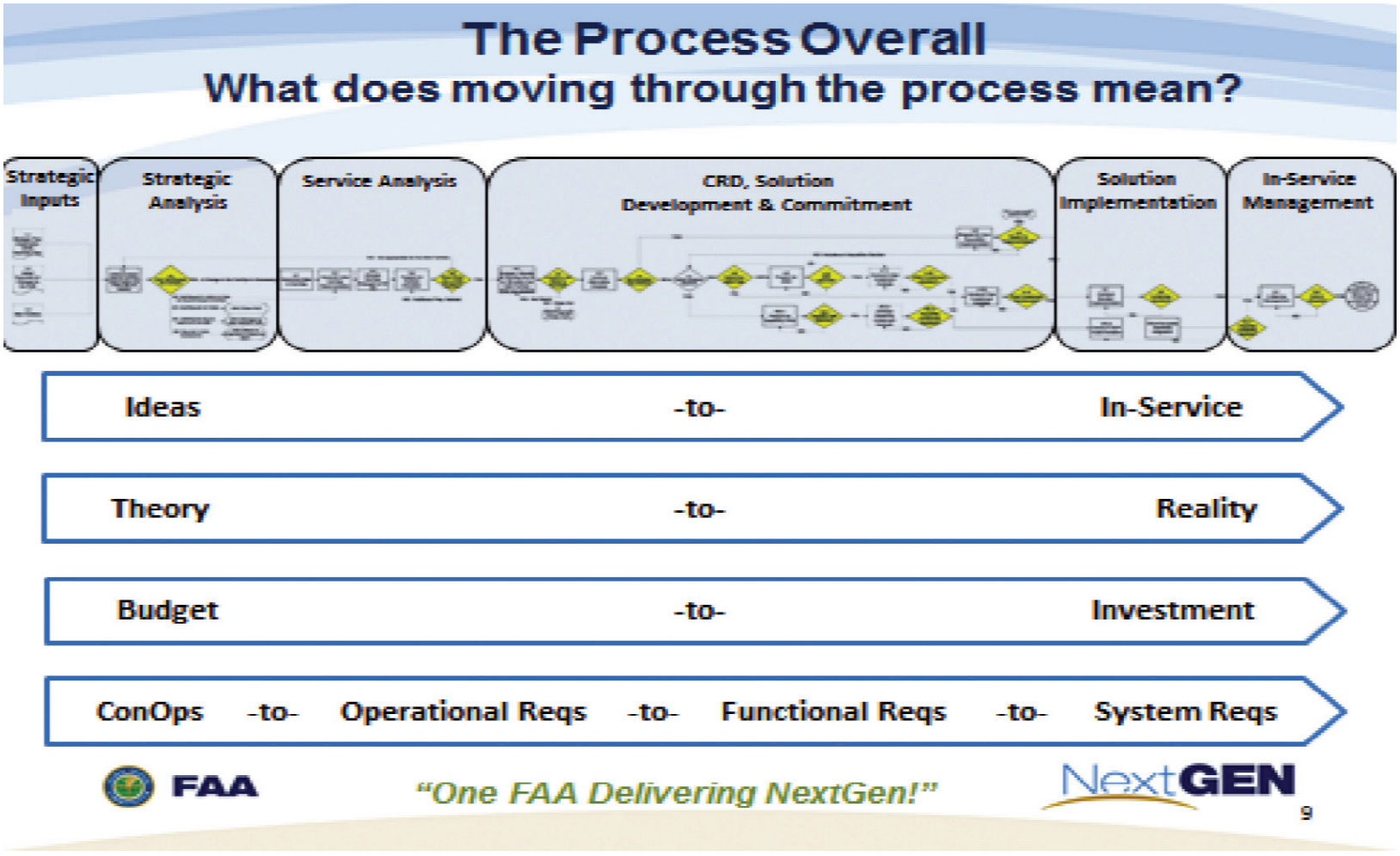


Figure 3. I2I Process

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.

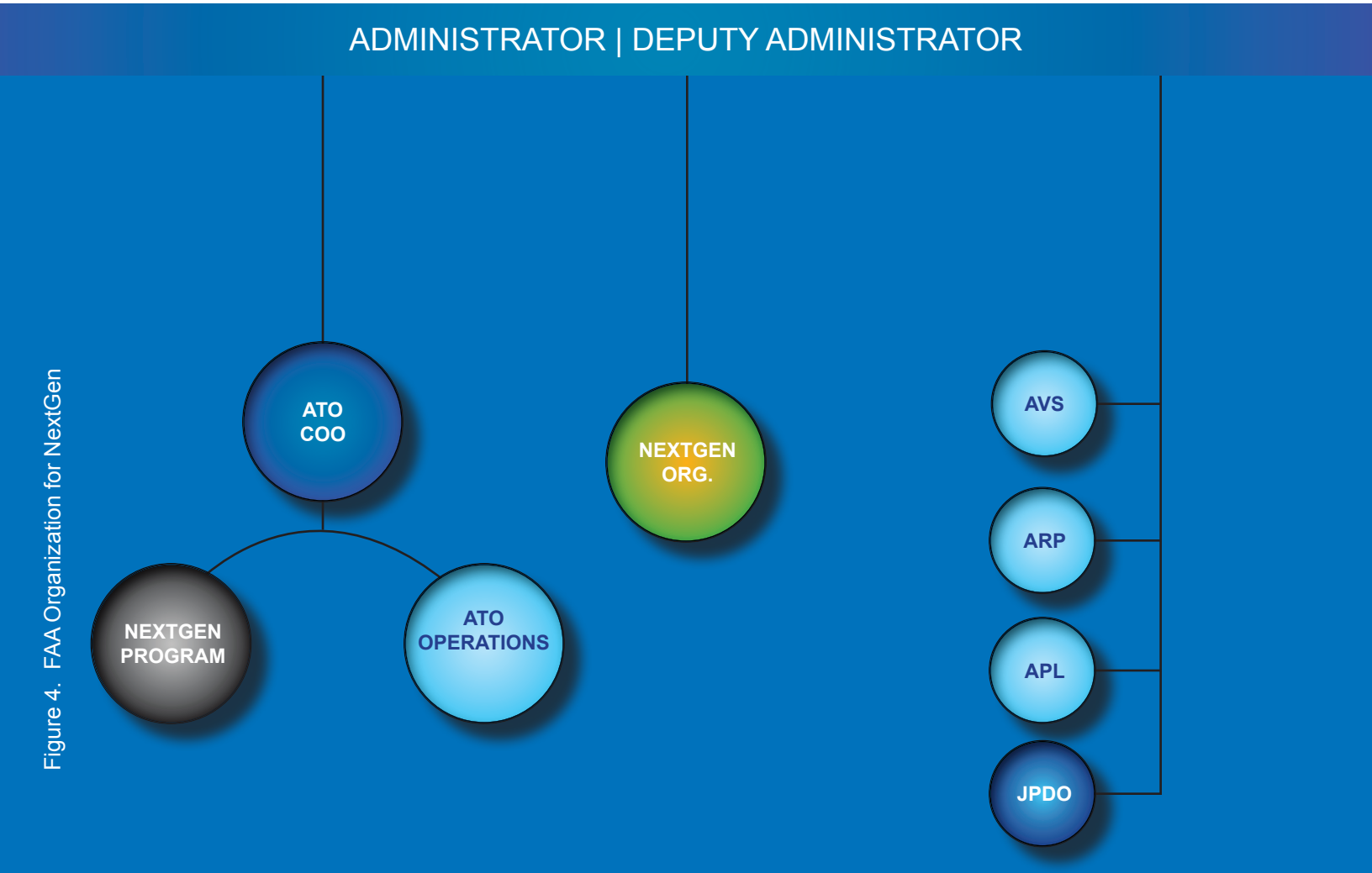


Figure 4. FAA Organization for NextGen

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:

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*

- ✓**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.**

NEXTGEN SEGMENT TIMELINE

Figure 5. NextGen Segment Timeline

The FAA is responsible for planning and implementing the majority of NextGen's near-term (current through 2012) and mid-term (2012 through 2018) goals. 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 NGIP. Internally, the more detailed NSIP is the master working document used to align all of our activities. The NSIP is supplemented by the Integrated Master Schedule (IMS) 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 6 shows the overview of planning activities.

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 now and into the mid-term (defined as 2012-2018). The NextGen Lifecycle Integration Office is the lead office for this document, released annually early in the calendar year. In addition to the NGIP, the FAA response to the RTCA Mid-Term Implementation Task Force is also on the FAA's NextGen website: http://www.faa.gov/nextgen .

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 is broken up into several "segments" that represent planning horizons. The current NSIP covers Segment Alpha, which describes the planned activities that can be implemented between today and 2015. Segment Bravo, which will focus on those activities that will be implemented in the 2016-2018 timeframe, is still in development.

In the NSIP, each increment is a discrete change in the NAS, delivering benefits in one or more of these areas. The NSIP is currently focused on high priority near-term activities and is being expanded to address other mid-term initiatives and related key issues. NSIP increments are aligned 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 on-line database of information, available at http://nasea.faa.gov .

The FAA updates the NAS EA annually in December. Aspects of the EA are approved by the Joint Resources Council (JRC), 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.

NEXTGEN REVIEW BOARD (NRB)

The NRB provides oversight, status, and prioritization of guidance on existing and proposed NextGen initiatives. The NRB monitors the progress of NextGen initiatives outlined in the NSIP and works to mitigate any problems that arise. To facilitate this oversight, the NRB includes members from the various organizations to assist with integration and identification of required policy changes, and understanding of funding impacts. The NRB provides recommendations to the NMB.

The AVS NRB members are Bruce DeCleene (AIR-130) and Gary Powell (AFS-400 acting).

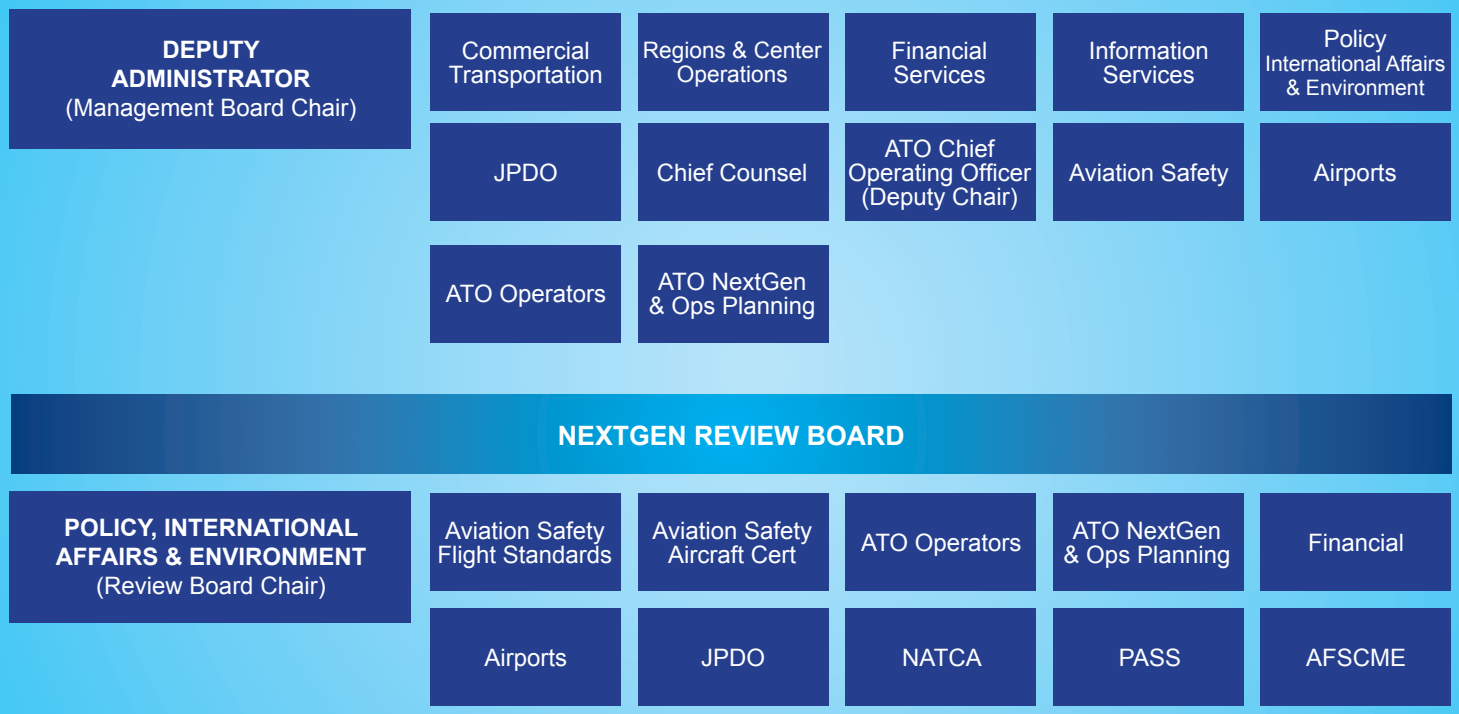


Figure 6. NextGen NMB/NRB Membership

ASSISTANT ADMINISTRATOR FOR NEXTGEN

The FAA's 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. The Assistant Administrator is also responsible for managing FAA's research and development, NAS EA, systems engineering, and performance modeling.

NAS LIFECYCLE INTEGRATION (FORMALLY KNOWN AS NEXTGEN INTEGRATION AND IMPLEMENTATION OFFICE (NGI&I)

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 (see Figure 8).

AVS RTCA NAC member: John Hickey (AVS-2)

RTCA NAC Working Subcommittee:

The NAC Subcommittee supports the NAC by providing technical advice and staff support. This is accomplished through the establishment and sponsorship of standing Work Groups and ad hoc Task Groups. Currently there are three standing work groups. These work groups are:

- *Airspace and Procedures Working Group*
- *Business Case and Metrics Working Group*
- *Integrated Capabilities Working Group*

AVS RTCA NAC Subcommittee member: Bruce DeCleene (AIR-130)

AVS RTCA NAC Airspace & Procedures Working Group member: Gary Powell (AFS-401)

AVS RTCA NAC Integrated Capabilities Working Group member: Bruce DeCleene (AIR-130)

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- and mid-term (through 2018). 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 is comprised of top-level executives representing operators, manufacturers, air traffic management, aviation safety, airports and environmental, civil and military, domestic and international.

CURRENT NAC STRUCTURE

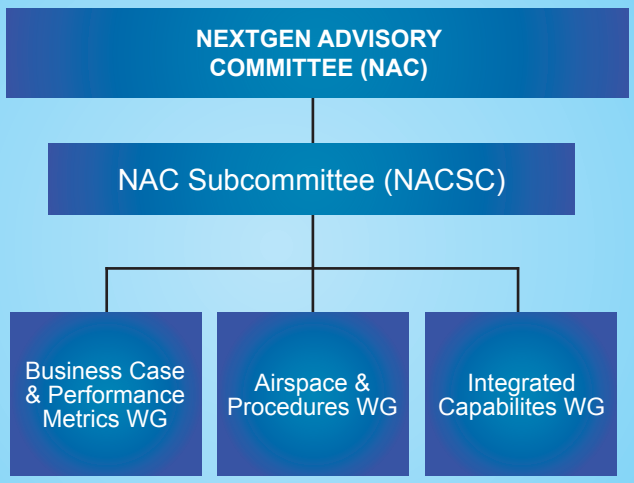


Figure 8. NAC Structure

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 addresses the key messages of NextGen for AVS, identifies communication strategies to ensure that we are all informed of the latest NextGen developments, and describes the training plan for NextGen.

COMMUNICATIONS AND TRAINING

A. KEY MESSAGES

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

NextGen is comprised of individual initiatives to improve safety, efficiencies, 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 flight crew by providing applicable information to the flight deck, and be implemented as performance-based operations where practical. Many of the cockpit initiatives relate to the transformational programs of PBN, ADS-B, and Air Traffic Control (ATC) data communications. The NAS transformation will occur over time, not all in one year.

2. HELP IMPROVE SAFETY.

As NextGen is implemented, we will ensure system safety is maintained and improved, commensurate with the increased exposure. Safety improvements must accompany both the expected increase in traffic and new operations flown in increasingly demanding conditions. SMS is a comprehensive, proactive approach for managing and evaluating all aspects of system safety -- especially monitoring the level of safety achieved in the air transportation system and evaluating changes to the system. ASIAS is a tool that will play a significant role in supporting the tenants of SMS, including SRM and Safety Assurance requirements

3. EFFICIENT SAFETY OVERSIGHT IS VITAL.

Implementing NextGen requires a significant investment from industry and government. In order 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 that have been tested and proven 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 AO.

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 NextGen initiatives cannot be implemented by the FAA alone. 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 (for example, the Department of Defense).

B. COMMUNICATION STRATEGIES

We must all have an opportunity to review NextGen objectives and contribute to their refinement and overall program success. People 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. AVSMT SITE VISITS

The AVSMT recognizes the need to promote NextGen understanding by reaching out to the workforce and explaining NextGen during site visits. Budget realities required the AVSMT to limit the number of field site visits. In FY12 the AVSMT members are adding field site visits to other business related travel to the extent possible.

2. AVS TOWN HALL MEETINGS

Town hall meetings, conducted for the benefit of the entire AVS work force, provide a forum for the AVSMT to discuss pertinent NextGen issues and to address questions.

3. 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/. It also contains a link to the FAA NextGen website at http://www.faa.gov/nextgen where NextGen videos, a calendar of events and more information are located. The AVS website includes enabler tutorials and an e-mailbox for feedback, which is checked regularly to answer AVS employee questions about NextGen. The address is: AVSNextGen@faa.gov .

4. 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.

5. 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 or milestones 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 will occur over a variety of timeframes. We need to continue with an ongoing responsiveness to this evolution. Training will be essential for a successful NextGen implementation. Communicating where to find further information and providing appropriate training is important to supporting NextGen implementation. Like the FAA NGIP, the AVS NextGen Training Plan will evolve over time and must be flexible to serve a varied workforce.

Through training, AVS will ensure that everyone involved in, and impacted by, the 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 has also assessed the unique needs of their workforce and is responsible for implementing its training strategy.

The NextGen Training Oversight Team (TOT) is responsible for proposing the specific NextGen training strategy to the AVS NextGen Coordination Group in collaboration with the AVS training community, specifically the AVS Training Council. The TOT will monitor content to ensure consistency across Services. As part of ongoing routine training revision cycles, each AVS Service and Office will need to continue incorporating NextGen concepts into existing technical training courses as appropriate. Each Service and Office will continue developing and managing training materials and will incorporate NextGen concepts into these as well. In collaboration with the TOT, AVS Training Council, AVS NextGen Coordination Group and AVS Services and Offices will develop and deploy NextGen training via existing channels. AQS in collaboration with 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;
- Revising current courses to incorporate NextGen concepts;
- Developing new courses;
- 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.

NEXTGEN TRAINING PLAN

SERVICE/OFFICE	REVISED COURSES	NEW COURSE DEVELOPMENT
Flight Standards Service (AFS)	• Review current training courses to integrate NextGen as courses are revised	• NextGen Technologies for AFS (July 2011) • Oceanic and International Operations (June 2012) • NextGen avionics maintenance course (delayed due to funding, but tentatively planned for 2013)
Aircraft Certification Service (AIR)	• Updated FAA21018 Aviation Safety Engineer/ Systems Job Functions (September 2011). • Review FAA 27200034 Certification Tasks for Aviation Safety Engineers • Updated FAA25811 Advanced Communications (Nov 2011), and FAA25815 Advanced Navigation (Dec 2011) courses. • Review the following: o FAA25804 Repairs and Modifications o FAA25814 Low Visibility/ Autopilot	• FAA 27200024 ADS-B Out Installation and Airworthiness Guidance (completed) • Develop NextGen Avionics course, explain current technology, incorporate relevant content from FAA25811 Advanced Communications and FAA25815 Advanced Navigation (delayed due to funding, initial draft for 2012, refresh every 3 yrs contingent on funding). • Develop new course on certification of hybrid (new and novel) technology (discuss installation of 3rd party avionics, initial draft for 2012 contingent on funding).
Office of Quality, Integration, and Executive Services (AQS)	• Review and incorporate NextGen concepts into AVS-sponsored courses (i.e., New Manager Course, AVS 101 webinar and NextGen Overview Course (Dec 2011)	
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 4. Planned NextGen training activities

SECTION 6

This AVS NextGen Work Plan focuses primarily on accomplishing NSIP Segment Alpha, which includes planned activities that can be implemented 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 two years; therefore AVS Services and Offices should focus on NextGen research requirements for Segment Bravo and beyond.

The remainder of this section provides an overview of the process for identifying AVS R&D requirements and identifies those AVS R&D requirements specifically related to NextGen. The last paragraphs discuss research for future operations, preparing AVS to meet future challenges.

AVP manages the AVS R&D Program. AVS R&D responds to the research needs of AAM, AFS, AIR, ATO, and AVP.

AVS R&D is supported by Research, Engineering and Development (RE&D) funds appropriated by Congress under the category of Aviation Safety. The content of the research requirements within the AVS R&D portfolio reflect the evolving needs of the AVS services and offices. AVS R&D is integrated with the research requirements of the other FAA LOBs within the structure of the R&D Executive Board (REB) process, managed by ANG The output of the R&D REB is an annual FAA R&D portfolio and budget request, which is ultimately submitted to Congress with the President's Budget Request.

The FAA assigned NextGen budget responsibility to ANG, including funding for NextGen-related R&D. Facilities and Equipment (F&E) monies fund some NextGen development and applied research -- a separate budget development process from RE&D.

AVS R&D REQUIREMENTS PROCESS

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 vehicle 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 process. In the April-May period, the AVSMT will specify particular areas of research that are strategic to the LOB. Likewise, the Service/Office level and the Division/Directorate level may also indicate areas that may be strategic from the Service-, Office-, Division-, and Directorate-level. This guidance is provided to the 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 the AVS organization they represent, TCRG representatives should develop NextGen research requirements needed to fulfill AVS NextGen responsibilities.

Based on the strategic guidance and the overall mission of the organization, research requirements are defined and recommended at the lowest levels of the organization. The requirements are then reviewed and prioritized by the management chain, with final approval by AVS-1.

The AVS R&D Requirements Process identifies a clear line of sight between each issue or need and the R&D needed to resolve it. The process also supports a framework for effective monitoring of the development of products. AVS manages the requirements process to assure a structured path from the identification of mission needs to a validated prioritized listing of aviation safety research requirements.

For a complete description of the FAA R&D Program, see the National Aviation Research Plan (NARP) at www.faa.gov/narp. The NARP is an integrated, performance-based plan for the FAA R&D Program supporting both the day-to-day operation of the national air transportation system and the future vision of the NextGen. The NARP is available on the FAA website. National Aviation Research Plan

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 requirements are submitted to ANG for consideration, which then prioritizes and programs funds. Many of the NextGen Budget Line Items (BLIs) evolved over the last several years. Within AVS, the AVS R&D Requirements Process is used to identify NextGen research requirements. AVS NextGen requirements are not prioritized through the REB, but are being provided to the NextGen I&I organization to support AVS obligations to NextGen goals.

C. NEXTGEN RESEARCH ASSETS

AFS FLIGHT OPERATIONS SIMULATION LABORATORY

The Flight Operations Simulations and Analysis 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 that can be 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 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.
The data collected from these modeling tools, as well as from flight tests and flight simulators, is analyzed and translated into performance and safety parameters used to establish NextGen operational standards.

CIVIL AEROSPACE MEDICAL INSTITUTE (CAMI)

The FAA CAMI is the medical certification, research, education, and occupational health wing of the FAA's AAM. 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.

Figure 8. AFS Laboratory Flight Simulators

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.

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.

Research is needed to ensure that data collection, storage, modeling and analysis systems are optimized and that the needs of safety initiatives and priorities of each FAA LOB are being met.

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. AFS Flight Systems Laboratory

Migration of avionics architecture. The avionics industry continues to develop more integrated avionics, either as modular avionics or as one-box-does-all equipment. Given the need for continued avionics evolution, AVS recognizes that these architectures are an essential element of NextGen. The certification policy for these systems must continue to be improved to address innovations in integration. For example, with integrated systems and broadband communication, it is technically feasible to update avionics software with remote maintenance.

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 or may be accomplished in a ground system and the result communicated to the aircraft. A common operational concept of use for mid-term TOps is in development through RTCA, and a parallel activity in JPDO is defining the long-term TOps capabilities.

Unmanned Aircraft Systems (UAS). In 2012, UAS access to the NAS remains restricted due to a lack of appropriate operational procedures, standards, and policies. Most UAS operate under Visual Flight Rules (VFR) or in segregated airspace. The FAA allows UAS operations on a case-by-case basis. This is done through the Certificate of Waiver or Authorization (COA) for public aircraft and special airworthiness certificates in the experimental category for civil users. Unmanned aircraft are aircraft flown by pilots and are required to comply with Part 91 aircraft operating rules. Due to the diverse utility that UAS offer, their use will increase exponentially in a variety of key public and civil areas. Industry projections for 2018 forecast more than 15,000 UAS in service in the U.S., with almost 30,000 deployed worldwide [*World Unmanned Aerial Vehicle Systems, Market Profile and Forecast 2009-2010,* The Teal Group]. From an operational, infrastructure, and safety perspective, the increasing number of UAS presents a number of challenges, the solutions to which will involve and impact all NAS constituencies, but ultimately require a seamless integration of UAS into the NAS. Two steps taken in 2012 to meet these challenges include: A Notice of Proposed Rulemaking for small UAS and an accompanying AC published in the Federal Register for public comment; and work on developing UAS Test Sites and projects as required by the National Defense Authorization Act.

SECTION 7

NextGen cannot succeed if it is unique to the U.S. – if different solutions are used elsewhere in the world, then the aircraft equipment manufacturer and international operator costs increase while the benefits attributable to NextGen capabilities decrease. Differences in operations can increase training costs and incur risks due to confusion between operations in the U.S. and elsewhere. Recognizing this, AVS is actively engaged in harmonizing NextGen enablers with foreign civil aviation authorities, bilaterally and through ICAO.

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 are supporting the creation of a more focused ICAO PBN Operational Approval Tiger Team to improve the alignment of the operational approvals of different authorities.

In 2012, we are helping ICAO to complete an update to the ICAO Manual on PBN, adding a number of new capabilities for various operations. These new operational capabilities should provide more flexible procedure designs, leveraging the same basic set of aircraft capabilities as are 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 (OSRWG), AVS develops and advocates U.S. operational policy for ICAO North Atlantic (NAT), Cross Polar, Pacific and Caribbean/South American (CAR/SAM) Working Groups. We are also very active in coordinating implementation with Europe, working with Single European Sky ATM Research (SESAR) and Eurocontrol.

AVS is actively working to harmonize future Global Navigation Satellite System (GNSS) standards so that they may be globally acceptable and interoperable, considering the multiple GNSS constellations that are under development. The US 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. This initiative is led by the Department of State and affects all civil users of GNSS, not only aviation. The FAA is active in these forums. Activities 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 - Broadcast

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; EU affects aircraft over 5700 Kg or with maximum speed exceeding 250 knots;
- EU has no explicit performance requirements;
- 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

Harmonization of ATS data communication is important to avoid regional implementations that may result in expensive multiple equipage solutions on aircraft. AVS is supporting the development of international data communication standards for ATN Baseline 2 which will lead toward a global convergence of data communication technology and equipment performance. This activity is occurring in joint RTCA Special Committee 214 and EUROCAE Working Group 78, with the resultant standards to be referenced as acceptable means of compliance to ICAO member state aviation regulations.

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 EVS and SVS. Additionally, these standards are actively being harmonized with EASA in their current rulemaking activities to ensure the operational benefit realized by this technology is maximized in Europe. It is important that AVS continues to monitor EU rulemaking activities and remain engaged with those regulatory authorities as they proceed. This will primarily be accomplished through the All Weather Operations Harmonization Aviation Rulemaking Committee (AWO HARC) which consists of US and EU regulatory authorities as well as industry stakeholders.

Avionics Safety Enhancements
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 are working 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 Working Group. Their goal is to develop standards that EFB software and hardware manufactures will utilize to create EFB solutions that industry will safely adapt

FIS information is needed to safely fly whether it is here in the United States or elsewhere in the world. For operators that operate outside of the NAS there is a need for their FIS data to be accessed in universal manner. In the end state, multiple links would provide FIS data link services globally, to include the following domains: Preflight planning and dispatch release, surface operations, terminal, and domestic, oceanic, remote, and polar en route. Operationally, the concept is to provide crews with seamless data in all operating domains, from preflight, to departure, to arrival at the gate -- anywhere and at any time.

For such a global FIS system to work, though, the community needs global technical standards and interoperability. Consequently, the technical community, working with AFS & AIR, is assisting in the development of several enabling technical standards. RTCA, EUROCAE, SAE, AEEC, and the Open Geospatial Consortium (OGC), are involved. Ultimately, revised ICAO Standards and Recommended Practices (SARPS) and World Meteorological Organization guidance will be needed to ensure seamless, global, FIS operations.

ENGINES AND FUELS TECHNOLOGIES

DROP-IN RENEWABLE JET FUEL:

The FAA supported the ICAO Workshop on Aviation and Sustainable Alternative Fuels, held in Montreal, Quebec, from October 18 to 20, 2011. The FAA provided an overview of their approval policy for “drop-in” alternative aviation fuels and of the recent approval to allow operations with HEFA fuels. In addition, the FAA discussed future fuel pathways such as ATJ and coordinated with regulatory authorities from other countries.

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 UAT 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.

APPENDIX A: NEW ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
PBN				
RNP 1 with Curved Path	Operational Rule	Draft 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	2013
	INSTRUMENT FLIGHT PROCEDURE design guidance	Publish Order 8260.PBN[1] to incorporate and supersede Order 8260.42B, 8260.44, 8260.52, and 8260.54A	AFS-420	December 2012
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 RNP 0.3, RNP 2, and Advanced-RNP	AFS-470	2014
Trajectory Operations	Equipment Standard	TSO: Equipment standard for trajectory operations	AIR-130	2014
	Installation Standard	AC: Advisory circular for evaluating this capability as installed	AIR-130	2014

[1]Date changed from the 2011 AVS Work Plan for NextGen due to Baro VNAV temperature correction validation.

APPENDIX A: NEW ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
ADS-B				
In-Trail Procedure (ADS-B In)	Operational Guidance	Update AC 90-114A Automatic Dependent Surveillance-Broadcast Operations	AFS-406	September 2012
Interval Management	Equipment Standard	TSO[2]: Equipment standard for interval management applications.	AIR-130	2014
	Operational Guidance	AC 20-172B[2] Airworthiness Approval for ADS-B In Systems and Applications: Update installation guidance for ADS-B In applications to support IM.	AIR-130	2014
	Operational Guidance	AC 90-114B Automatic Dependent Surveillance-Broadcast Operations	AFS-406	2014
	Implementation Guidance	Order 8900.1 revision, standard Operations Specifications	AFS-406	2014
ADS-B Traffic Advisory System (ADS-B In)	Equipment Standard	TSO-C195c: Equipment standard for non-TCAS equipped aircraft to obtain conflict detection capability that is compatible with typical VFR operations	AIR-130	December 2013
	Installation Guidance	AC 20-172C[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	2014

[2]Date Changed from the 2011 AVS Work Plan for NextGen due to alignment with ADS-B ARC

APPENDIX A: NEW ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
DATA COMMUNICATIONS				
FANS-1/A (over SatCom)	SatCom (Inmarsat Swiftbroadband)	TSO-C159b[3] Avionics Supporting Next Generation Satellite Systems: Update TSO to invoke standards for new INMARSAT service	AIR-130	June 2013
Dual Stack Data Comm	Installation Guidance	AC 20-140B Guidelines for Design Approva lof Aircraft Data Link Communications Systems Supporting Air Traffic Services (ATS)	AIR-130	October 2012
ATN Baseline 2	Installation Guidance	AC 20-140C Guidelines for Design Approva lof Aircraft Data Link Communications Systems Supporting Air Traffic Services (ATS): Update AC to support US data link program (dependent on funding for US program)	AIR-130	2014
	Operational Guidance	AC 120-70C[4] Operational Authorization Process for Use of Data Link Communication System	AFS-470	2014

[3]TSO schedule date moved to June 2013 due to revised RTCA standards schedule
[4]AC 120-70C accelerated one year to align with other guidance

APPENDIX A: NEW ENABLING POLICY

ENABLER	INITIATIVE	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
LOW VISIBILITY OPERATIONS[7]				
EFVS	Operational Rule	Rulemaking to expand the operational use of EFVS systems	AFS-410	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	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	2014
GLS Category III	Installation Guidance	Interim criteria (project specific policy)	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	ANE-111	2014
	ASTM standards (Pyrolsis)	Expand jet fuel specification to allow production via alternative processes and feedstocks	ANE-111	2015
Electric engines	ASTM Standards (for the electric propulsion system components and their installation requirements)	Gain experience from initial projects to identify performance requirements that allow the safe introduction of the technology into experimental and light sport aircraft.	ACE-114	2014

[5]SVS initiatives were moved to Segment Bravo implementation (2016-2020). Appendix A currently only tracks Segment Alpha Initiatives.

APPENDIX B: STREAMLINING INITIATIVES

INITIATIVE (ACTIVITY TITLE)	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
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
NAV Lean (Rec.2)	Approve TARGETS-developed STAR output for electronic transfer of data to the National Aeronautical Services Group (AeroNav Services) procedure production database.	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.14)	Revise FAA Order 8260.19 to clearly define the responsible Federal official authorized to sign applicable environmental documents. *This represents the AVS portion of Recommendation 14.	AFS-400	September 2013
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
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 Lines of Business, and the definition of “minor amendments” for use when “fast-tracking” eligible IFPs.	AFS-400	January 2014

APPENDIX B: STREAMLINING INITIATIVES

INITIATIVE (ACTIVITY TITLE)	SPECIFIC ACTION (ACTIVITY TARGET)	OPR	SCHEDULE
NAV Lean (Rec.21)	Establish a Web-based Operations Approval entry portal and a Web-based work package to accommodate the needs of other Lines of Business and external stakeholders.	AFS-400	September 2014
Expansion of Approved Model Lists	Notice describing use of approved model lists for all aircraft product types.	AIR-110	September 2012
Expansion of Approved Model Lists	Advisory Circular describing appropriate use of approved model lists and identified required data.	AIR-110	September 2013
Field Approval Process	Establish online Job Aid for field approvals (currently Figure 4-68 in 8900.1, Volume 4, Chapter 9, Section 1)[6]	AFS-360	August 2012
New Guidance for Major Repair and Alterations	Develop joint Order addressing process for approving major repairs and alterations	AFS-360/AIR-110	December 2013
Training	Develop NextGen avionics design approval course	AIR-130	Contingent on funding
Training	Develop NextGen avionics maintenance course	AFS-360	September 2013

[6]Extended due to new requirements for additional 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, MEM Center.	AFS – Support safety assessments, risk analyses and working groups 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, Horizon Airlines.	AFS – 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.	MITRE, NASA Ames.	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 Performance Based Navigation technology to improve arrival rates at airports.	Port Authority of New York & New Jersey (PANNYJ), Houston Airport System (HAS), 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, Cape Air, NetJets, Evergreen Cargo, AAG Helicopter, CareFlite Helicopter, Bell Helicopter.	AFS & AIR - Support for operational approval of new WAAS applications.
Unmanned Aircraft Systems (UAS) Demos 1S, 1P, 1 SE, 2, 3, 4, NEO Spiral II,.	Seamless integration of Unmanned Aircraft Systems (UAS) into the National Airspace System (NAS) including Human-In-The-Loop simulation, UAS simulator development.	ANG-C53, inter-agency including WJHTC and industry partners including NATCA.	AFS & AIR provide guidance for simulator definition.

APPENDIX C: NEXTGEN DEMONSTRATIONS

DEMO	DESCRIPTION	PARTNERS	AVS ACTIVITY
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 Tailored Arrivals (TA) and operator authorization to fly TAs.** **AIR – Requirements definition for aircraft participating in demo.**
Departure Clearance (DCL) Data Link Trials.	DCL is a prelude to the Terminal Data Link Service (TDLS) 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 TBO.
Wake Turbulence Research Program.	Safely change wake turbulence separation standards where possible to improve capacity.	AFS, DOT Volpe, MITRE, United Airlines, MIT/LL, National Institute of Aero-space, CSSI, NEXTOR.	AFS - Evaluate Wake Turbulence Enhancement of Arrivals/Departures research initiative toward CSPO independent applications. - Provides requirements for an analysis tool to screen aircraft flight data recorder data to identify potential wake vortex encounter. - Conduct industry pilot wake vortex data collection using the FAA transportable wake software model. - Establish WVE tolerance criteria (metrics), this includes defining WVE hazard boundaries and determining risk levels of WVE's in the NAS.
ADS-B IN In-Trail Procedure (ITP).	ADS-B In capability that enables flight level changes using reduced separation standards in non-radar oceanic airspace (NRA).	Honeywell, Goodrich, UAL.	AFS & AIR - Develop supporting ITP equipment certification standards and operational guidance. 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.
ADS-B In Interval Management (IM).	IM applications enable enhanced Visual Separation on Approach (VSA), situational awareness in flight and on airport surface.	USAIR, Goodrich, Astronautics, ACSS.	AFS & AIR - Develop support-ing IM equipment certification standards and operational guidance

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
105208-11 Basic Rerouting Capability	2012	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards
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 Automated Congestion 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 Electronic Negotiations*	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

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 Airport Surface Capability	2013 2015	ADS-B for Surface Vehicles	No additional activity	No additional activity	No additional activity

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
103208-14 Enhanced Vision Systems (EVS) for Taxi	2010 2015	EVS	No additional activity	Proof of concept study with FEDEX	No additional activity

OI 104207 Enhanced Surface Operations

"Data communication between aircraft and ANSP is used to exchange clearances, amendments, and requests. At specified airports, data communications is the principal means of communication between ANSP and equipped aircraft.

"Terminal automation provides the ability to transmit automated terminal information, departure clearances and amendments, and taxi route instructions via data communications, including hold-short instructions. The taxi route instruction data communication function reduces requests for progressive taxi instructions. Benefits arising from this capability, in conjunction with other NAS investments, include enhanced airport throughput, controller efficiency, enhanced safety, as well as reduced fuel burn and emissions."

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104207-11 Revised Departure Clearance via Data Comm	2015	FANS 1/A+ (VDL mode 2)	Define aircraft qualification criteria	Define approval strategy for use on existing aircraft	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 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
104209-15 Departure Routing Increment 1	2012	No Aircraft or Operator Enabler	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards
104209-16 External Data Exchange	2010 2011	(AOC/FOC to ANSP) SWIM	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards

OI 102406 Provide Full Surface Situation Information

Automated broadcast of aircraft and vehicle position to ground and aircraft sensors/ receivers provides a digital display of the airport environment. Aircraft and vehicles are identified and tracked to provide a full comprehensive picture of the surface environment to ANSP, equipped aircraft, and flight operations centers (FOCs).

"Surface situation information will complement visual observation of the airport surface. Decision support system algorithms will use enhanced target data to support identification and alerting of those aircraft at risk of runway incursion. In addition, non-ANSP functions, such as airport (movement and non-movement areas) and security operations will benefit from information exchange and situational awareness of aircraft and equipped vehicle surface position and movement

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
102406-11 Situational Awareness and Alerting of Ground Vehicles	2010 2011	Surface Indications/ Alerts (ADB-In)	No additional activity	No additional activity	No additional activity

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
104120-14 Arrival Interval Management Using Flight Deck Capability	2015	Interval Management (ADS-B In)	No additional activity	No additional activity	No additional activity

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 throughput.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
104117-11 Integrated Departure/Arrival Capability (IDAC	2011 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 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.

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

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

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
102141-13 Amend Independent Runway Standards in Order 7110.65 (include Blunder Model Analysis)	2010 2013	ILS	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	ILS	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	ILS	No additional activity	Complete safety study 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

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TIME BASED FLOW MANAGEMENT

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 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 throughput.

IMPROVED APPROACHES AND LOW VISIBILITY OPERATIONS

OI 107107 Ground Based Augmentation System Precision Approaches

GPS/GBAS support precision approaches to Category I and eventually Category 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 107103 RNAV SIDs, STARSs and Approaches

RNAV is available throughout the National Airspace System (NAS) using satellite-based avionics equipment and systems

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
107103-12 RNP and RNP Authorization (AR) Approaches	2010 2015	RNP 1, RNP AR	No additional activity	No additional activity	No additional activity
107103-13 RNAV SIDs and STARS at Single Sites	2010 2015	RNAV 1	No additional activity	No additional activity	No additional activity

APPENDIX D: NEXTGEN SEGMENT IMPLEMENTATION PLAN: SEGMENT A

IMPROVED MULTIPLE RUNWAY OPERATIONS

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 enable operation	No additional activity
107117-13 LPV Approaches	2010 2015	LPV	No additional activity	No additional activity	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
107118-11 EFVS to Touchdown	2012 2015	EFVS	Complete RTCA SC-213 activity	Complete RTCA SC-213 activity Finalize 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 2015	No Aircraft or Operator Enabler	No additional activity	Oversee the SA CAT I/II program	No additional activity

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 CDTIFIS-B	No additional activity	No additional activity	No additional activity
103305-13 Provide NAS Status via Digital NOTAMs	2009 2015	FIS-B	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards

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AUTOMATION SUPPORT FOR SEPARATION MANAGEMENT

OI 102137 Automation Support for Separation Management

The Air Navigation Service Provider (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 ADS-Contract (ADS-C) Climb/Descent Procedure (CDP)	2010 2012	ADS-C FANS-1/A RNP 4	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
102108-12 ADS-C Automation for Oceanic CDP	2011 2014	ADS-C FANS-1/A (SatCom) RNP 4	No additional activity	No additional activity	Approve controls that are defined to mitigate or eliminate initial high risk hazards

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

COMMON SERVICES

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
103119-13 Reduce Weather Impact (RWI) - Initial	2013 2015	WX Reporting system	No additional activity	No additional activity	No additional activity

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	2013	TBD	Technical support to AEE as required	No additional activity	No additional activity
108209-13 Large-Scale Redesign of Airspace Leveraging PBN	2014	TBD	Technical support to AEE as required	No additional activity	No additional activity
109315-13 Adaptive Trailing Edges	2013	TBD	Technical support to AEE as required	No additional activity	No additional activity
109315-14 Ceramic Matrix Composite turbine Blade Tracks	2014	TBD	Technical support to AEE as required	No additional activity	No additional activity
109315-15 Ceramic Matrix Composite Acoustic Nozzle	2014	TBD	Technical support to AEE as required	No additional activity	No additional activity
109315- 16 Engine Weight Reduction and High temperature Impeller	2015	TBD	Technical support to AEE as required	No additional activity	No additional activity
109315-17 Dual-Wall Turbine Blade	2013	TBD	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	No additional activity	No additional activity	No additional activity

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ENVIRONMENT AND ENERGY

OI 109316 Increased use of Alternative Aviation Fuels Phase 1

Determine the feasibility and market viability of alternative aviation fuels for commercial aviation use. Obtain ASTM International approval of Hydrotreated Renewable Jet (HRJ) blends and other advanced sustainable fuel blends from renewable resources that are compatible with existing infrastructure and fleet thus meeting requirement to be a 'drop-in' fuel.

INCREMENT	IOC	ENABLER	AIR ACTIVITY	AFS ACTIVITY	AOV ACTIVITY
109316-11 Drop-In 50-50% HRJ Blend Fuels	2011	Drop-In Renewable Jet Fuel	No additional activity	No additional activity	No additional activity
109316-11a Drop-In < 50% HRJ Fuels (Less than 50% Blend)	2015	Drop-In Renewable Jet Fuel	No additional activity	No additional activity	No additional activity
109316-12 Other Advanced Aviation Alternative Fuels	2015	Drop-In Renewable Jet Fuel	No additional activity	No additional activity	No additional activity

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
109304-11 Enhanced Query Capabilities	2012 2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	No additional activity
109304-12 Airspace Facility Data	2012 2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	No additional activity
109304-13 General Aviation Flight Data	2012 2013	No Aircraft or Operator Enabler	No additional activity	No additional activity	No additional activity
109304-15 Enhanced Stakeholder Access	2013 2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	No additional activity
109304-16 Enhanced Data Standards	2013 2014	No Aircraft or Operator Enabler	No additional activity	No additional activity	No additional activity