Federal Aviation Administration

NextGEN

NextGen Implementation Plan

AUGUST 2014

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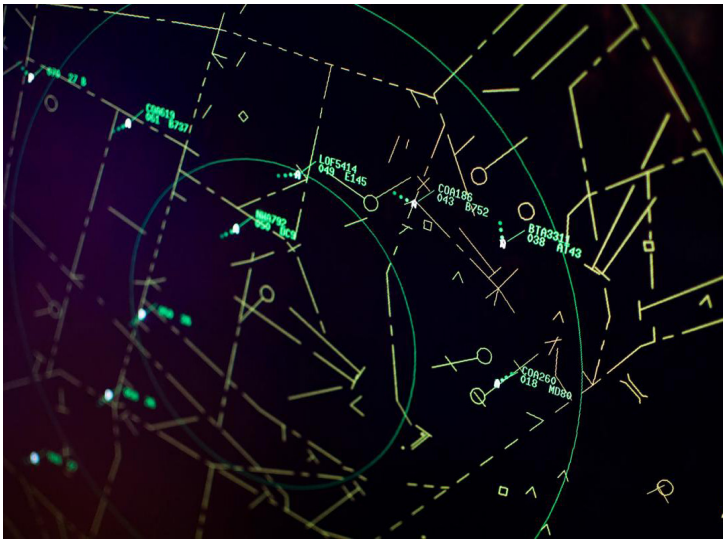

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NEXTGEN PROGRAMS

AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

Automatic Dependent Surveillance–Broadcast (ADS-B) is the more precise, satellite-based successor to radar. ADS-B Out uses GPS technology to determine an aircraft's location, airspeed and other data, and broadcasts that information to a network of ground stations (which relays the data to air traffic control displays) and to nearby aircraft equipped to receive the data via ADS-B In. ADS-B In provides operators of properly equipped aircraft with weather and traffic position information delivered directly to the cockpit.

ADS-B Out equipage has been mandated in most controlled airspace — generally where transponders are required today — by January 1, 2020. ADS-B In equipage is not currently mandated.

TARGET USERS

Aircraft owners and pilots flying in most controlled airspace, air traffic controllers, airport surface vehicle operators

EQUIPAGE REQUIREMENTS

Avionics equipment requirements for operators and installers are detailed in FAA Advisory Circular 90114 and Technical Standard Orders TSO-C166b and TSO-C154c. To meet the ADS-B Out mandate, aircraft require a position source (GPS) and a compatible transmitter. A display device is needed for ADS-B In.

- Aircraft operating above 18,000 feet (FL180) or internationally require a Mode S transponder operating on 1090 MHz with Extended Squitter (1090ES). A 1090 MHz receiver is needed to process TIS-B information. FIS-B is not available with 1090ES.
- Aircraft operating within U.S. airspace below FL180 can use either a 1090ES or a Universal Access Transceiver (UAT) operating on 978 MHz. UAT is capable of receiving TIS-B and FIS-B.

OPERATIONAL CAPABILITIES

ADS-B Out avionics transmit position, airspeed and other data to ground receivers that in turn relay the information to controllers and aircraft equipped for ADS-B In. ADS-B In requires

additional aircraft equipage to receive and display data from ground stations and ADS-B-equipped aircraft.

SERVICE CAPABILITIES

ADS-B In-equipped aircraft have access to the following additional broadcast services:

- Flight Information Service–Broadcast (FIS-B): Broadcasts graphical weather to the cockpit as well as text-based advisories, including Notices to Airmen and significant weather activity. Available only with a UAT.
- Traffic Information Service–Broadcast (TIS-B): Provides altitude, ground track, speed and distance of aircraft flying in radar contact with controllers, and within a 15-nautical mile (nm) radius, up to 3,500 feet above or below the receiving aircraft's position.
- Automatic Dependent Surveillance–Rebroadcast: ADS-B Out information can be broadcast on two frequencies, 1090 MHz and 978 MHz. ADS-R rebroadcasts data from one frequency to the other, providing aircraft operating on both ADS-B links the ability to see each other on their traffic displays.

IMPLEMENTATION

In March 2014 the FAA completed the ADS-B baseline ground infrastructure (634 ground stations). The agency is now working to complete the integration of ADS-B into the air traffic control facilities around the country. As of August 2014, ADS-B had been integrated into the automation platforms at 17 of the 24 en route air traffic control facilities, 60 of the 159 terminal facilities and 32 of the 44 towers at airports equipped with surface surveillance systems.

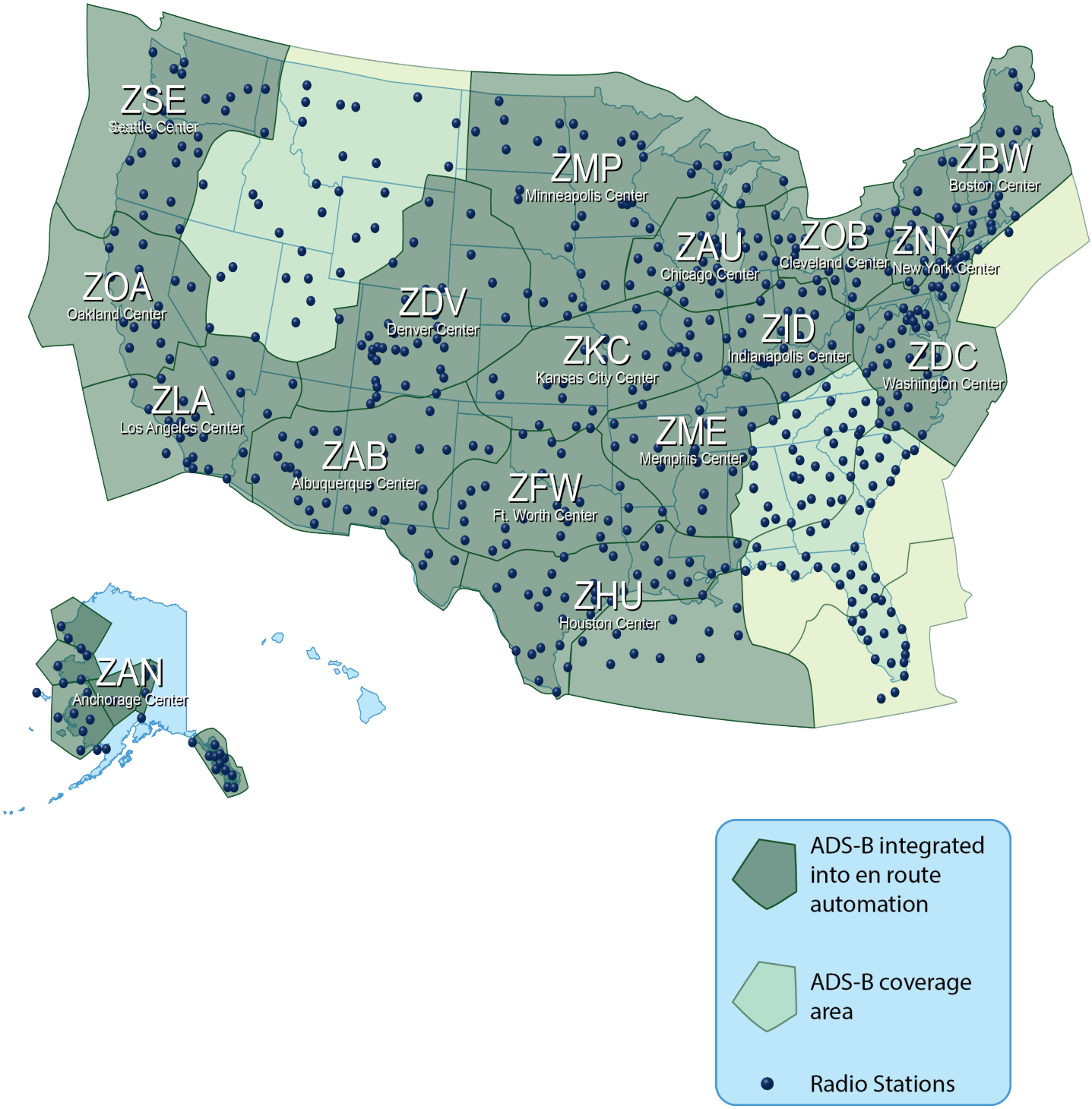
BENEFITS ACHIEVED TO DATE

The FAA declared ADS-B Initial Operational Capability (IOC) in the Gulf of Mexico on December 17, 2009, providing improved communications, weather and surveillance services to operators in the Gulf region.

- ADS-B surveillance has reduced separation between helicopters in the Gulf from a single aircraft inside a 20-by-20-mile block of airspace to 5 nm. This allows direct routing clearances for ADS-B-equipped helicopters, which has shortened trips by about 14 nm and saved about 14 gallons of fuel per flight. The FAA estimates over 300,000 nm in flight savings from December 2009 to February 2014.
- Helicopter operator PHI reports an increase in annual flight hours during periods of low visibility from 1,500 to 20,000.
- ADS-B provides surveillance over the Gulf of Mexico, where radar coverage is not available. When severe weather blocks the usual flight paths between Florida and California, properly equipped aircraft can fly a more efficient ADS-B route over the Gulf as opposed to the typical over-land reroute. Flights that use the ADS-B route during severe weather save between 7 and 11 minutes of flight time on average, burning less fuel and creating fewer emissions than flights on typical reroutes.
- General aviation pilots in properly equipped aircraft have subscription-free access to traffic and weather.

ADS-B COVERAGE AND EN ROUTE INTEGRATION

As of June 2014



PROGRAM MILESTONES	DATE
ADS-B Segment 1 and Segment 2 Investment Decision	August 2007
Initial Operating Capability (IOC) ADS-B Capability on Common Automated Radar Terminal System IIIE at New York TRACON	July 2011
IOC ADS-B Capability on Standard Terminal Automation Replacement System at Houston TRACON	March 2012
IOC ERAM Release 3 with ADS-B Capability at Houston Center	April 2012
Achieve En Route Separation Services IOC at the 12th site	March 2014
Achievement of critical Services Implementation Service Acceptance Test at all 306 Service Volumes (Services encompass ADS-B Out, ADS-B In, TIS-B, FIS-B)	March 2014
Complete baseline ADS-B radio station infrastructure deployment	March 2014
Achieve Terminal Separation Services IOC at the 55th site	June 2014
Investment Analysis Readiness Decision for ADS-B In Applications Planning Milestone	September 2014
Complete IOC Surface Advisory Services at all 35 Airport Surface Detection Equipment, Model X sites	September 2014
Complete IOC at last (24th) En Route site	September 2015
Final Investment Decision for ADS-B In Applications Planning Milestone	June 2016
Complete all Terminal and Surface IOCs	2019
ADS-B Out Rule Compliance	January 2020

DATA COMMUNICATIONS

Data Communications (Data Comm) enables controllers and pilots to communicate with digitally-delivered messages, rather than rely solely on radio voice communications. With the push of a button, controllers will be able to electronically send routine instructions, such as departure clearances (DCL) and weather-avoiding reroutes, directly to the flight deck. Messages will appear only on the cockpit display of the aircraft to which they apply, reducing the potential for miscommunication that can occur from radio voice exchanges.

TARGET USERS

Air traffic controllers, airline pilots, airline dispatchers

EQUIPAGE REQUIREMENTS

Future Air Navigation System 1/A+ (direct data link between pilot and controller)
VHF Digital Link (VDL) Mode 2 avionics for en route services.

VDL Mode 0 avionics will be accommodated for tower services.

OPERATIONAL CAPABILITIES

- Data Comm will initially deliver digital tower pre-departure clearance services, including route revisions.
- Data Comm services will be provided in en route airspace, enabling controllers to provide pilots with with frequency handoffs, altitude changes, and inflight reroutes.
- Collectively, these services will save time and increase controller and pilot productivity, leading to greater efficiency, improved routing around weather and congestion, increased flexibility and accommodation of user requests, and reduce the potential for miscommunication as controllers send digital messages to each aircraft.

IMPLEMENTATION

In September 2012, as part of Segment 1, the FAA awarded a 7-year Data Comm Integrated Services contract to provide engineering support, communications infrastructure and avionics incentives necessary to enable Data Comm messaging and services.

In 2013, the FAA initiated DCL tower trials at Memphis (January) and Newark (April). Both trials will conclude in January 2016. Initial DCL services are expected in 2016.

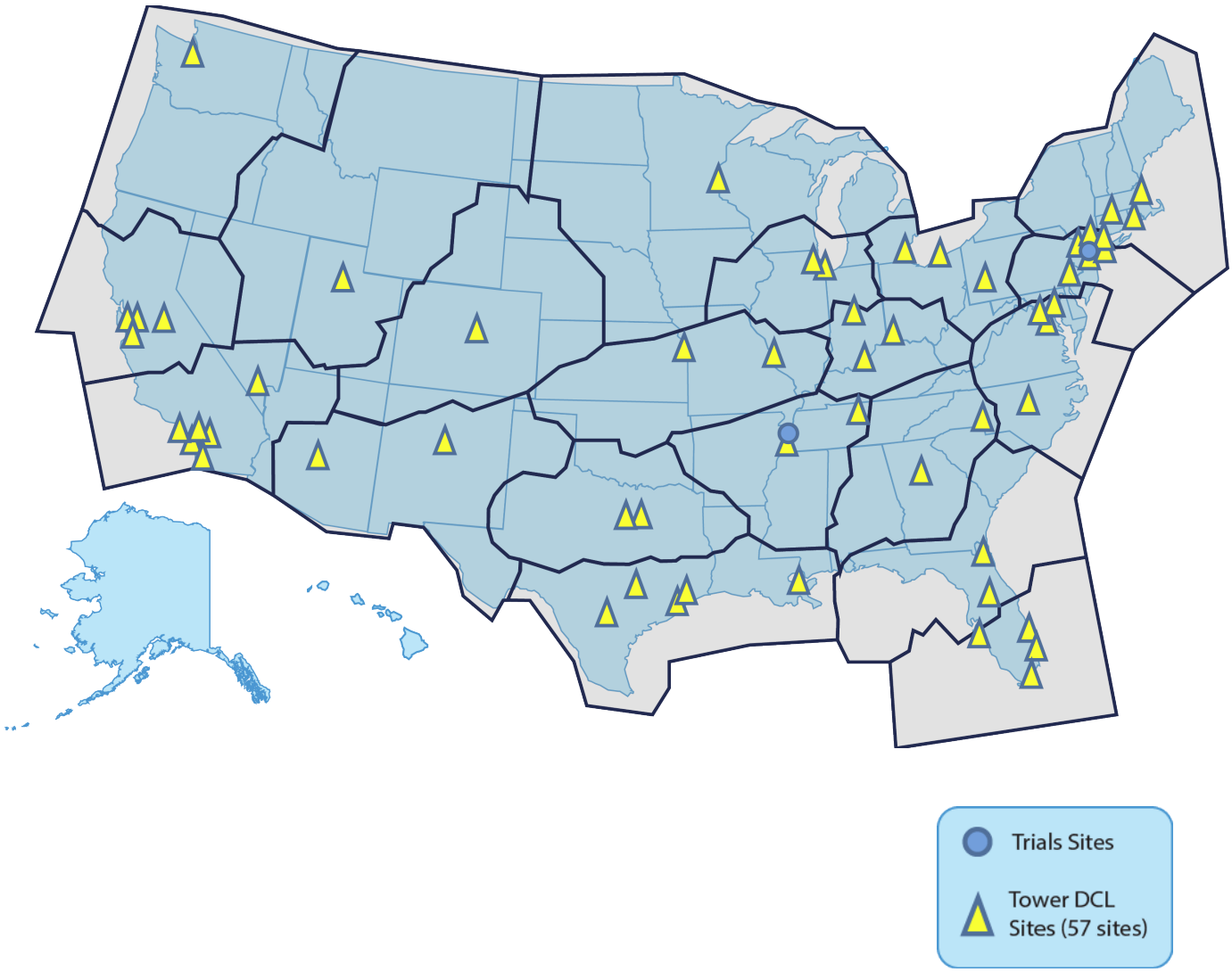
By the end of calendar year 2014 the FAA plans to make the Final Investment Decision for en route services, with initial Data Comm capabilities expected in high-altitude airspace beginning in 2019.

BENEFITS ACHIEVED TO DATE

Not applicable, prototype operational use in limited trials only.

DATA COMMUNICATIONS DEPARTURE CLEARANCE TOWER SERVICE

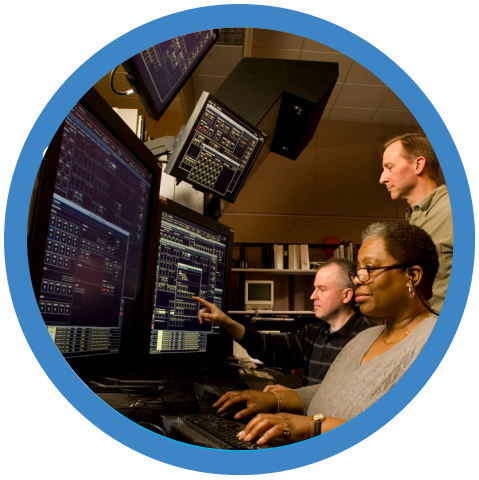
As of June 2014



PROGRAM MILESTONES	DATE
SEGMENT 1	
Data Comm Segment 1 Phase 1 Final Investment Decision (FID) for En Route Automation Modernization (ERAM) and Tower Data Link System (TDLS)	May 2012
Data Comm Segment 1 Phase 1 Data Comm Integrated Services Contract Award	September 2012
Data Comm Segment 1 Phase 1 TDLS Preliminary Design Review complete	October 2012
Data Comm Segment 1 Phase 1 TDLS Critical Design Reivew complete	July 2013
Data Comm Segment 1 Phase 1 ERAM Initial Test Release (ITR)	April 2014
ERAM R4 ITR	June 2014
TDLS V12 ITR	July 2014
Deliver Data Comm Network Service Build 1 to William J. Hughes Technical Center	September 2014
Complete Program Level Integrated Baseline Review	September 2014
Complete Data Comm Informal Integration and Interface Service Test	September 2014
Data Comm Segement 1 Phase 1 En Route Services FID	October 2014
Data Comm Segment 1 Phase 1 Operational Test and Evaluation	November 2015
Data Comm Segment 1 Phase 1 IOC at first site	March 2016
Data Comm Segment 1 Phase 1 In-Service Decision	December 2016
Data Comm Segment 1 Phase 1 Site Operational Readiness Decision	April 2017
Data Comm Segment 1 Phase 1 IOC at last site	May 2019
TOWER TRIALS	
Initiate Departure Clearance (DCL) tower trials at MEM	January 2013
Initate DCL tower trials at EWR	April 2013
Complete DCL tower trials	September 2014

EN ROUTE AUTOMATION MODERNIZATION

En Route Automation Modernization (ERAM) replaces the legacy HOST automation system at 20 of the FAA's network of en route centers, which control high-altitude traffic. This scalable system fuses flight plan information with information from surveillance sources to automate many air traffic control functions and support controller decisions. ERAM is not a NextGen program but it is foundational to the success of many NextGen capabilities. For instance, ERAM serves as the platform upon which data sharing, digital communications and trajectory-based operations will reside.



TARGET USERS

Air traffic controllers at en route Air Route Traffic Control Centers

EQUIPAGE REQUIREMENTS

Additional equipage not required for National Airspace System users.

OPERATIONAL CAPABILITIES

- ERAM combines flight plan information with surveillance data from Automatic Dependent Surveillance–Broadcast, Wide Area Mulitlateration and radar to automate a number of air traffic control functions such as tracking aircraft, providing conflict alerts and minimum safe altitude warnings and recording air traffic events.
- ERAM enables controllers to see beyond the boundaries of the airspace controlled by their own center, enabling them to handle traffic more efficiently. This extended coverage is possible because ERAM processes data from 64 radars, compared with 24 for HOST.
- Each ERAM system can track 1,900 aircraft at a time, compared with 1,100 for HOST.

IMPLEMENTATION

As of June 2014, 16 of 20 FAA en route centers are using ERAM on a continuous basis. The agency has completed installation and begun initial operations, called initial operating capability (IOC), at 18 facilities. The remaining two centers — Jacksonville and Atlanta — are expected to reach IOC before the end of fiscal year 2014. An ERAM site is considered fully implemented once it has accomplished three phases — initial operating capability, continuous operations and operational readiness demonstration (ORD). All centers are expected to achieve the final implementation stage and be ORD by March 2015.

The FAA will continue to add new NextGen capabilities to installed ERAM systems.

BENEFITS ACHIEVED TO DATE

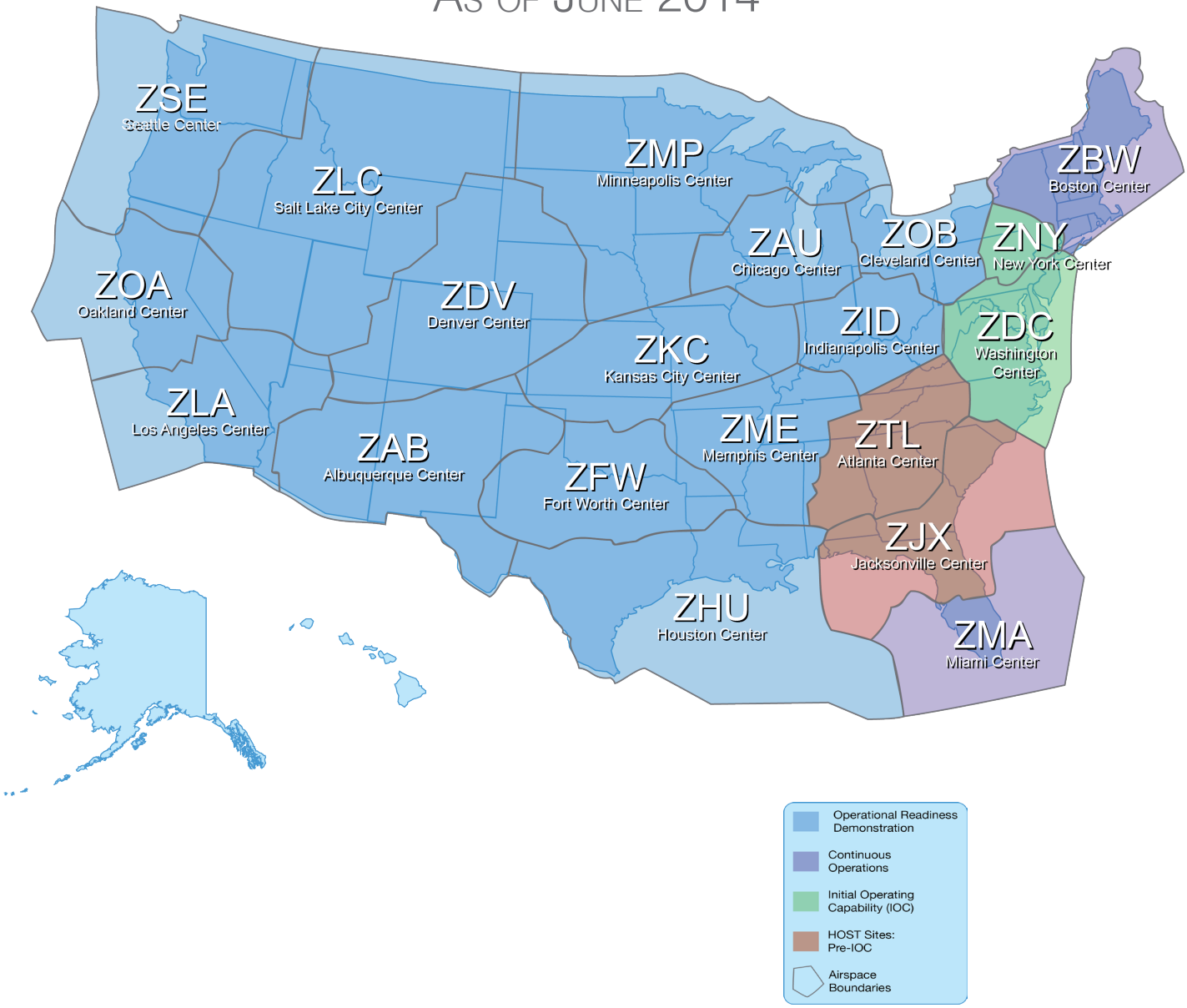
ERAM processes data from 64 radars instead of 24. ERAM systems can track 1,900 aircraft at a time, instead of 1,100.

With ERAM, many types of aircraft handoffs from one facility's airspace to another can be done automatically rather than manually.

New color screens used with ERAM no longer reflect glare, which allows light levels in radar rooms to be raised. ERAM also gives controllers the ability to customize what they see. For example, a controller could turn all of the airplanes in a sector to a single color, such as blue, to distinguish them from others in nearby airspace.

EN ROUTE AUTOMATION

As of June 2014



PROGRAM MILESTONES	DATE
Final Investment Decision (FID) for ERAM	June 2003
ERAM Release 1: Key site - General Acceptance	April 2008
ERAM In Service Decision	March 2011
ERAM Release 2: Key site Operation Readiness Demonstration (ORD)	March 2012
ERAM Release 3: First site ORD	August 2012
System Enhancement and Tech Refresh FID	September 2013
Initial Investment Decision for ERAM Sector Enhancement Planning Milestone	September 2014
Achieve Initial Operating Capability at last two sites (Jacksonville and Atlanta)	September 2014
Last site ORD	March 2015
FID for ERAM Sector Enhancement Planning Milestone	June 2015

TERMINAL AUTOMATION MODERNIZATION AND REPLACEMENT

Air traffic controllers use different automation platforms depending on whether the airspace involved is near airports or at high altitude. The Terminal Automation Modernization and Replacement (TAMR) program converts terminal air traffic control facilities to a single, common automation platform: the Standard Terminal Automation Replacement System (STARS). TAMR is funding a technology refresh at the 54 sites where STARS is already in operational use while replacing older automation platforms at 108 other facilities. TAMR is not a NextGen program but, like ERAM, the successful transition to this common automation platform is foundational to successfully deploying other NextGen capabilities.

TARGET USERS

Air traffic controllers at towers and Terminal Radar Approach Control (TRACON) facilities

EQUIPAGE REQUIREMENTS

Additional equipage not required for National Airspace System users.

OPERATIONAL CAPABILITIES

STARS provides individual preference settings for controllers. STARS meets operational requirements for core NextGen capabilities, such as Automatic Dependent Surveillance–Broadcast (ADS-B). It further provides data-recording capability and quadruple redundancy.

IMPLEMENTATION

TAMR is being implemented in three phases.

- Phase 1 is a technology refresh of the existing STARS platform at 47 sites by 2020.
- Phase 2, completed in 2008, replaced automation systems with STARS at four TRACONs: Anchorage, Alaska; Corpus Christi, Texas; Pensacola, Fla.; and Wichita, Kan. It also modernized aging air traffic controller displays and system processors at four additional TRACONS: Chicago, Denver, St. Louis and Minneapolis/St. Paul.
- Phase 3 is replacing the remaining 100+ automation systems with STARS to support the increasing demand for air traffic services. Phase 3 is occurring in two segments defined by the type of automation systems being replaced by STARS.
- Phase 3 (Segment 1) will replace Common Automated Terminal System IIIE (CARTS IIIE) at 11 facilities by 2017. CARTS IIIE consists of a common software baseline capable of operating on three terminal automation platforms, ARTS IIIEs, ARTS IIEs and ARTS IEs.
- Phase 3 (Segment 2) replaces CARTS IIE and IE at 97 facilities by 2019. In April 2014, IOC was achieved at the first Phase 3 (Segment 2) site, Allentown, Pa., TRACON.

BENEFITS ACHIEVED TO DATE

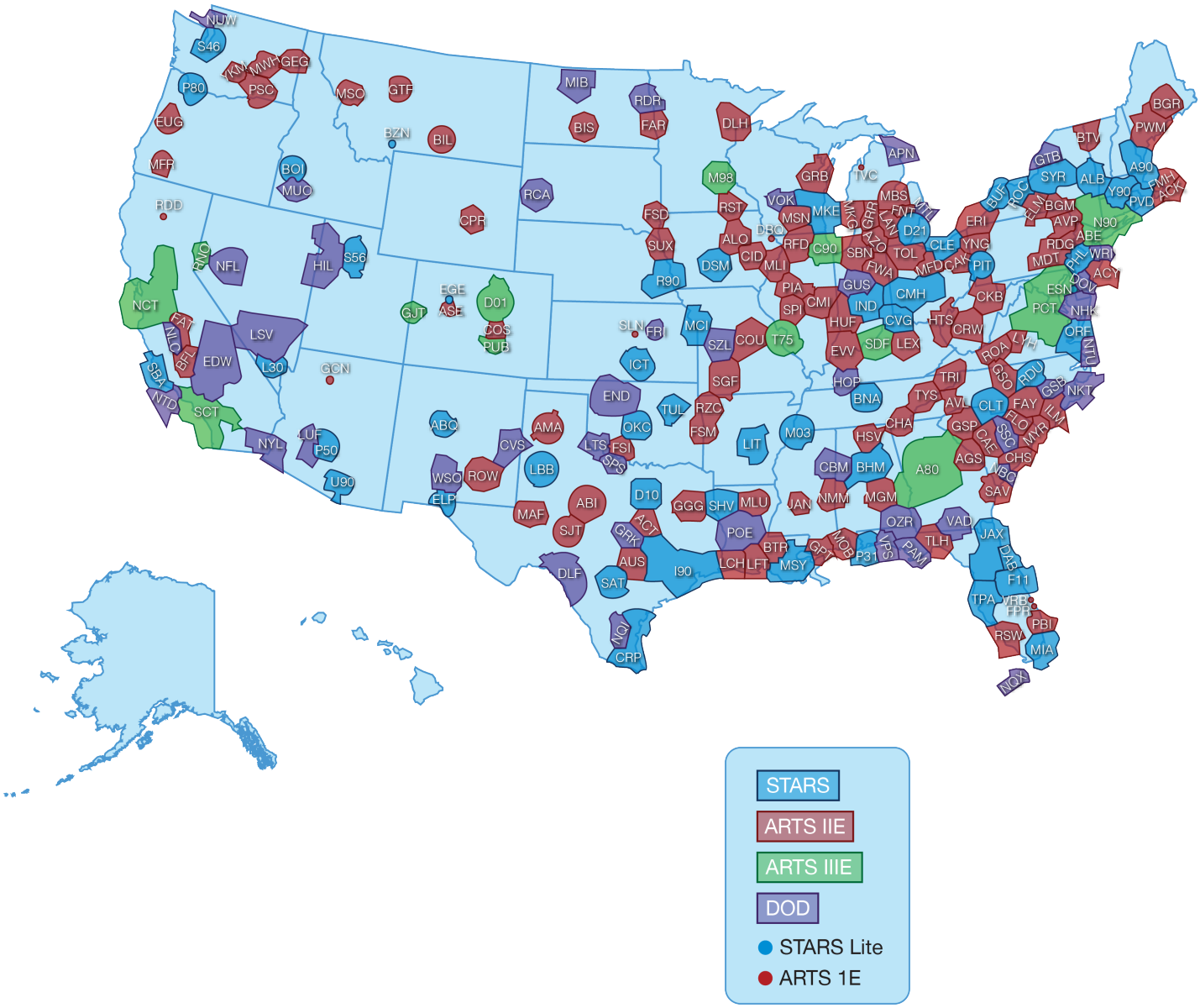
STARS supports ADS-B.

LCD screens cut electric use by 67 percent, take less time to maintain and are more reliable than the previous CRT screens.

A single system throughout the National Airspace System reduces cost by eliminating the need to develop, test and deploy software on multiple platforms and maintain an aging automation platform.

TERMINAL AUTOMATION

As of June 2014



PROGRAM MILESTONES	DATE
TAMR Phase 3 Segment 1 Contract Award - 11 STARS Systems (NTE)	December 2010
TAMR Phase 3 Segment 1 Final Investment Decision (FID)	December 2011
TAMR Phase 1 FID	September 2012
TAMR Phase 3 Segment 2 FID	September 2012
TAMR Phase 1 complete Initial Operating Capability (IOC) at key site	December 2012
TAMR Phase 3 Segment 1 complete IOC at key site on E1 - D10	May 2013
TAMR Phase 1 complete IOC at 2nd site	January 2014
Complete IOC at one Air Traffic Services site	January 2014
Complete IOC at first TAMR Phase 3 Segment 2 site	August 2014
TAMR Phase 3 Segment 2 complete IOC at first site (ARTS IIE)	August 2014
TAMR Phase 3 Segment 1 complete IOC at key site on E2 - D10	September 2014
Complete IOC at key site on second major software build (R2) - D10	September 2014
TAMR Phase 3 Segment 1 complete Operational Readiness Decision (ORD) at key site on E2 - D10	May 2015
TAMR Phase 3 Segment 1 complete IOC at 5th site - M98	October 2015
TAMR Phase 3 Segment 2 complete IOC at 12th site (ARTS IIE)	December 2015
TAMR Phase 3 Segment 1 complete IOC at last (11th) site - N90	October 2016
TAMR Phase 3 Segment 2 complete IOC at 34th site (ARTS IIE)	December 2016
TAMR Phase 3 Segment 1 complete ORD at last (11th) site - N90	October 2017
TAMR Phase 1 complete IOC at 26th site	December 2017
TAMR Phase 3 Segment 2 complete IOC at 65th site (ARTS IIE)	December 2017
TAMR Phase 1 complete IOC at 39th site	March 2019
TAMR Phase 3 Segment 2 complete IOC at last (91st) site (ARTS IIE)	March 2019
TAMR Phase 3 Segment 2 complete ORD at last site	June 2019
TAMR Phase 1 complete IOC at last (48th) site	February 2020

NAS VOICE SYSTEM

The National Airspace System Voice System (NVS) replaces the current voice switches operated independently at individual facilities. NVS will use router-based communications linked through the FAA Telecommunications Infrastructure (FTI) network. NVS and FTI will provide the FAA with a nationwide capability for routing, monitoring and sharing communication assets among facilities, enabling greater flexibility for the development and usage of airspace/traffic assignments in all airspace.

TARGET USERS

Air traffic controllers, pilots, including pilots of Unmanned Aircraft Systems (UAS)

EQUIPAGE REQUIREMENTS

Additional equipage not required for National Airspace System users.

OPERATIONAL CAPABILITIES

- NVS provides FAA increased flexibility to shift controller workload between facilities as needed. For example, NVS will allow adjacent facilities to share communication resources to mitigate the impact of bad weather on air traffic.
- NVS will enable digital and flexible direct communication between air traffic controllers and pilots, including UAS pilots.

IMPLEMENTATION

The NVS contract was awarded on August 24, 2012. As part of Segment 1, a demonstration of NextGen capabilities was completed on November 20, 2013 using three networked demonstration systems. These systems are located at a vendor facility in Melbourne, Fla., the William J. Hughes Technical Center and the Mike Monroney Aeronautical Center.

The first Final Investment Decision (FID) for Segment 2 (Production) is scheduled for September 17, 2014. Two systems for testing and three key site systems are planned to be procured in order to achieve an In-Service Decision in FY 2019. Additional NAS systems will then be ordered for deployment based on a second FID in FY 2017.

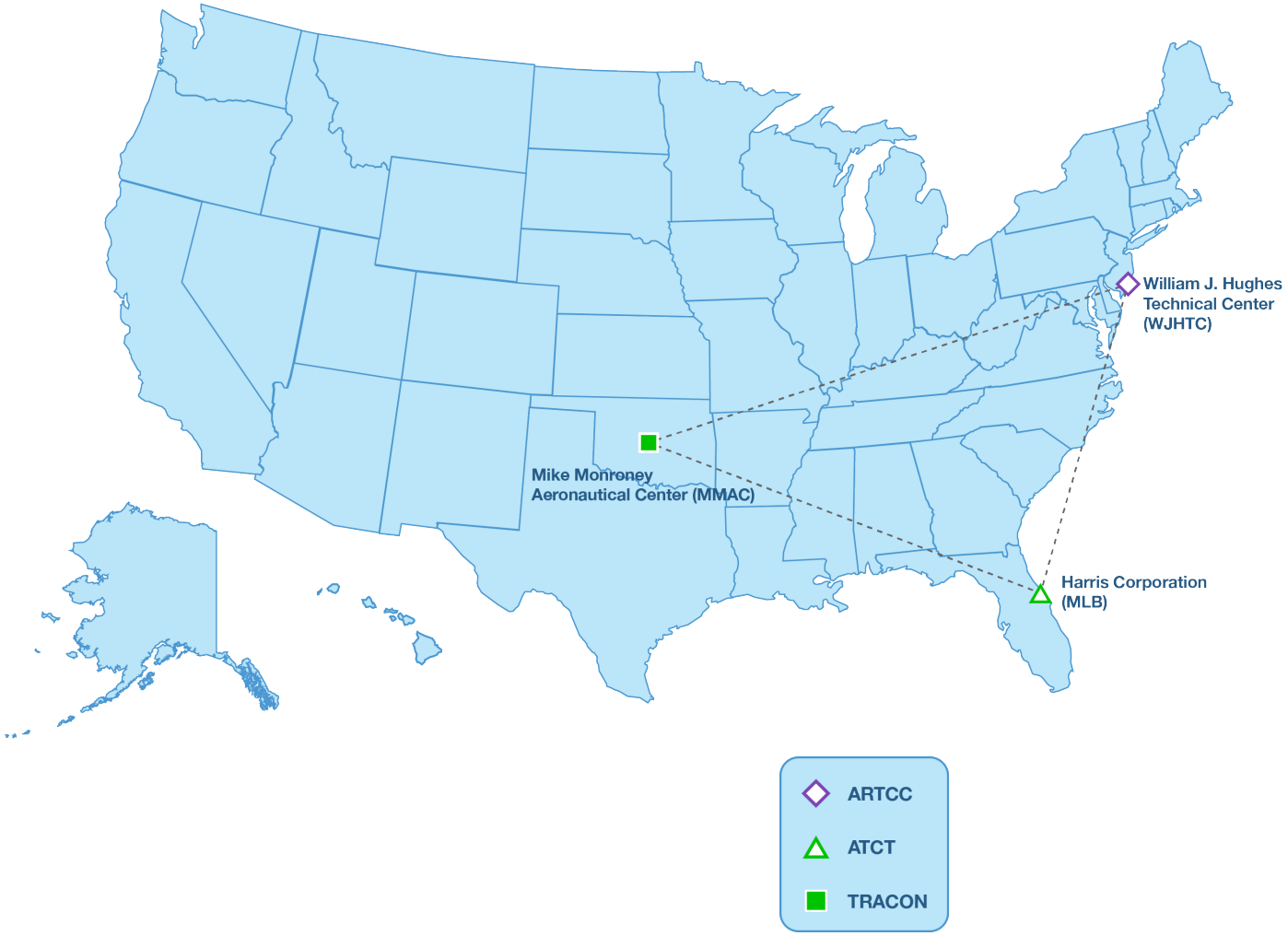
BENEFITS ACHIEVED TO DATE

Not applicable, capability still in development.

PROGRAM MILESTONES	DATE
Demonstrate the Business Continuity Plan, which is part of the NVS NextGen Capabilities Demonstration that was completed using the three networked demonstration systems.	March 2014
Achieve NVS Final Investment Decision	September 2014
Begin Air Traffic Control (ATC) Task and Skills Analysis development	November 2015
Initiate Operational Test and Evaluation	December 2016
Initiate deployment of NVS at ATC facilities	2018-2019

NAS VOICE SYSTEM

As of June 2014



SYSTEM WIDE INFORMATION MANAGEMENT

System Wide Information Management (SWIM) is the digital data-sharing backbone of NextGen. SWIM infrastructure enables Air Traffic Management-related information sharing among diverse, qualified systems. SWIM also provides information governance.

SWIM has been distributing weather and flight planning information to National Airspace System (NAS) users, mainly airline operations centers, since 2010 and will continue to develop and add services.

TARGET USERS

Air traffic controllers, operators in the NAS including business jet operators, airports

EQUIPAGE REQUIREMENTS

Additional equipage not required for National Airspace System users.

OPERATIONAL CAPABILITIES

- SWIM Terminal Data Distribution System (STDDS) converts raw surface data from airport towers into accessible information to send to the airports' corresponding Terminal Radar Approach Control (TRACON) facility. The TRACON makes information available to airlines and airports through SWIM messaging services. STDDS will provide surface data to the Traffic Flow Management System, which controllers use to balance traffic demands with capacity across the NAS. Controllers can better calculate end-to-end trajectories. In August 2013, Miami TRACON became the first facility to start distributing data from towers in its coverage area to an airline via STDDS.
- SWIM Flight Data Publication Service (SFDPS), currently available in the SWIM research and development domain, will improve flight data sharing and ensure consistency of this data across the NAS via standards and consolidation of flight data currently maintained by multiple systems into a common repository. SFDPS is the first system to provide data using the standard Flight Information Exchange Model (FIXM) with a Globally Unique Flight Identifier. SFDPS also makes information available to airlines and airports through SWIM messaging services.

IMPLEMENTATION

SWIM Segment 2 consists of two parts.
Segment 2a (2015) includes:

- Capabilities added to the NAS Enterprise Messaging Services (NEMS), an information-sharing infrastructure that enables the publication and sharing of NAS data, including flight planning, traffic flow management, surface radar and weather information.

- NEMS nodes at all air route traffic control centers (e.g., currently at Atlanta, Salt Lake City, Los Angeles, Miami, Boston, Minneapolis, Chicago, Washington, Seattle, Fort Worth).
- Increased security capabilities.
- The ability for consumers to self-manage data subscriptions.
- An enriched set of traffic flow data for external consumers to maintain common situational awareness of the NAS.

Segment 2b builds upon the infrastructure foundation laid by Segment 2a, and

- Increases and improves products from SFDPS.
- Increases the security of NAS data flows with Identify and Access Management which provides a certificate management service that enables more secure data exchanges with outside partners.
- Builds upon the monitoring capability of the existing infrastructure by adding status information about producers and consumers. This aims to build end-to-end situational awareness of all elements of, or participants in, an information exchange.
- Adds additional terminal data to the list of STDDS published information and enriches the functionality of existing services.
- Adds new data query functionality to the NAS: NAS Common Reference supports complex data queries for NAS flight weather and aeronautical information.
- Enables the efficient transition to global harmonization of information standards, including the Aeronautical Information Exchange, Weather Information Exchange and FIXM.

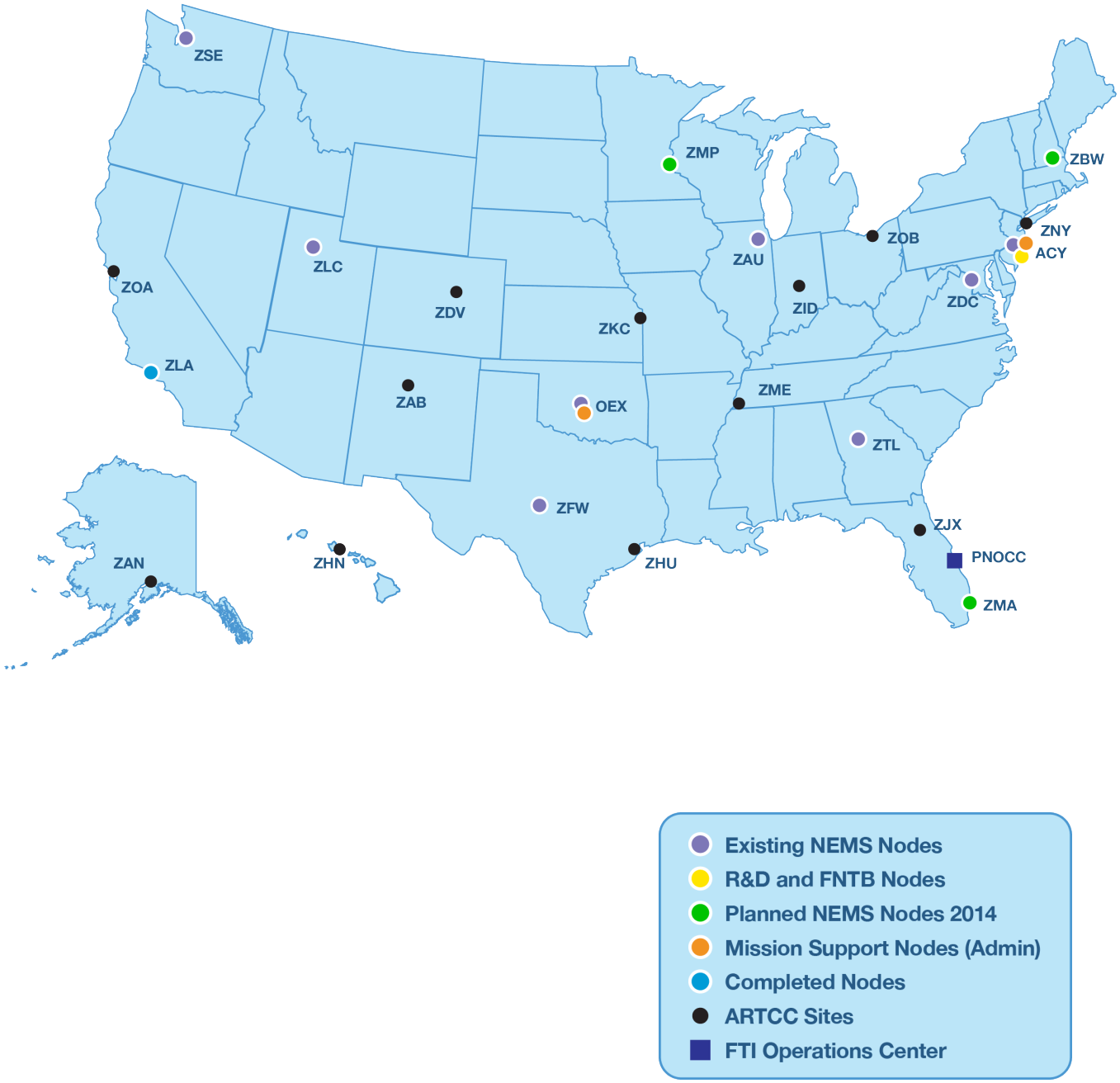
BENEFITS ACHIEVED TO DATE

Increased ground situational awareness with data shared from STDDS via NEMS to TRACONS and airport authority (e.g., Southern California TRACON and Los Angeles runway construction, operational April 2014; San Francisco runway construction, operational May 2014).

SWIM INFRASTRUCTURE DEPLOYMENT

NAS ENTERPRISE MESSAGING SERVICE (NEMS)

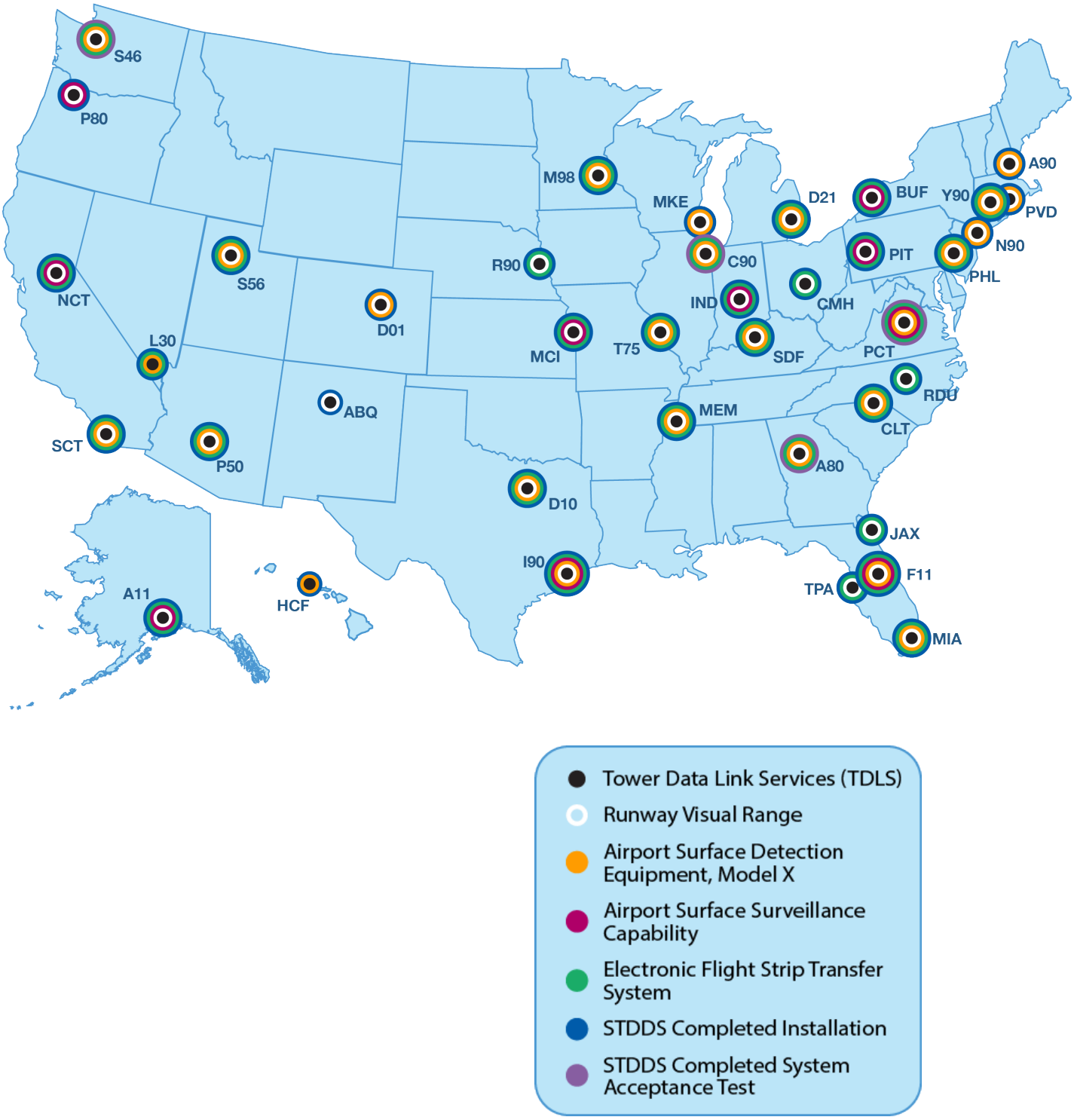
As of June 2014



SWIM TERMINAL DATA DISTRIBUTION SYSTEM

(STDDS) BY TRACON

As of June 2014



PROGRAM MILESTONES	DATE
SEGMENT 1	
SWIM Segement 1 Final Investment Decision (FID)	July 2009
SWIM Segment 1 Corridor Integrated Weather System (CIWS) Publication operational - SWIM Implementation Programs (SIP) = CIWS	September 2010
SWIM Segment 1 Specual Use Airspace (SUA) Automated Data Exchange operational - SIP=Aeronautical Information Management (AIM)	December 2010
SWIM Segment 1 Integrated Terminal Weather Service (ITWS) Publication operational - SIP=ITWS	January 2011
SWIM Segment 1 Reroute Data Exchange operational - SIP=Traffic Flow Management (TFM)	June 2011
SWIM Segment 1 Terminal Data Distribution operational - SIP=SWIM Terminal Data Distribution System (STDDS)	May 2012
SWIM Segment 1 Pilot Report Data Publication operational - SIP=Weather Switching Center Replacement (WMSCR)	June 2012
SWIM Segment 1 Flight Data Publication - Initial Flight Data Services operational - SIP=En Route Automation Modernization	December 2012
Miami TRACON distributes data to airline via STDDS	August 2013
Complete NextGen Capabilities Packages	September 2013
SWIM Segment 1 Operational Test and Evaluation complete - Flight Data Publication Service (FDPS) - SIP=FDPS	March 2014
SWIM Segment 1 Runway Visual Range (RVR) Publication Service operational - SIP=STDDS	June 2014
SWIM Segment 1 Flow Information Publication operational - SIP=TFM	December 2014
SWIM Segment 1 Flight Data Publication operational - SIP=FDPS	July 2015
SWIM Segment 1 SWIM Tool Kits (Core Services) - complete implementation	September 2015
SEGMENT 2	
SWIM Segment 2a Authorization to Proceed	November 2010
SWIM Segment 2a FID for SWIM Segment 2a Planning Milestone	July 2012
SWIM Segment 2a complete on-ramping of CIWS and WMSCR using SWIM NAS Enterprise Messaging Service (NEMS)	September 2013
SWIM Segment 2a complete Enhanced Weather Information Network Server (EWINS) using SWIM NEMS	November 2013
SWIM Segment 2a complete NEMS Demand Assessment and Associated Deployment of new NEMS Nodes	April 2014
SWIM Segment 2a complete on-ramping of Time Based Flow Management using SWIM NEMS	June 2014
Complete on-ramping of EWINS using SWIM NEMS	June 2014
SWIM Segment 2a complete NEMS Dynamic Subscription Capability Development	June 2014
SWIM Segment 2a complete on-ramping of ITWS using SWIM NEMS	September 2014
SWIM Segment 2a FID for SWIM Segment 2b Planning Milestone	September 2014
Complete on-ramping of AIM SUA using SWIM NEMS	September 2014
SWIM Segment 2a complete NEMS Security Services Capability development	February 2015
SWIM Segment 2a complete NEMS Web Services Capability development	August 2015
SWIM Segment 2a completion	December 2017

NEXTGEN PORTFOLIOS

IMPROVED SURFACE OPERATIONS

Improved Surface Operations will improve safety, efficiency and flexibility on the airport surface by implementing new traffic management capabilities for pilots and controllers using shared surface movement data. The capabilities in the portfolio address surface movement and the exchange of information between controllers, pilots and air traffic managers that occur for departing aircraft from the gate to departure of the aircraft from the airport; and for landing traffic from exiting the runway to arriving at the terminal gate.

The increments in this portfolio will achieve success by tracking the movement of surface vehicles and aircraft, incorporating the movement data into the airport surveillance infrastructure and sharing the information with controllers, pilots and airline operations managers.

TARGET USERS

Air traffic controllers, operators

TARGET AREAS

Surface, terminal, en route

ANTICIPATED BENEFITS

FLEXIBILITY

Capabilities in this portfolio will improve the timely exchange of data to enable aircraft operators to more accurately adjust their departure and arrival times for the most efficient use of available runways, taxiways and gates.

- Permitting taxi operations to occur that support low visibility operations for takeoff, improving access during those times
- Reducing effect of weather related delays

EFFICIENCY

Capabilities in this portfolio improve efficiency:

- Enabling more effective scheduling that includes runway, departure fix and Traffic Flow Management ground-management constraints with automatic reassessment and update of the departure schedule based on the ability of departing flights to meet the designated departure schedule
- Enhancing the ability to react to changing airport conditions, such as severe

weather, by issuing digital pre-departure clearances, including routing revisions, using Data Communications (Data Comm)

- Improving awareness of surface congestion at major hub airports, greatly streamlining the coordination of corrective action and improving the resilience of the system
- Reducing fuel burn and operating costs related to long departure queues
- Reducing delays by improving event data quality and adherence to controlled departure times
- Reducing FAA operating costs through the use of automated flight strips

SAFETY

Capabilities in this portfolio enhance safety on the airport surface by improving pilot and controller awareness of surface traffic through ground-based automation, data distribution and flight deck capabilities.

Enhancements to Aviation Safety Information Analysis and Sharing system will support NextGen with in-depth analysis of safety data from industry and government sources:

- Identifying existing or prospective operational risks that exist in the National Airspace System
- Revealing potential improvements for efficiency and capacity

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FUNDING

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102406 – Provide Full Surface Situation Information

OI 103207 – Improved Runway Situational Awareness for Controllers

SUPPORTED BY NEXTGEN DATA COMM

OI 104207 – Enhanced Surface Traffic Operations

SUPPORTED BY NEXTGEN IMPROVED SURFACE OPERATIONS PORTFOLIO

OI 104209 – Initial Surface Traffic Management

SUPPORTED BY OPERATIONAL APPROPRIATIONS

OI 107202 – Low Visibility Surface Operations

IMPROVED SURFACE OPERATIONS[1]							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Surface Tactical Flow	Concept development and validation for future TFDM Work Packages					
	Remote Tower Demonstration					Demonstration of remote operations at non-towered airports	
	Airport Surface Surveillance Capability	Development of ASSC for ASDE-3/ AMASS airports					
	Data Comm	Revised Departure Clearance concept work		Revised Departure Clearance development			
	Enhanced Flight Vision System			EFVS Improved Low-Vis taxi development			
	Terminal Flight Data Manager	Concept work for TFDM	Development and AMS work for TFDM				

[1] Increments Integrate Surveillance Data with Flight Data (Surface) and Establish Enhanced Data Exchange with Flight Operators and Airport Operators moved to the National Airspace System Infrastructure portfolio.

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

IMPROVED SURFACE OPERATIONS							
		FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:							
Terminal Flight Data Manager (TFDM)	Early Implementation Scope			Early Implementation Scope includes Electronic Flight Strip Transfer System Technology Refresh, Advanced Electronic Flight Strips Deployment, Traffic Flow Management System Modifications to Extend Flight Operator Data Exchange			
	Increments implemented: · 104209-17 Provide Initial Surface Management System · 104209-31 Electronic Flight Data Exchange						
	Core						Implementation to begin following FID in FY15/FY16 timeframe
	Increments implemented: · 104209-17 Provide Initial Surface Management System · 104209-13 TFDM Scheduler/Sequencer[2] · 104209-31 Electronic Flight Data Exchange[3]						
	Future Work Package						Implemen-tation to occur following implemen-tation of TFDM Core
	Increment implemented: · 104209-27 Departure Reservoir Management*						
	Airport Surface Surveillance Capability			Installation of Airport Surface Surveillance Capability at 9 ASDE-3/AMASS airports			
	Increment implemented: · 103207-13 Expansion of Surface Surveillance						
	Data Comm					Revised Departure Clearance via Data Comm	
	Increment implemented: · 104207-11 Revised Departure Clearance via Data Comm						

[2] Formerly Stand up TFDM Scheduler/Sequencer.
[3] Formerly Migrate to Electronic Flight Data Exchange.

Concept | Development | Operation

* Work Supports Post FY 2016 Capabilities

IMPROVED SURFACE OPERATIONS							
		FY12	FY13	FY14	FY15	FY16	FY17+
	ASDE-X & ADS-B: Situational Awareness and Alerting of Ground Vehicles	ADS-B Out equipment available for installation in airport vehicles that regularly operate in the movement area					
	Increment implemented: · 102406-11 Situational Awareness and Alerting of Ground Vehicle						
	Enhanced Flight Vision System (EFVS)					Improved Low Visibility Taxi Implemen-tation	
	Increment implemented: · 107202-22 Improved Low Visibility Taxi (EFVS)[4]						

[4] Moved from OI 103208 to OI 107202.

Concept Development Operation * Work Supports Post FY 2016 Capabilities

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS

Improved Approaches and Low-Visibility Operations include capabilities designed to increase airport approach and arrival access and flexibility. This will be accomplished through a combination of procedural changes, improved aircraft capabilities, and improved precision approach guidance. The procedural changes allow for more efficient flight tracks which lead to reduced fuel use and emissions while keeping aircraft safely separated through the use of Optimized Profile Descents (OPD). The Enhanced Flight Vision System (EFVS) and other similar flight deck capabilities provide access to more runways when visibility is low, leading to increased throughput and reduced delay. Ground Based Augmentation Systems will provide improved precision-approach guidance to flight crews and will enhance satellite navigation capabilities.

The increments in this portfolio will achieve success through a combination of effective procedure design and implementation, air traffic controller training, and aircraft equipage and approval. Some increments also require installation and certification of ground infrastructure.

TARGET USERS

Air traffic controllers, pilots

TARGET AREAS

Terminal

ANTICIPATED BENEFITS

ACCESS AND EQUITY

Capabilities in this portfolio provide greater access to airports (approach and landing) during periods of low visibility or low cloud ceiling, through the use of:

- Global Navigation Satellite System
- Required Navigation Performance procedures
- EFVS
- Other flight deck technologies

EFFICIENCY

The use of OPDs will lead to fuel efficiency benefits:

- Meeting the airspace design objective of separating different flows of traffic
- Allowing for more efficient descent profiles

ENVIRONMENT

Capabilities in this portfolio will, where feasible:

- Enable equipped aircraft to fly precise vertical and horizontal paths from high-altitude airspace down to the runway
- Save time and fuel while allowing the potential to limit overflight of environmentally sensitive areas

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FUNDING

SUPPORTED BY OPERATIONS APPROPRIATIONS

OI 107115 – Low-Visibility/Ceiling Takeoff Operations

OI 107117 – Low-Visibility/Ceiling Approach Operations

OI 107118 – Low-Visibility/Ceiling Landing Operations

SUPPORTED BY NEXTGEN FLEXIBLE TERMINAL ENVIRONMENT/IMPROVED MULTIPLE RUNWAY OPERATIONS PORTFOLIO

OI 107107 – Ground Based Augmentation System Precision Approaches

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Ground Based Augmentation Systems (GBAS)			CAT II/III non-federal approval develop-ment work			
	Enhanced Flight Vision System (EFVS) for Takeoff				Work supports post FY2016 capabilities		Work supports post FY2016 capabilities
	Synthetic Vision System (SVS) for Lower Than Standard Approach Minima Operations			Work supports post FY2016 capabilities			
	Enhanced Flight Vision System (EFVS) to Touchdown	Work supports post FY2016 capabilities	Work supports post FY2016 capabilities				
	Enhanced, Synthetic and Combined Vision Systems (CVS) for Low Visibility/Ceiling Landing Operations			Work supports post FY2016 capabilities			

Concept Development Operation * Work Supports Post FY 2016 Capabilities

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
Ground Based Augmentation System (GBAS)	GBAS Category I: non-federal system approval			GBAS CAT II/III standards: ground system design approval and validation		
Increments implemented: · 107107-11 GBAS Category I Non-Federal System Approval · 107107-21 GBAS Category II/III Standards* *Note: The GBAS Cat I/II/III validation provides approval for non-federal acquisition and use of the GBAS Cat I/II/III systems. For this reason, the implementation strategy beyond the FAA approval is dependent on external acquisition and deployment of GBAS capability.*						
Enhanced Flight Vision Systems (EFVS) to 100 Feet	EFVS to 100 feet is approved and ready for continued expansion					
Increment implemented: · 107117-11 Enhanced Flight Vision Systems (EFVS) to 100 Feet						
Synthetic Vision System (SVS) for Lower Than Standard Approach Minima Operations					Work supports post FY2016 capabilities	
Increment implemented: · 107117-12 Synthetic Vision System (SVS) for Lower Than Standard Approach Minima Operations*						
Enhanced Flight Vision System (EFVS) to Touchdown				Work supports post FY2016 capabilities		
Increment implemented: · 107118-11 Enhanced Flight Vision System (EFVS) to Touchdown						
Enhanced, Synthetic and Combined Vision Systems (CVS) for Low Visibility/Ceiling Landing Operations						Work supports post FY2016 capabilities
Increment implemented: · 107118-21 Enhanced, Synthetic and Combined Vision Systems (CVS) for Low Visibility/Ceiling Landing Operations*						

Concept Development Operation *** Work Supports Post FY 2016 Capabilities**

IMPROVED MULTIPLE RUNWAY OPERATIONS

Improved Multiple Runway Operations (IMRO) improves access to closely spaced parallel runways (CSPR). This will enable more arrivals and departures, which will increase efficiency and capacity at those airports while reducing flight delays. The capabilities in this portfolio will enable the use of simultaneous approaches (two aircraft arriving side-by-side) during periods of reduced visibility, decrease the required separations between aircraft on dependent approaches (staggered aircraft arrivals on parallel runways), and alleviate the effects of wake turbulence that normally require increased separation between aircraft in terminal airspace (airspace surrounding airports).

The increments in this portfolio will achieve success through the approval of procedures via authorization of FAA orders. After analysis is complete to determine the required procedure and separation standards, FAA safety risk management processes are followed for approval of the separation changes, and controller training is performed as needed prior to operational use.

TARGET USERS

Air traffic controllers, pilots

TARGET AREAS

Terminal

ANTICIPATED BENEFITS

ACCESS AND EQUITY

Capabilities in this portfolio will improve access to parallel, intersecting and converging runways through new procedures, standards, guidance and decision support tools.

CAPACITY

This portfolio increases airport capacity through the introduction of capabilities that:

- Safely reduce separation standards for closely spaced parallel operations and makes this capability available at additional airports
- Improve air traffic controller awareness of all relevant airborne traffic approaching runways that converge or intersect, or whose flight paths converge or intersect
- Reduce wait time between departures

FUNDING

SUPPORTED BY NEXTGEN FLEXIBLE TERMINAL ENVIRONMENT/IMRO PORTFOLIO

OI 102140 – Wake Turbulence Mitigation for Departure: Wind-Based Wake Procedures

OI 102141 – Improved Parallel Runway Operations

OI 102144 – Wake Turbulence Mitigation for Arrivals: CSPRs

IMPROVED MULTIPLE RUNWAY OPERATIONS							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	CSPO: Simultaneous Dual Approaches for CSPRs spaced >3600'	Concept validation FY09-FY12	Procedure design and author-ization completed in FY13				
	CSPO: 1.0 NM Dependent Stagger for CSPRs spaced >2500' & <3600'	Completed concept validation and analysis		Procedure design and authorization to be completed in FY15			
	CSPO: Simultaneous Dual Approaches with Offset		Concept validation initiated in FY13 and planned for completion in FY14		Procedure design and authorization to be completed in FY16		
	CSPO: Simultaneous Triple Approaches		Concept validation initiated in FY13 and planned for completion in FY14		Procedure design and authorization to be completed in FY16		
	CSPO: Enable Additional Approach Options for New Independent Runway Separation Standards	Concept validation and analysis FY11-FY12	Procedure design and authorization FY13-FY14				
	CSPO: Simultaneous Approaches with High Update Radar Surveillance Required		Concept validation and analysis initiated in FY13 and planned for completion in FY14		Procedure design and authorization to be completed in FY16		
	CSPO: Paired Approach for CAT I	Concept validation and analysis initiated in FY09 and planned for completion in FY18					Procedure author-ization complete by FY20

Concept | Development | Operation

* Work Supports Post FY 2016 Capabilities

IMPROVED MULTIPLE RUNWAY OPERATIONS							
		FY12	FY13	FY14	FY15	FY16	FY17+
	Wake Turbulence Mitigation for Departures (WTMD)	Development initiated in FY08 for Operational demos at SFO, IAH, and MEM					
	Wake Turbulence Mitigation for Arrivals - Procedure (WTMA-P)	Concept validation and analysis initiated in FY11	Procedure design planned for completion in FY14 and authorized in FY15				
	Wake Turbulence Mitigation for Arrivals: System for CSPRs spaced <2500' (WTMA-S)					Work supports post FY2016 capabilities	

Concept | Development | Operation | * Work Supports Post FY 2016 Capabilities

IMPROVED MULTIPLE RUNWAY OPERATIONS						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
CSPO: Simu-ltaneous Dual Approaches for CSPRs spaced >3600'			Orders effective at ATL FY14 Q3			
Increment implemented: · 102141-13: Improved Parallel Runway Operations - Amend Independent Runway Separation Standards in Order 7110.65 (including Blunder Model Analysis)						
CSPO: 1.0 NM Dependent Stagger for CSPRs spaced >2500' & <3600'					Orders effective beginning FY15 through FY16 at MSP, JFK, SEA, PDX, RDU, DAL	
Increment implemented: · 102141-14: Improved Parallel Runway Operations - Amend Dependent Runway Separation Standards in Order 7110.65						
CSPO: Simultaneous Dual Approaches with Offset						Orders effective in FY17 at JFK, PDX, MSP, DTW
Increment implemented: · 102141-22: Improved Parallel Runway Operations - Amend Standards for Simultaneous Independent Approaches – Dual with Offset*						
CSPO: Simultaneous Triple Approaches						Orders effective in FY17 at ATL
Increment implemented: · 102141-24: Improved Parallel Runway Operations - Amend Standards for Simultaneous Independent Approaches – Triple*						
CSPO: Simultaneous Approaches with High Update Radar Surveillance Required						Orders effective in FY17 at SEA
Increment implemented: · 102141-23: Improved Parallel Runway Operations - Simultaneous Independent Closely Spaced Approaches – High Update Rate Surveillance Required*						

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

IMPROVED MULTIPLE RUNWAY OPERATIONS							
		FY12		FY14	FY15	FY16	FY17+
	CSPO: Enable Additional Approach Options for New Independent Runway Separation Standards				Revise standards in Order 7110.65 to set lower runway separation standards for LNAV/VNAV, RNP, and RNP AR approaches in SIPIA operations without high-update surveillance		
	Increment implemented: · 102141-15: Improved Parallel Runway Operations – Enable Additional Approach Options for New Independent Runway Separation Standards						
	CSPO: Paired Approach for CAT I						Orders to be effective in FY20+
	Increment implemented: · 102141-21: Improved Parallel Runway Operations - Paired Approaches for Runways Spaced <2500' (CAT I)*						
	Wake Turbulence Mitigation for Departures (WTMD)			Deployments at SFO, IAH, and MEM initiated in FY13 to validate benefits prior to further deployment at up to 7 more sites through FY16			
	Increment implemented: · 102140-01: Wake Turbulence Mitigation for Departures (WTMD): Wind-Based Wake Procedures						
	Wake Turbulence Mitigation for Arrivals - Procedure (WTMA-P)					Orders effective starting in FY15 at PHL, ATL, BOS, DTW, SEA, EWR	
	Increment implemented: · 102144-11: Wake Turbulence Mitigation for Arrivals: CSPRs - Wake Turbulence Mitigation for Arrivals – Procedures for Heavy/B757 Aircraft[1]						

[1] Moved from OI 102141 to OI 102144.

Concept | Development | Operation

* Work Supports Post FY 2016 Capabilities

PERFORMANCE BASED NAVIGATION

Performance Based Navigation (PBN) uses Area Navigation (RNAV) and Required Navigation Performance (RNP) to improve access and flexibility in the National Airspace System (NAS) with the goal of providing the most efficient aircraft routes from departure runway to arrival runway. PBN defines the performance requirements for routes and procedures that enable aircraft to navigate with greater precision and accuracy. It provides a basis for designing and implementing new flight paths, redesigning airspace and providing safe obstacle clearance. Progressive stages of PBN capabilities include the safe implementation of more closely spaced flight paths for departure, arrival and approach. The portfolio also looks to right-size the navigation assets in the NAS through reviews of procedures and infrastructure to determine whether they are still useful, require revision or can be removed.

The increments in this portfolio will achieve success through the development of high- and low-altitude routes and terminal procedures that allow for integrated operations connecting airports from runway to runway. New PBN operations will provide more direct flight operations while continuing to provide routing flexibility for operations and air traffic controllers. Procedures will be prioritized and implemented based on new FAA PBN Orders. National standards for reduced separation and divergence, vertical design guidance and criteria will be developed to further advance PBN capabilities. Teams are continuing work at several Metroplex[1] sites to study current operations, identify design improvements and implement new procedures. The combination of new procedures, separation standards and methods reduce the dependency on ground-based navigation structure.

TARGET USERS

Air traffic controllers, pilots

TARGET AREAS

Selected areas of the NAS

ANTICIPATED BENEFITS

ACCESS AND EQUITY

Capabilities in this portfolio provide improved benefits by defining navigation performance specifications for an aircraft along a route, during a procedure, or in airspace. In addition, certain capabilities provide an access benefit to all qualified runway ends, especially for those

[1] Metroplex is an effort to expedite PBN in large metropolitan areas that include several commercial and general aviation airports.

runway ends not equipped with Instrument Landing System (ILS), and a flexibility benefit at ILS airports, by providing an alternative instrument approach to continue operations if the ILS fails.

- Optimization of arrival and departure vertical profiles
- Reductions in lateral track distances
- Repeatable, predictable flight paths

CAPACITY

Capabilities in this portfolio improve capacity by removing level-offs on arrivals, segregating arrival routes to de-conflict flows, adding departure points, expediting departures, adding new high-altitude PBN routes and realigning airspace to enhance the NAS.

- Increased capacity in transition airspace for arrivals and departures
- Improved collaboration within and between air traffic control (ATC) facilities
- Improved opportunity for traffic flow managers to more fully exploit the use of available NAS resources

EFFICIENCY

Capabilities promote flight efficiency by ensuring that flights obtain the most efficient requested or assigned routing for which the flight is performance qualified, given the ATC situation. RNAV- and RNP-equipped aircraft have access to performance-restricted routes, without creating additional workload for controllers.

- Reduced ATC task complexity and pilot/controller communications due to reduced radar vectoring
- Reduced need for traffic management initiatives due to provision of additional exit points/earlier route divergence
- Reduced emissions and fuel burn through operational improvements

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FUNDING

SUPPORTED BY NEXTGEN PBN-METROPLEX RNAV/RNP/PBN & METROPLEX PORTFOLIO/ OPERATIONS APPROPRIATIONS

OI 108209 – Increase Capacity and Efficiency Using RNAV and RNP

SUPPORTED BY OPERATIONS APPROPRIATIONS

OI 107103 – RNAV Standard Instrument Departures, Standard Terminal Automation Replacement System and Approaches

SUPPORTED BY SYSTEM DEVELOPMENT

OI 104123 – Time Based Metering Using RNAV and RNP Route Assignments

PERFORMANCE BASED NAVIGATION							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Metroplex – Study Phase	Study Phase work began in FY2011 at DC and North Texas Metroplexes; Study Phase at final site is expected to end in FY2015					
	Metroplex – Design Phase	Design Phase work began in FY2011 at DC and North Texas Metroplexes; Design Phase at final site is expected to end in FY2016					
	Metroplex – Evaluation Phase	Evaluation Phase work began in FY2012 at Houston and DC Metroplexes; Evaluation Phase at final site is expected to end in FY2017					
	Integration of NAS Design and Procedure Planning – PBN Initiatives	Concept validation for SEA/BFI implemen-tation	Modeling, simulation and safety analysis for new RNAV/RNP procedure development				
	Optimized Route Coordinator		Work supports post FY2016 capabilities			Work supports post FY2016 capabilities	
	PBN Route Eligibility Check	OPS funded					
	Provide Full Terrestrial RNAV Network at or above Flight Level (FL) 240			Concept validation work		Work supports post FY2016 capabilities	
	Equivalent Lateral Spacing Operation Standard (ELSO)		OPS funded				

Concept Development Operation * Work Supports Post FY 2016 Capabilities

PERFORMANCE BASED NAVIGATION							
		FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:							
	Metroplex - Implementation Phase		Implementation Phase work began in FY2013 at Houston Metroplex; is expected to end at final site in FY2018				
	Metroplex - Post Implementation Phase			Post Implementation Phase work is expected to begin in Q3 of FY2014 at Houston Metroplex; is expected to end at final site in FY2019			
	Increment implemented: · 108209-12 Optimization of Airspace and Procedures in the Metroplex (OAPM)[1]						
	Integration of NAS Design and Procedure Planning – PBN Initiatives		Initial implemen-tation at SEA/BFI				PBN initiatives implemen-tation complete at 2nd location
	Increment implemented: · 108209-20 Advanced and Efficient RNP[2]						
	Optimized Route Capability						Implemen-tation expected to begin in FY2018
	Increment implemented: · 108209-20 Advanced and Efficient RNP						
	Large Scale Redesign of Airspace Leveraging Performance Based Navigation (PBN)	Timeline extended beyond FY2015 (original end date) to FY2016 to reflect New York/New Jersey/Philadelphia Metropolitan Area Airspace Redesign					
	Increment implemented: · 108209-13 Large Scale Redesign of Airspace Leveraging Performance Based Navigation (PBN)[3]						
	Transition to PBN Routing for Cruise Operations	Implementation began in FY2010; Timeline extended beyond FY2016 (original end date) to FY2017+ to enable the transition to Q/T routes from conventional VOR based routes					
	Increment implemented: · 108209-14 Transition to PBN Routing for Cruise Operations[4]						

[1] Timeline extended due to budget constraints and program interdependencies.
[2] Timeline extended to implement development of safety case and training.
[3] Timeline extended to reflect New York/New Jersey/Philadelphia Metropolitan Area Airspace Redesign Schedule.
[4] Timeline extended to enable the transition to Q/T routes from conventional VOR based.

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

PERFORMANCE BASED NAVIGATION							
		FY12	FY13			FY16	FY17+
	PBN Route Eligibility Check		OPS funded available at ZLC				
	Increment implemented: · 108209-18 PBN Route Eligibility Check						
	RNAV (GPS) Approaches	OPS funded available at 30 core airports plus 2,636 non-core airports					
	Increment implemented: · 108209-19 RNAV (GPS) Approaches						
	Equivalent Lateral Spacing Operation Standard (ELSO)				New capability		
	Increment implemented: · 108209-21 Equivalent Lateral Spacing Operation Standard (ELSO)[5]						
	RNP Authorization Required (AR) Approaches	OPS funded available at 22 core airports plus 97 non-core airports					
	Increment implemented: · 107103-12 RNP Authorization Required (AR) Approaches						
	RNAV SIDs and STARs at Single Sites	OPS funded available at 29 core airports plus 338 non-core airports					
	Increment implemented: · 107103-13 RNAV SIDs and STARs at Single Sites						

[5] New Capability.

Concept | Development | Operation | * Work Supports Post FY 2016 Capabilities

METROPLEX CHART				
SITE	INDUSTRY DESIGN/ SIMULATION FOR DESIGN PHASE COMPLETE	100% DESIGN COMPLETE	FAA/INDUSTRY STAKEHOLDER OUTREACH COMPLETE	IMPLEMENTATION COMPLETE
Northern California	11/23/2012	5/6/2013	3/15/2015	4/30/2015
Atlanta	11/30/2012	3/29/2013	1/19/2018	2/1/18
Charlotte	10/19/2012	7/19/2013	1/19/2018	2/1/18
Houston	5/25/2012	9/28/2012	5/6/2013	5/29/2014
DC	3/1/2012	9/28/2012	6/10/2015	6/25/2015
North Texas	4/1/2012	8/30/2012	8/22/2014	9/18/2014
Southern California	2/19/2014	6/9/2014	9/2/2016	9/15/16
South/Cent Florida	FY15	TBD	TBD	TBD
Cleveland/Detroit	FY15	TBD	TBD	TBD
Phoenix	FY15	TBD		
Chicago, Boston, Memphis	TBD			

On track | Complete

TIME BASED FLOW MANAGEMENT

Time Based Flow Management (TBFM) will enhance National Airspace System (NAS) efficiency by using the capabilities of the Traffic Management Advisor (TMA) decision-support tool, a system that is already deployed at all Air Route Traffic Control Centers in the contiguous United States. In particular, improvements in TMA's core Time Based Metering (TBM) capability and its trajectory modeler, an expansion of TMA and its departure capabilities to additional locations, and enhancements to TMA's departure capabilities, will enhance efficiency and optimize demand and capacity. Improvements will also be made to enable controllers to more accurately deliver aircraft to the Terminal Radar Approach Control facility while providing the opportunity for aircraft to fly optimized descents.

TARGET USERS

Air traffic controllers, operators

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

EFFICIENCY

Efficiency is improved through the introduction of capabilities in this portfolio that will:

- Expand TBM and other advanced TBFM-based capabilities to additional geographical areas, as they provide more efficient traffic flow compared with traditional miles-in-trail traffic flow management
- Enable TBFM's use of more accurate trajectories, which will translate into more accurate estimated times of arrival resulting in more efficient slot and delay allocation
- Increase departure-time compliance by enabling control tower personnel to manage ground operations to meet self-scheduled, de-conflicted departure times

ENVIRONMENT

More efficient flight paths have the potential to reduce fuel burn and emissions.

FUNDING

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102118 – Interval Management – Spacing

SUPPORTED BY NEXTGEN TBFM/TBFM PORTFOLIO

OI 104115 – Current Tactical Management of Flow in the En Route for Arrivals/Departures

OI 104117 – Improved Management of Arrival/Surface/Departure Flow Operations

OI 104120 – Point-in-Space Metering

OI 104123 – TBM Using Area Navigation and Required Navigation Performance Route Assignments

OI 104128 – TBM in the Terminal Environment

TIME BASED FLOW MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	TBFM Work Package 3	Investment analysis for Work Package 3 – FID expected in FY2014					
	TBFM Tech Refresh				Mission analysis activities	Investment analysis activities	
	FOC Preferences Incorporated into Metering					Work supports post-FY16 capabilities	
	Interval Management – Spacing (IM-S) Cruise					Work supports post-FY16 capabilities	
	Interval Management – Spacing Arrivals and Approach					Work supports post-FY16 capabilities	
	Complex Clearances		Concept work began in FY13/FY14; supports post-FY16 capabilities				

Concept Development Operation

*** Work Supports Post FY 2016 Capabilities**

TIME BASED FLOW MANAGEMENT						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
TBFM Work Package 2	Operational availabilities between FY14 and FY17					
Increments implemented: · 104120-11 Extended Metering · 104123-12 Ground-Based Interval Management – Spacing (GIM-S)[1] · 104115-11 Implement TMA's Adjacent Center Metering Capability at Additional Locations · 104115-12 Implement TMA at Additional Airports · 104123-11 Use Area Navigation (RNAV) Route Data to Calculate Trajectories Used to Conduct TBM Operations[2] · 104117-11 Integrated Departure and Arrival Capability (IDAC)[3]						
TBFM Work Package 3						Operational availabilities between FY17 and FY20
Increments implemented: · 104128-24 TBM in the Terminal Environment [Formerly known as Terminal Sequencing and Spacing (TSS)]* · 104120-21 Metering During Reroute Operations · 104123-21 Lateral Maneuvering for Delay Absorption (Path Stretch)* · 104117-11 Integrated Departure and Arrival Capability (IDAC)[3]						
TBFM Tech Refresh						Tech Refresh opera-tionally available in FY17
Increment implemented: · N/A						
FOC Preferences Incorporated into Metering						Opera-tionally available in FY20
Increment implemented: · 104120-28 FOC Preferences Incorporated into Metering*						
Interval Management – Spacing (IM-S) Cruise						Opera-tionally available in FY20
Increment implemented: · 102118-21 Interval Management – Spacing (IM-S) Cruise*						

[1] Formerly Arrival Interval Management Using Ground Automation. Moved from OI 104120 to OI 104123.
[2] This increment now ends in FY2014.
[3] Timeline extended to capture the remaining waterfall schedule of 15 sites.

Concept | Development | Operation | * Work Supports Post FY 2016 Capabilities

TIME BASED FLOW MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
	Interval Management – Spacing Arrivals and Approach						Opera-tionally available in FY20
	Increment implemented: · 102118-23 Interval Management – Spacing Arrivals and Approach*						
	Complex Clearances						Opera-tionally available in FY21+
	Increment implemented: · 104123-23 Complex Clearances*						

Concept Development Operation

*** Work Supports Post FY 2016 Capabilities**

COLLABORATIVE AIR TRAFFIC MANAGEMENT

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision-making by flight planners and FAA traffic managers to improve overall efficiency of the National Airspace System (NAS), provide greater flexibility to the flight planners and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers impose Traffic Management Initiatives (TMI) to account for congestion, weather, special activity airspace, or other constraints. TMIs are the means by which traffic managers manage constraints. These initiatives can alter users' flight plans. The impact of TMIs can be reduced by tailoring flow management actions to specific flights.

CATM services are targeted to deliver a combination of increased information on the users' preferred alternative routes, enhanced tools for assessing the impact of rerouting decisions, and improved communications and display of instructions to controllers in order to accommodate user preferences to the maximum extent possible.

TARGET USERS

Air traffic controllers, traffic managers, operators

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

CAPACITY

This portfolio increases capacity through the introduction of capabilities that result in:

- Imposing fewer en route capacity constraints as congestion is resolved through tailored incremental congestion responses
- Automated congestion resolution tools matching user preferences to airspace with available capacity

FLEXIBILITY

Capabilities in this portfolio improve flexibility by:

- Increasing user route flexibility through negotiated trajectories for congestion resolutions.
- Simplifying relieving departure queue and reducing surface delays through Integrated Departure Route Planning decision support
- Facilitating the ability of local traffic managers to balance workload even on days when there are no major impacts from severe weather
- Enabling improved/optimal runway assignments considering airspace configuration changes

EFFICIENCY

This portfolio provides efficiency benefits through:

- Increasing aggregate flight efficiency by factoring individual flight trajectories into the congestion solution.
- Reducing arrival delay by identifying opportunities for reopening arrival airspace
- Advance forecast of impact and clearing enabling decision to hold arrivals at higher altitudes or on the ground, reducing fuel burn and terminal congestion
- Optimizing flight trajectory before take-off (pre-departure) or entry into oceanic airspace (pre-oceanic) to reduce fuel consumption and environmental impact of oceanic flights

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FUNDING

SUPPORTED BY NEXTGEN CATM TECHNOLOGY/CATM PORTFOLIO

OI 101102 – Provide Full Flight Plan Constraint Evaluation with Feedback

OI 104208 – Enhanced Departure Flow Operations

OI 105208 – Traffic Management Initiatives with Flight-Specific Trajectories

OI 105302 – Continuous Flight Day Evaluations

SUPPORTED BY SEPARATION MANAGEMENT PORTFOLIO

OI 104102 – Interactive Planning using Four Dimensional Trajectory Information in the Oceanic Environment

SUPPORTED BY IMPROVED SURFACE/TERMINAL FLIGHT DATA MANAGEMENT PORTFOLIO

OI 104117 – Improved Management of Arrival/Surface/Departure Flow Operations

SUPPORTED BY SYSTEM DEVELOPMENT

OI 105207 – Full Collaborative Decision-Making

COLLABORATIVE AIR TRAFFIC MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	CATM-T Work Package 4	CATM-T WP4 development, concept validation, and FAA AMS investment analysis (IARD, IID, FID) for CATMT-T WP4					
	CATM-T Work Package 5					TFM Gap Analysis and CATM-T Work Package 5 concept exploration	Concept validation, and FAA AMS investment analysis for CATM-T Work Package 5
	Airborne Rerouting Automation	ERAM System Airborne Reroute System Requirements	Software development, procedure design, and key site testing				
	Airborne Rerouting with DataComm		Concept exploration of automation systems and procedures for future enhancements to the airborne rerouting capability				

Concept Development Operation * Work Supports Post FY 2016 Capabilities

COLLABORATIVE AIR TRAFFIC MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:							
	CATM-T Work Package 1	Fully deployed by the end of FY2015					
	Increments Implemented: · 105208-11 Execution of Flow Strategies · 104208-11 Delivery of Pre-Departure Reroutes (PDRR) to Controllers[1]						
	CATM-T Work Package 2	Fully deployed by the end of FY2015					
	Increments Implemented: · 101102-11 Collaborative Trajectory Options Program · 105302-11 Collaborative Airspace Constraint Resolution[2] · 101102-12 Route Availability Planning (RAPT) · 105208-21 Airborne Rerouting (TFMS enhancements)						
	CATM-T Work Package 3	Fully deployed by the end of FY2016					
	Operational Improvements Supported: · Collaborative Information Exchange (CIX) · TFM Remote Site Engineering (TRS-R)						
	CATM-T Work Package 4					Solution implementation	
	Increments Implemented: · 105207-26 Integrated Departure Route Planning * · 104208-23 Arrival Route Availability Planning* · 105302-23 Integrate TMI Modeling · 105302-25 Airport Acceptance Rate Decision Support* · 105302-21 Improve Demand Predictions						
	CATM-T Work Package 5 and Future Work Packages						Implementation to begin post FY17
	Increments Possibly Included: · 101102-21 Constraint Evaluation Feedback* · 101102-22 Negotiate Mitigations* · 104102-21 User Tactical Trajectory Feedback* · 104102-23 User Trajectory Planning in Pre-Oceanic Phase* · 104117-31 Collaborative Airport and Airspace Configuration Management* · 105207-28 Airborne Trajectory Negotiations with Flight Operations Centers (FOC)* · 105208-24 Aircraft Equipage Eligibility During TMIs* · 105302-22 Probabilistic Constraint Prediction* · 105302-24 Enhanced Post Operations* · 105302-27 User Input to Improved Departure Predictions*						
	Airborne Rerouting Automation					Solution implementation	
	Increment Implemented: · 105208-21 Airborne Rerouting (ERAM enhancements)						

[1] Moved from OI 105208 to OI 104208.
[2] Timeline extended due to budget constraints.

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

SEPARATION MANAGEMENT

Separation Management focuses on the enhancement of aircraft separation assurance. Separation Management improvements will provide air traffic controllers with tools and procedures to separate aircraft with different kinds of navigation equipment and wake performance capabilities, what is known as a mixed environment.

The increments in this portfolio will achieve success by enhancing current National Airspace System (NAS) infrastructure through the integration into air traffic control automation systems of enabling technologies, new standards and new procedures. The key automation systems impacted by this portfolio are Advanced Technologies and Oceanic Procedures, Terminal Automation Modernization and Replacement, and En Route Automation Modernization.

TARGET USERS

Air traffic controllers, operators

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

Capabilities in this portfolio will enhance aircraft separation assurance by safely reducing separation between aircraft, and as a result improve capacity, efficiency and safety in the NAS.

CAPACITY

Capabilities in this portfolio will support an increase in capacity by:

- Increasing airport throughput as a result of closer spacing of flights accepted from Terminal Radar Approach Control airspace and managed on final approach
- Enabling air traffic controllers and pilot through reduced separation between aircrafts to manage increasing traffic levels in oceanic airspace

EFFICIENCY

This portfolio will provide improved efficiency through the introduction of capabilities that will:

- Enable more oceanic flights to ascend and descend to their preferred altitudes
- Allow controllers to approve additional pilot requests for direct routes and more efficient altitudes

SAFETY

This portfolio will provide controllers automated information about wake vortex separation requirements for any given aircraft pair, along with accurate wind data which will help predict more accurate and safer separation standards.

FUNDING

SUPPORTED BY EN ROUTE AUTOMATION MODERNIZATION

OI 102146 – Flexible Routing

SUPPORTED BY FLEXIBLE TERMINAL ENVIRONMENT/IMPROVED MULTIPLE RUNWAY OPERATIONS PORTFOLIO

OI 102137 – Automation Support for Separation Management

OI 102144 – Wake Turbulence Mitigation for Arrivals: Closely Spaced Parallel Runways

SUPPORTED BY NEXTGEN SYSTEM DEVELOPMENT/SEPARATION MANAGEMENT PORTFOLIO

OI 102154 – Wake Re-Categorization

SUPPORTED BY NEXTGEN TRAJECTORY BASED OPERATIONS (TBO)

OI 102114 – Initial Conflict Resolution Advisories

SUPPORTED BY NEXTGEN TBO/SEPARATION MANAGEMENT PORTFOLIO

OI 102117 – Reduced Horizontal Separation Standards En Route – 3 Miles

OI 104102 – Interactive Planning using Four Dimensional Trajectory Information in the Oceanic Environment

OI 108212 – Improved Management of Special Activity Airspace

OI 104122 – Integrated Arrival/Departure Airspace Management

OI 104127 – Automated Support for Conflict Resolution

SUPPORTED BY NEXTGEN TBO/SEPARATION MANAGEMENT PORTFOLIO AND AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102108 – Oceanic In-Trail Climb and Descent

SEPARATION MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Oceanic Tactical Trajectory Management (OTTM) - ATOP Enhancement WP1	IARD (ATOP WP1) – Targeted for 1st Quarter calendar year 2015 FID (ATOP WP1) – Targeted for 1st Quarter calendar year 2016				ATOP WP 2 work	
	Oceanic In-Trail Climb and Decent	Concept validation					
	Oceanic Tactical Trajectory Management (OTTM) - ATOP Concept Engineering	Concept engineering in support of ATOP WP1				Concept engineering in support of ATOP WP2	
	Separation Management – ERAM Sector Enhancements – ERAM Enhancements Investment Analysis	IARD – Achieved successfully, July 2014 FID – Targeted 3rd Quarter, calendar year 2015				ERAM future segment work	
	Separation Management – Modern Procedures - ERAM Enhancement Concept Engineering	Concept engineering in support of ERAM sector enhancement				Concept engineering in support of ERAM system enhancements future segment	

[1] Increment Electronic Flight Data for Non-Surveillance Airspace moved to the National Airspace System Infrastructure portfolio.

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

SEPARATION MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
	Trajectory Based Operations (TBO) and Unmanned Aircraft Systems (UAS) Integration Demonstration			Demon-stration project			
	Wake Turbulence Re-categorization	FAA/EUROCONTROL Wake Re-Cat Phase II (leader/follower) benefit study FAA/EUROCONTROL Wake Re-Cat Phase II (leader/follower) safety argument					
	Alternative Position, Navigation, and Timing (APNT)		Pre-implementation and investment analysis activities				

Concept Development Operation

*** Work Supports Post FY 2016 Capabilities**

SEPARATION MANAGEMENT							
		FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:							
	Oceanic In-Trail Climb and Descent		Operational Readiness by 2016				
	Increments implemented: · 102108-12 Enhanced Oceanic Climb/Descent Procedure via ADS-C Automation · 102108-13 Automatic Dependent Surveillance-Broadcast (ADS-B) Oceanic In-Trail Procedure and Automation						
	ATOP Enhancement WP1					Operational Readiness by 2020	
	Increments implemented: · 104102-22 Approval of User Requests in Oceanic Airspace - Auto Re-Probe* · 104102-25 Preferred Routing in Constrained Oceanic Airspace (Data Exchange via SWIM) · 104102-26 Approval of User Requests in Oceanic Airspace - Conflict Resolution Advisory* · 104102-30 Enhanced Conflict Probe for ATOP Surveillance Airspace*						
	ERAM Sector Enhancement Work Package					Operational Readiness by 2020	
	Increments implemented: · 102114-30 En Route Radar Controller Conflict Probe* · 102114-31 Approval of User Requests and Resolving Conflicts with Efficient Maneuvers in En Route Airspace[2] · 102137-27 Integration of UAS* · 102137-28 Vertical Conformance Verification Entry * · 108212-22 Increased Utilization of SAAs in En Route Airspace* · 102146-21Increase Capacity and Efficiency Using Flight Management Computer (FMC) Route Offset* · 102117-21 Wake Turbulence Mitigations for En Route Controller[3]* · 104122-21 Expanded use of 3nm Separation in transition airspace* · 104127-21 En Route Conformance Monitor for PBN Routes *						
	Wake Turbulence Re-categorization, Phase 1	Approval for Wake Re-cat Stds Change in 7110.65 Implementation of Wake Re-cat phase 1 at 7 sites (MEM, SDF, CVG, A80, NCT, HNL, N90) to be complete FY15 Q4 Implementation of ATPA at all sites completed in FY14 Q2					
	Increments implemented: · 102154-11 Wake Re-Categorization Phase 1 · 102137-15 Automated Terminal Proximity Alert (ATPA) Phase 1 - Single Runway						
	Wake Turbulence Re-categorization, Phase 2					Operational Readiness by 2020	
	Increments implemented: · 102154-21 Wake Re-categorization Phase 2 - Static Pair-wise Wake Separation Standards * · 102144-23 Automated Terminal Proximity Alert (ATPA) Phase 2 – Multiple Runways*						

[2] Moved from OI 102137 to OI 102114.
[3] Formerly Wake Turbulence Alerts for En Route Controllers. Moved from OI 102137 to OI 102117.

Concept | Development | Operation | * Work Supports Post FY 2016 Capabilities

ON-DEMAND NAS INFORMATION

On-Demand National Airspace System (NAS) Information will provide flight planners, air traffic controllers and traffic managers, and flight crews with consistent and complete information related to changes in various areas of the NAS, such as temporary flight restrictions, temporary availability of special use (military) airspace, equipment outages and runway closures. The capabilities in this portfolio will be realized through net-enabled information access to and exchange of aeronautical and flight information using common data formatting and information exchange standards.

TARGET USERS

Air traffic controllers, traffic managers, flight planners, flight crews

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

Improving the consistency, completeness, and accuracy of the NAS advisory service information has the following anticipated benefits:

- Reduced fuel burn and operating costs related to planning around constraints that are not accurate representations of NAS status and airspace usage
- Increased flexibility of the NAS to enable users to adapt according to their own needs
- Maintenance and improved safety of the NAS

CAPACITY

Capabilities in this portfolio coordinate availability schedules for special use airspace, providing access to airspace that otherwise would not be available and thereby improving airspace capacity.

EFFICIENCY

Capabilities in this portfolio improve flight efficiency by reducing flight time and distance for operators who opt for more efficient routes through awareness of the availability of special use airspace.

PREDICTABILITY

Capabilities in this portfolio provide real-time status of airspace, enabling operators to more predictably plan their schedules.

SAFETY

Capabilities in this portfolio provide an additional margin of safety by delivering real-time traffic, flight and NAS status information directly to the flight deck, providing flight crews information quickly and in a usable form.

FUNDING

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST (ADS-B)

OI 103209 – Enhanced Traffic Advisory Service

SUPPORTED BY NEXTGEN ADS-B, COLLABORATIVE AIR TRAFFIC MANAGEMENT TECHNOLOGY (CATMT)/COLLABORATIVE AIR TRAFFIC MANAGEMENT (CATM) PORTFOLIO & SYSTEM WIDE INFORMATION MANAGEMENT (SWIM)

OI 103305 – On-Demand NAS Information

SUPPORTED BY NEXTGEN CATM/ON-DEMAND NAS PORTFOLIO, CATMT/CATM PORTFOLIO & SWIM

OI 108212 – Improved Management of Special Activity Airspace

ON-DEMAND NAS INFORMATION							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Aeronautical Information Management Modernization Segment 1	AIMM Segment 1 investment analysis and development					
	Aeronautical Information Management Modernization Segment 2	Demo ACS capabilities supporting AIMM Segment 2	AIMM Segment 2 investment analysis and development				
	Aeronautical Information Management Modernization Segment 3			Concept work FY14 through FY16 for automation support for space vehicle operations entry & through CRDRD for other AIMM Segment 3 increments		AIMM Segment 3 Investment Analysis (IARD FY16, IID FY17, FID FY18)	
	Flight Object	FIXM v1.0 engineering & require-ments work	Development of FIXM v1.1, v2.0, v3.0, v4.0, v5.0, v6.0, v7.0				
	FOXS					Engineering and investment analysis for FOXS implementation and FIXM v5.0/v6.0/v7.0 incorporation into FOXS	
	Advanced Methods Unified Flight Planning & Filing (UFPF) and NAS Common Reference (NCR)	NCR transitioning to SWIM Segment 2B UFPF transitioning to a future work package in CATM					
	Advanced Methods			Concept Work – constraint prediction, monitoring & alerting; operational response development; post-operational analysis & training			
	Collaborative Information Management	Provides research and analysis of the mechanisms used when accessing and managing inter-agency information sharing Inter-agency Service Oriented Architecture (SOA) will be built to provide increased awareness of the methods which DoD could utilize for the exchange of Flight Object data					

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

ON-DEMAND NAS INFORMATION						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
Aeronautical Information Management Modernization Segment 1				Operationally available FY14 through FY16		
Increments implemented: · 103209-01 Traffic Situational Awareness with Alerts (TSAA)[1] · 103305-13 Provide NAS Status via Digital Notices to Airmen (NOTAMs) for FOCs/AOCs · 103305-23 Airborne Access to Information Portal[2] · 108212-12 Improve SUA-Based Flow Predictions*						
Aeronautical Information Management Modernization Segment 2				Operationally available in FY17		
Increments implemented: · 103305-12 Provide Improved Advisories for Flight Operations Centers (FOCs)/Airline Operations Centers (AOCs)* · 103305-24 Tailored NAS Status via Digital NOTAMs for ANSP* · 108212-21 Improve SAA-Based Flow Predictions						
Aeronautical Information Management Modernization Segment 3						Opera-tionally available in FY20+
Increments implemented: · 103305-21 Static Airspace Constraints* · 103305-22 Planned Airspace Constraints* · 108212-11 ANSP Real-Time Status for SAAs* · 108212-23 Automation Support for Space Vehicle Operations Entry*						

[1] Moved from OI 103206 to OI 103209.
[2] Timeline adjusted to reflect maturity of capability.

Concept | Development | Operation

* Work Supports Post FY 2016 Capabilities

ENVIRONMENT AND ENERGY

Environment and Energy uses a comprehensive five-pillar approach to overcome the environmental constraints that are facing aviation from noise, air quality, climate, energy and water quality concerns. The five-pillar approach is comprised of improved scientific knowledge and integrated modeling, aircraft technology maturation, sustainable alternative jet fuels, air traffic management modernization and operational improvements, and policies, environmental standards and market-based measures. The environmental performance of the National Airspace System (NAS) will be tracked using the NextGen Environmental Management System (EMS) Framework to identify additional system improvements with the goal of achieving sustainable aviation growth.

TARGET USERS

Air traffic controllers, FAA and operators

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

Capabilities in this portfolio will, where feasible, save time and fuel while allowing the potential to limit overflight of environmentally sensitive areas.

FUNDING

SUPPORTED BY ENVIRONMENT PORTFOLIO

OI 109310 – Implement EMS Framework – Phase 2

OI 109321 – Increased Use of Commercial Aviation Fuels – Phase 2

SUPPORTED BY NEXTGEN RESEARCH, ENGINEERING AND DEVELOPMENT

OI 109315 – Implement NextGen Environmental Engine and Aircraft Technologies – Phase 1

OI 109318 – Environmental Engine and Aircraft Technologies – Phase 2

SUPPORTED BY NEXTGEN SYSTEM DEVELOPMENT

OI 109316 – Increased Use of Alternative Aviation Fuels – Phase 1

SUPPORTED BY NEXTGEN SYSTEM DEVELOPMENT/ENVIRONMENT PORTFOLIO

OI 109309 – Implement EMS Framework – Phase 1

ENVIRONMENT AND ENERGY							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Implement EMS Framework – Phase I	Development work from FY12 through FY14					
	Implement EMS Framework – Phase II					Work supports post-FY16 capabilities	
	Implement NextGen Environmental Engine and Aircraft Technologies – Phase I	Development work occurred from FY12 through FY14 with additional testing and maturation demonstration of technologies occurring through FY16					
	Implement NextGen Environmental Engine and Aircraft Technologies – Phase II					Development work to complete between FY16 and FY19	
	Increased Use of Alternative Aviation Fuels – Phase I	Development work from FY12 through FY14					
	Increased Use of Alternative Aviation Fuels – Phase II					Work supports post-FY16 capabilities	

Concept Development Operation

*** Work Supports Post FY 2016 Capabilities**

ENVIRONMENT AND ENERGY						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
Implement EMS Framework – Phase I		Operationally available between FY13 and FY15				
Increments implemented: · 109309-12 Environmental Targets · 109309-13 NEPA Strategy and Processes – Phase 1[1] · 109309-14 Environmental Assessment of NextGen Capabilities[2] · 109309-15 Improved Scientific Knowledge – Phase 1 · 109309-16 Analysis to Support International Environmental Standard-Setting – Phase 1 · 109309-17 Aviation Environmental Portfolio Management Tool[3] · 109309-19 Environmental Goals and Targets Performance Tracking System · 109309-20 NextGen EMS Frameworks and Stakeholder Collaboration · 109309-21 Aviation Environment Design Tool (AEDT) Version 2B						
Implement EMS Framework – Phase II						Operational availability expected in FY20
Increments implemented: · 109310-22 Environmental Performance and Targets* · 109310-23 NEPA Strategy and Processes – Phase 2* · 109310-24 EMS Data Management and Stakeholder Collaboration* · 109310-25 Aviation Environmental Tools Suite* · 109310-26 Analysis to Support International Environmental Standard-Setting – Phase 2*						
Implement NextGen Environmental Engine and Aircraft Technologies Phase I		Operationally available between FY13 and FY17				
Increments implemented: · 109315-13 Adaptive Trailing Edges · 109315-14 Ceramic Matrix Composite Turbine Blade Tracks[4] · 109315-15 Ceramic Matrix Composite Acoustic Nozzle · 109315-16 Engine Weight Reduction and High-Temperature Impeller[5] · 109315-17 Dual-Wall Turbine Vane[6] · 109315-18 Flight Management System - Air Traffic Management (FMS-ATM) Integration · 109315-19 Ultra High-Bypass Ratio Geared Turbofan – Phase 1						

[1] Implementation of this capability occurred in 2012.
[2] Formerly Decision Support Assessment.
[3] Formerly Aviation Environmental Portfolio Management Tool (APMT) – Economics.
[4,5] Timeline extended to reflect testing and demonstration to mature the technologies at the designated TRL.
[6] Formerly Dual-Wall Turbine Blade. Timeline extended to reflect testing and demonstration to mature the technologies at the designated TRL.

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

ENVIRONMENT AND ENERGY							
		FY12	FY13	FY14	FY15	FY16	FY17+
	Implement NextGen Environmental Engine and Aircraft Technologies Phase II					Operationally available between FY16 and FY20	
	Increments implemented: · 109318-26 Flight Management System - Air Traffic Management (FMS-ATM) Integration* · 109318-27 Ultra High-Bypass Ratio Geared Turbofan – Phase 2* · 109318-28 Explore and Demonstrate New Technologies under CLEEN Phase 2*						
	Increased Use of Alternative Aviation Fuels Phase I				Operationally available in FY15		
	Increments implemented: · 109316-12 Drop-In >50% HEFA Fuels (Greater than 50% Blend)[7] · 109316-13 Other Advanced Aviation Alternative Fuels						
	Increased Use of Alternative Aviation Fuels Phase II						Operationally available in FY20
	Increments implemented: · 109321-21 Other Advanced Drop-In Aviation Alternative Fuels Increment 2* · 109321-22 Generic Methodology for Alternative Fuels Approval*						

[7] Formerly Drop-In >50% HRJ/HEFA Fuels (Greater than 50% Blend).

Concept Development Operation

*** Work Supports Post FY 2016 Capabilities**

SYSTEM SAFETY MANAGEMENT

System Safety Management is developing data acquisition, storage, analysis and modeling capabilities to meet the safety analysis needs of NextGen designers, implementers and practitioners. These resources will be used throughout the FAA to ensure that new capabilities either improve or maintain current safety levels while simultaneously improving capacity and efficiency in the National Airspace System (NAS). The portfolio currently contains two projects. The Aviation Safety Information Analysis and Sharing (ASIAS) project collects aviation data from more than 100 commercial and general aviation operations sources, and fuses the data to improve the analysis of complex issues related to NextGen operational improvements. ASIAS also maintains many aviation-related metrics and benchmarks that enable analysts to monitor important aviation system characteristics. The System Safety Management Transformation (SSMT) project, which uses ASIAS data and data from other sources, is developing data analysis and modeling capabilities that will enable safety analysis to determine how NAS-Wide operational improvements will affect safety and evaluate potential safety-risk mitigations. SSMT results are returned to stakeholders for use in planning and evaluation, and to ASIAS for metrics development and tracking. Long-term tracking of ASIAS metrics are embedded in the SSMT risk analysis baseline capability (the Integrated Safety Assessment Model) to provide ongoing support to the NextGen safety assessment process.

TARGET USERS

FAA, operators

TARGET AREAS

NAS-Wide

ANTICIPATED BENEFITS

SAFETY

The capabilities in this portfolio enable the sharing of de-identified safety and risk data among the FAA and NAS users, which will identify NAS-Wide trends and emerging airspace management risks before they result in accidents or incidents.

FUNDING

SUPPORTED BY NEXTGEN SYSTEM DEVELOPMENT/SYSTEM SAFETY MANAGEMENT PORTFOLIO

OI 109304 – Enhanced Safety Information Analysis and Sharing

OI 109326 – Integrated Safety Analysis and Modeling

SUPPORTED BY SYSTEM SAFETY MANAGEMENT PORTFOLIO

OI 109303 – Safety Information Sharing and Emergent Trend Detection

SYSTEM SAFETY MANAGEMENT PORTFOLIO							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Enhanced Safety Information Analysis and Sharing	Development work from FY12 through FY14					
	Safety Information Sharing and Emergent Trend Detection					Development work from FY16 through FY17	
	Integrated Safety Analysis and Modeling			Development work from FY14 through FY16			
	Integrated Safety Analysis and Modeling – NAS-Wide System Modeling and Anomaly Detection			Concept work from FY14 through FY17			

Concept Development Operation

* Work Supports Post FY 2016 Capabilities

SYSTEM SAFETY MANAGEMENT PORTFOLIO						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
Enhanced Safety Information Analysis and Sharing			Operationally available in FY15			
Increments implemented: · 109304-17 Expanded ASIAS Participation* · 109304-18 ASIAS Data and Data Standards* · 109304-19 Enhanced ASIAS Architecture* · 109304-20 Upgraded and Expanded ASIAS Analytical Capabilities* · 109304-21 Vulnerability Discovery* · 109304-22 ASIAS Studies and Results* · 109304-23 ASIAS Collaboration Capabilities*						
Safety Information Sharing and Emergent Trend Detection						Operationally available in FY20
Increments implemented: · 109303-21 Additional ASIAS Participants* · 109303-22 NextGen Enabled Data* · 109303-23 Architecture Evolution and NextGen Support* · 109303-24 Analytical Capabilities in Support of NextGen* · 109303-25 Automated Vulnerability Discovery* · 109303-26 Continued Studies and Results* · 109303-27 Expanded Collaboration Environments*						
Integrated Safety Analysis and Modeling						Operationally available in FY18-FY20
Increments implemented: · 109326-01 Automated Operational Anomaly Detection, Analysis and Forecasting Models* · 109326-02 System-Wide Integrated Risk Baseline Annual Reports* · 109326-03 Tailored, Domain-Specific Baseline and Predictive Risk Models (NextGen Portfolio Support)* · 109326-04 Integrated NAS-Wide Hazard Identification, Evaluation and Forecasting* · 109326-05 Integrated NAS-Wide Automation System Modeling and Anomaly Detection*						

Concept Development Operation *** Work Supports Post FY 2016 Capabilities**

NAS INFRASTRUCTURE

National Airspace System (NAS) Infrastructure provides research, development and analysis of capabilities that depend on and impact activities in more than one NextGen portfolio. Work in this portfolio includes capabilities that address aviation weather issues, which supports the need to improve air traffic management (ATM) decision making during adverse weather conditions, improves the use of weather forecast information in the transformed NAS and evolves the existing aviation weather infrastructure, i.e., dissemination, processor, and sensor systems, to standardize weather information and interfaces, and reduce operational costs. This portfolio also includes capabilities that address engineering issues, which provide for cross-cutting research, development and analysis in Terminal/ Terminal Radar Approach Control system engineering. NextGen navigation engineering, information management and new ATM requirements to determine if these new systems can achieve the targets for 2025 and beyond. This includes new air traffic control management procedures, separation standards and flexible airspace categories to increase throughput.

TARGET USERS

FAA, other government agencies (e.g., NOAA), operators

TARGET AREAS

NAS-Wide

FUNDING

SUPPORTED BY DATA COMMUNICATIONS

OI 102112 – Current En Route Separation

SUPPORTED BY SEPARATION MANAGEMENT PORTFOLIO

OI 102105 – Current Oceanic Separation

SUPPORTED BY SYSTEM WIDE INFORMATION MANAGEMENT

OI 103119 – Initial Integration of Weather Information into NAS Automation and Decision Making

SUPPORTED BY TERMINAL FLIGHT DATA MANAGEMENT

OI 104209 – Initial Surface Traffic Management

NATIONAL AIRSPACE SYSTEM INFRASTRUCTURE							
		FY12	FY13	FY14	FY15	FY16	FY17+
Pre-Implementation Phase:							
	Common Support Services – Weather	WP1 AMS work – FID scheduled for 4th Quarter CY2014					
	NextGen Weather Processor	WP1 Concept work	WP1 AMS work – FID scheduled for 4th Quarter CY2014				
	Advanced Technologies and Oceanic Procedures Future Work Package					ATOP in transition sectors concept work	
	Weather Forecast Improvements	In-Flight icing, turbulence and ceiling & visibility forecast enhancements concept work		In-Flight Icing, turbulence and ceiling & visibility forecast enhancements development			
	Terminal Flight Data Manager (TFDM)	Concept work for TFDM	Development and AMS work for TFDM				
	ERAM Future Segments					Electronic Flight Data (non-surveillance) and improved information sharing concept work	
	Data Comm		Initial En Route Data Communications concept work		Initial En Route Data Communications development		

Concept | Development | Operation

*** Work Supports Post FY 2016 Capabilities**

NATIONAL AIRSPACE SYSTEM INFRASTRUCTURE						
	FY12	FY13	FY14	FY15	FY16	FY17+
Implementation Phase:						
Common Support Services - Weather				Implementation to begin post-FID in FY2015		
Increments implemented: · 103119-12 NextGen Common Weather Information Base - Initial* · 103119-13 Enhanced In-Flight Icing Diagnosis and Forecast* · 103119-17 4D Tailored Volumetric Retrievals for Aviation Weather Information* · 103119-18 Enhanced Turbulence Forecast and Graphical Guidance* · 103119-19 Enhanced Ceiling and Visibility Analysis and Forecasts*						
NextGen Weather Processor – WP1				Implementation to begin post-FID in FY2015		
Increments implemented: · 103119-11 Enhanced NAS-Wide Access of 0-2 Hours Convective Weather on Traffic Forecast for NextGen Decision Making* · 103119-14 Enhanced Weather Radar Information for Air Traffic Control (ATC) Decision-Making* · 103119-15 Extended Convective Weather on Traffic Forecast for NextGen Decision-Making* · 103119-16 Convective Weather Avoidance Model (CWAM) for Arrival/Departure Operations*						
Advanced Technologies and Oceanic Procedures Future Work Package						Implementation to begin in FY2016-FY2020 timeframe
Increment implemented: · 102105-15 Advanced Technologies and Oceanic Procedures (ATOP) in Transition Sectors*						
ERAM Future Segments						Implementation expected to begin FY2019
Increments implemented: · 102112-12 Electronic Flight Data for Non-Surveillance Airports[1] · 102112-13 Improved Information Sharing between En Route Sector Controllers Using Integrated Display System*						
Data Comm						Implementation expected to begin FY2019
Increment implemented: · 102112-11 Initial En Route Data Communication Services*						

[1] Moved from Separation Management Portfolio.

Concept | Development | Operation

* Work Supports Post FY 2016 Capabilities

NATIONAL AIRSPACE SYSTEM INFRASTRUCTURE							
		FY12	FY13	FY14	FY15	FY16	FY17+
Terminal Flight Data Manager	Early Implementation Scope			Early implementation scope includes Electronic flight strip transfer system technology refresh, advanced electronic flight strips deployment, Traffic Flow Management System modifications to extend flight operator data exchange			
	Increment implemented: · 104209-33 Establish Enhanced Data Exchange with Flight Operators and Airport Operators[2]						
	Core						Implementation to begin following FID in FY15/FY16 timeframe
	Increment implemented: · 104209-32 Integrate Surveillance Data with Flight Data (Surface)[3]						

[2,3] Moved from Surface Portfolio.

Concept Development Operation * Work Supports Post FY 2016 Capabilities

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