NextGen Commitments and FY09 Work Plan

The FAA is implementing a series of operational changes that are improving the performance of the NAS, such as this new runway at Chicago O'Hare International Airport, which opened in November 2008.

Appendix B: NextGen Commitments and FY09 Work Plan

The FAA has created a portfolio framework that supports the required tracking, planning, reporting, and execution needed to successfully implement a large-scale integration project like NextGen. The full NextGen Portfolio contains elements from all phases of the agency's acquisition management system. It contains acquisition and implementation commitments for transformational programs like ADS-B; enabling activities that advance and demonstrate concepts and that lead to the development of system technical requirements; and applied research into areas like human factors.

For management purposes, the FAA has organized its NextGen Portfolio into seven solution sets, each focusing on a series of related operational capabilities that together will bring about the mid-term system.

Applied research is a mature level of research that helps us find solutions to specific problems. (In comparison, basic research is a broader exploration of future possibilities; applied research builds on that knowledge to address targeted needs.) Examples include operational concept development, mid-term developmental guidance, and standards development. The FAA's National Aviation Research Plan details our NextGen applied research activities; a high level summary of this information is also captured in the FAA's NAS Enterprise Architecture, which maps that applied research to the ultimate NextGen operational capabilities it supports. Applied research is not addressed in this supplement to the plan, but more information can be found through the NextGen Web site.

Enabling activities focus on the development of concepts of use and technical requirements for proposed new systems or enhancements to existing systems, along with prototypes and demonstration activities. They provide critical information to help the agency make investment decisions. Some of these activities require several years to complete; the section titled "FY09 Solution Set Work Plan" highlights those that will be completed in this fiscal year. The complete FY09 Work Plan can be found on the FAA's NextGen Web site.

The FAA has committed to implementing a series of operational changes that will improve the performance of the NAS immediately, while building the foundation for NextGen capabilities to come. These include airfield improvements; advances in surveillance, navigation, communications, and traffic flow management; and new automation and information exchange technology. This section includes information about the five NextGen transformational programs (ADS-B, Data Communications, System Wide Information Management, NextGen Network Enabled Weather, and NAS Voice Switch). These programs enable specific fundamental paradigm shifts to the way we manage air traffic, communicate, and exchange data. ADS-B is a fully-funded program whose deployment has begun; the other programs are in early stages of development.

The section titled "Schedule of Implementation Commitments" provides deployment schedules for these commitments, which include existing and upcoming programs that provide a foundation for NextGen mid-term capabilities. Check marks indicate completed milestones. Implementation is considered complete when all relevant training, policies, and procedures are in place.

NextGen Transformational Programs

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
ADS-B		✓ TIS-B and FIS-B implemented in Miami area	— Surveillance and Broadcast Services in the Gulf of Mexico, Louisville, Philadelphia, Houston, and Juneau areas	— Additional infrastructure deployments	— Additional infrastructure deployments Note: All 794 ground stations will be deployed by 2013.
SWIM	✓ Awarded the Service Container software contract ✓ Developed SWIM Service Specification Document and Registry Interface Requirements Document	— Final Investment Decision for Segment 1B — Initial Segment 2 JRC preparations	— Final Investment Decision for Segment 2		— Segment 2 implementation begins FY12.
NextGen Network Enabled Weather	✓ Published weather product data format standards ✓ Conducted IT demonstrations, including capabilities of the virtual 4-D Weather Data Cube	— Publish NNEW Metadata guidelines — Demonstrations of the 4-D Weather Data Cube, including interagency interoperability	— Risk reduction activities for candidate IOC publisher/ subscribe systems	— Integrate and test NNEW systems	— Final NNEW evaluation and demonstrations
NAS Voice Switch	✓ Initiated investment analysis process and engineering studies		— Initial investment decision	— Final investment decision	
Data Communications	✓ Initial investment decision made for Segment 1 ✓ Frequency spectrum management to optimize allocation and reduce interference ✓ Conducted human-in-the-loop simulation	— Operational and regulatory activities — Operations and human factors research		— Final for Segment 1 investment decision	

Airfield Development

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
Runways, Taxiways and Airfield Improvements	✓ Chicago O'Hare Runway 10L/28R extension ✓ Center Taxiway at LAX, completing southside reconfiguration of LAX	✓ Washington Dulles Runway 1L/19R ✓ Seattle-Tacoma Runway 16R/34L ✓ Chicago O'Hare Runway 9L/27R ✓ Dallas-Fort Worth end-around taxiway — Philadelphia Runway 17/35 extension — JFK Airfield Improvements – Taxiway YA extension – JFK Taxiway K/KA ✓ Record of Decision for extension of Ft. Lauderdale Runway 9R/27L — Environment Assessment for Portland Runway 10L/28R extension	— Boston Logan, centerfield taxiway — Charlotte Runway 17/35 — Record of Decision for Philadelphia airfield reconfiguration — JFK Airfield Improvements – Taxiway KK extension – Southwest quadrant taxiway – Taxiway FB extension – High-speed exits for Taxiways PA, N, L – New fillets to accommodate A380	— JFK Airfield Improvements – Improved taxiway access from Runway 31L	— JFK Airfield Improvements – New taxiway south of Runway 31L and west of Runway 4L — Chicago O'Hare Runway 10C/28C

Initiate Trajectory-Based Operations

This solution set represents a shift from clearance based to trajectory based control. Aircraft will fly negotiated trajectories and air traffic control moves to trajectory management. The roles of pilots/controllers will evolve due to the increase in automation support. The focus of TBO is primarily en route cruise. Additional information about TBO operational capabilities can be found in the NAS Enterprise Architecture.

Mid-term Operational Capabilities:
- *Delegated Responsibility for Separation*
- *Oceanic In-Trail Climb and Descent*
- *Automation Support for Mixed Environment*
- *Initial Conflict Resolution Advisories*
- *Flexible Entry Times for Oceanic Tracks*
- *Point-in-Space Metering*
- *Flexible Airspace Management*
- *Increase Capacity and Efficiency Using RNAV and RNP*

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
ERAM *ERAM capability forms a foundation for NextGen automation*		— ERAM will be fully operational at 6 of 20 en route centers.	— ERAM will be fully operational at remaining 14 en route centers. — Final investment decision for ERAM post-Release 3	— Follow on ERAM capabilities will continue	
TMA *TMA capability forms a foundation for future strategic traffic flow management*	✓ Implemented at all 20 en route centers ✓ Adjacent center time-based metering for Newark and Philadelphia arrivals				

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Separation Management - Modern Procedures (Separation Automation Enhancements, D-side and R-side) *Provides enhanced decision support tools to ATC workstations for assistant and radar controllers.* *Note: Other controller enhancement tools are planned for the radar controller (R-side) console display, designed to provide visual cues to increase controller situational awareness.*	Conduct computer human interface assessment of changes to the D-side workstation to support functionalities for ERAM	Preliminary assessment determines requirements and system design; ensures enhancements conform to computer human interface (CHI) standards and best practices necessary for delivery of automation tools for mixed environment in 2013. This is linked to the capability called Automation Support for Mixed Environment.	**ATO-E Domain Engineering Group Craig Marina**	Q1	Q2	Q3	Q4
Separation Management - High Altitude *Looks at high altitude air traffic management in the ARTCCs, including airspace design, established routes, procedures, and application of separation standards.*	Conduct airspace design analysis and identify operational and system requirements	Lays the foundation for development of High Altitude Generic Airspace Concept Phase 1; eventually leads to development of initial standards and procedures for self-separation in 2017.	**ATO-P Air Traffic Systems Concept Development Group Michele Merkle**	Q1	Q2	Q3	Q4
Trajectory Management - Oceanic *Automation enhancements will take advantage of improved communication, navigation, and surveillance coverage in the oceanic domain. When authorized by the controller, pilots of equipped aircraft use established procedures for climbs and descents.*	Develop initial mid-term In-Flight Oceanic Trajectory Management-4D Research & Development Roadmap to NextGen capabilities	Demonstrate trajectory-based operations in transitional airspace between oceanic and domestic en route, using oceanic data link and Advanced Technologies and Oceanic Procedures (ATOP) automation in 2011.	**ATO-W Advanced Technology Development Prototype Group Thien Ngo**	Q1	Q2	Q3	Q4
Flight and State Data Management - Flight Object *Allows standardization of flight information for enhanced data exchange across the NAS and external systems.*	Provide the FAA data to support development of International Flight Data Object (IFDO) standards	Facilitate the exchange of important operational data with air traffic management system for better flight management; provide capability to exchange flight planning information in near real-time basis in 2016. (This activity targets the NAS Enterprise Architecture decision on mid-term automation system investment decision.)	**ATO-P NextGen Integration and Implementation Diana Liang**	Q1	Q2	Q3	Q4
Capacity Management - NextGen DME (Distance Measuring Equipment) *The DME network will be sustained to support en route navigation and to serve as an independent backup navigation source to Global Positioning System (GPS) and GPS/Wide Area Augmentation System (WAAS).*	Initiate contract to procure DMEs	Select contractor to deliver ~ 50 high power DME units by the end of FY14 (the final number is currently under evaluation and will be known in the June '09 timeframe). This capability will increase capacity and efficiency and provide a redundant en route network for an area navigation (RNAV) for en route area operations at major airports. (Next generation of DMEs available to support RNAV throughout the NAS in 2015.)	**ATO-W Ground Based NAVAIDS Group Steve Brunley**	Q1	Q2	Q3	Q4

Increase Arrivals/Departures at High Density Airports

The focus of this solution set is to increase the arrivals and departures in areas where demand for runway capacity is high or where there are multiple runways with airspace and taxiing interaction and finally for close proximity airports with potential and airspace/approach interference.

Mid-term Operational Capabilities:
– Improved Operations to Closely-Spaced Parallel Runways
– Initial Surface Traffic Management
– Time-Based Metering Using RNP and RNAV Route Assignments
– Integrated Arrival/Departure Airspace Management

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
RNAV/RNP *RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs)*	✓ Published 78 (goal was 50)	— 50 per year, including ✓ Chicago O'Hare ✓ Newark ✓ San Diego – Teterboro	— 50 per year	— 50 per year	— 50 per year Note: FAA is working with industry to develop priority deployment lists for RNAV/ RNP.
Simultaneous Non-Interferring Operations (SNI)	✓ Established 5 helicopter RNAV (GPS) procedures in New York as Helicopter PBN testbed	— Developing helicopter route implementation plan	— Begin helicopter route development (qty TBD) — Develop helicopter departure implementation plan	— Helicopter route development (qty TBD) — Begin helicopter departure procedure development	
RNP Authorization Required (AR)s	✓ Published 63 (goal was 25)	— 50 per year, including: – Monterey – Chicago/Midway – Houston – Phoenix	— 50 per year	— 50 per year	— 50 per year
RNAV routes	✓ Published 49 (goal was 12)	— 12 per year	— 12 per year	— 12 per year	— 12 per year
Reduced Separation for Dependent Arrivals to Closely Spaced Parallel Runways		✓ National order allowing 1.5-mile staggered diagonal separation between aircraft on approach to parallel runways at Boston, Cleveland, Philadelphia, St. Louis, and Seattle	— Additional enabling activities for reduce separation are listed under "Separation Management for Closely Spaced Parallel Runways" in the FY09 Work Plan.		

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
ASDE-X *ASDE-X is a safety system that also provides a foundation for follow-on surface management capabilities (see Integrated Surface Data).*	✓ Washington Dulles ✓ Detroit Metro Wayne County Airport ✓ Fort Lauderdale International Airport ✓ Phoenix Sky Harbor Airport ✓ John F. Kennedy International Airport ✓ Los Angeles International Airport	— Boston Logan International — Newark Liberty International	— Denver International Airport — George Bush Intercontinental Airport — Philadelphia International Airport — Minneapolis International Airport — John Wayne-Orange County Airport — Dallas/Fort Worth International Airport — Salt Lake City International Airport — Baltimore-Washington Thurgood Marshall International Airport — Chicago Midway International Airport — Honolulu International — Hickam AFB Airport — Miami International Airport — Ronald Reagan Washington National Airport — San Diego International Airport	— New York LaGuardia International Airport — Las Vegas McCarran International Airport — Memphis International Airport	
Integrated Surface Data *from ASDE-X to Traffic Flow Management System – provides improved traffic predictions*	✓ Receiving ASDE-X data from: – Dulles – John F. Kennedy – Memphis – Seattle – Louisville	— Installation of ASDE-X Data Distribution boxes at – Phoenix – Atlanta – Newark	— Installation of ASDE-X Data Distribution boxes at: –Laguardia Airport		

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
Airspace and Procedures Enhancements *New York/New Jersey/ Philadelphia*	✓ De-conflict Newark arrivals over SHAFF intersection. ✓ Simultaneous visual approaches to Runway 4L/R at Newark. ✓ Enhanced procedures for Caribbean arrivals: established Caribbean tactical reroutes for arrivals to manage Newark arrivals. ✓ New procedures to allow arrivals to Runway 29, while landing Runway 4R at Newark. ✓ Simultaneous Approaches to Runways 31L/R at JFK. ✓ Accessing J134/J149 from ELIOT intersection. ✓ Established helicopter RNAV (GPS) procedures in New York.	— Stage 1: – Establish procedural changes in core facilities and RNAV overlays	— Stage 2: – Relocate and expand west airways – Reconfigure Philadelphia airspace	— Stage 3 – Relocate and expand North airways – Facilitate Stage 4 elements	— Stage 4: – Relocate and expand south airways – Relocate and expand east airways – Change altitude restrictions – Create optimal descent procedures
Airspace and Procedures Enhancements *Chicago Airspace Project*	✓ Stage 2: – Southbound departure routes for Chicago Midway	— Stage 2: South Enhancements – Additional southbound departures – Southeast high and wide arrival procedures for Chicago O'Hare west flow (supports triple arrivals from east with new Runway 09L/27R)			— Stage 3: West and north enhancements – Additional westbound departures – High and wide arrival procedures for Chicago O'Hare east flow (supports triple arrivals from west with new Runway 10C/28C, scheduled for FY13)
Airspace and Procedures Enhancements *Western Corridor – Southern Nevada Airspace*			— Optimize existing airports and airspace		

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
Airspace and Procedures Enhancements *Houston Area Airspace Transition System (HAATS)*	✓ Phase 3A – Fifth departure route to northeast – Airspace realignment and new sectors in I90, ZHU, ZFW	— Phase 3B – Third eastbound departure route – New Severe Weather Avoidance Plan (SWAP) arrival route from the southeast – Realign southeast arrivals and departures to accommodate new routes	— Phase 3C – Expand airspace to the west by establishing College Station approach control services at Houston TRACON and modifying certain airspace boundaries – Third westbound departure route – Shift southwest arrivals to IAH and Houston southwest of the current location – New SWAP arrival route from the southwest – Dual capacity arrival routes from the northwest		
Airspace and Procedures Enhancements *High Altitude Airspace Management Program*		— Transition point-to-point second J80 route to Q42 — Initial transition of New York choke points routes to point-to-point navigation routes using NAS Reference System (NRS) — Initial transition of national playbook routes to point-to-point navigation using NRS			

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When
International Air Traffic Interoperability *Ensures FAA ATC automation systems seamlessly interface and operate with the international aviation community, from departure/arrival to/from outside the United States.*	Conduct a demonstration of gate-to-gate concept across the Atlantic Ocean including continuous descent procedures into Miami Airport	AIRE is to demonstrate operations with environmental benefits across the Atlantic Ocean supporting the FAA's international collaboration to validate 4D TBO and performance-based ATM alternatives for the Oceanic In-trail Climb and Descent initiative. This supports NextGen Oceanic Procedures development with Initial Operations Capability planned in 2010.	**ATO-W** **Advanced Technology Development Prototype Group** **Jim McDaniel**	Q1 Q2 Q3 Q4
High Density Airport (HAD) Capacity and Efficiency Improvement Project *This concept attempts to take advantage of existing ground technologies and functionality as a first step toward trajectory based operations. It leverages airborne navigational capabilities that already exist on most commercial production and many in-service airplanes.*	Conduct a human in the loop simulation including the controller and the flight deck with aircraft with 3D capability	The 3D paths permit more orderly and predictable traffic patterns and use path clearances rather than the conventional speed, altitude, and heading clearances to manage aircraft spacing. A site demonstration will be conducted to collect additional data to enhance efficiency, provide greater capacity, and reduce fuel consumption.	**ATO-P** **AT Systems Concept Development Group** **Charles Buntin**	Q1 Q2 Q3 Q4
Trajectory Management - Surface Tactical Flow *This project will demonstrate and document requirements for a series of capabilities that build on the NextGen vision for surface trajectory-based operations.*	Demonstrate early surface TBO concepts at Memphis	Identify requirements to deliver capability in 2017 for taxi conformance efficiency. Surface flow management will reduce surface engine operating times, resulting in fuel savings and reduced environmental impacts, and lead to collaborative resource allocation and avoidance of surface gridlock.	**ATO-P** **Advanced Technology Development Prototype Group** **Tom Prevost**	Q1 Q2 Q3 Q4
Trajectory Management - Arrival Tactical Flow *Initiate acquisition activities to expand automation algorithms and integrate airport surface, tower, and terminal approach information leading to better and more efficient trajectory planning.*	Complete Time-Based Flow Management (TBFM) final investment decision	Baselines the TBFM program to award a contract to expand and enhance the legacy traffic management advisor.	**ATO-R** **TFM Programs Group** **Midori Tanino**	Q1 Q2 Q3 Q4
Unmanned Aircraft Systems (UAS) 4D Trajectory Based Demonstration *Demonstration to evaluate the viability to ensure the safe integration of the UAS in the National Airspace System.*	Conduct flight trials of Unmanned Aircraft Systems in Florida to facilitate cross agency planning and integration required to develop data communication requirements and procedures for NAS operations	Demonstrate UAS concept to safely operate in the NAS without undue risks; assess UAS with data communication to support trajectory based operations.	**ATO-P** **Advanced Technology Development Prototype Group** **Jim Rogers**	TBD (pending final determination as a new start)

Increase Flexibility in the Terminal Environment

This solution set covers the terminal and airport operations for all airports. The focus of FLEX is on advanced separation procedures and improves trajectory management.

Mid-term Operational Capabilities:

– Wake Turbulence Mitigation for Departures (WTMD)
– Ground-Based Augmentation System (GBAS) Precision Approaches
– Use Optimized Profile Descent
– Provide Full Surface Situation Information
– Enhanced Surface Traffic Operations

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
Category II Operations on Type 1 ILS	✓ Boston 33L ✓ Pittsburgh 28R ✓ Anchorage 07L ✓ Fairbanks19R ✓ Seattle-Tacoma 34L/34C/34R ✓ Boise 10R ✓ St Petersburg 17L	— Dallas Love 13 — Philadelphia 27R — Atlanta 26R/27L — Burlington 15 — Sarasota 14/32 — Providence 23 — Savannah 09 — Richmond 16 — Denver 17L/17R/16R/8/25/26 — Newark 22L — Salt Lake City 17 — Teterboro 06 — Colorado Springs Muni 17L — Tucson 11L — Snohomish County 16R — Los Angeles 25R — NY La Guardia 22 — Los Angeles 24L — Windsor Locks 24 — Oakland 27R — Albany 01 — Sacramento 22L — Charlotte 05 — San Francisco 28L — Greensboro 05/23R — Santa Ana 19R — Washington Dulles 12/19L — Santa Rosa 32 — Raleigh/Dunham 05L/05R — Stockton 29R — Bangor 33 — Anchorage 07L — Islip 06 — Fairbanks 19R	— 38 candidates will be evaluated and, if found suitable, completed by January 2010.		

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
LPV/LP procedures *(LPV/LP procedures to be published at all qualifying runways by 2018)*	✓ Published 417 (goal was 300)	— 500 per year	— 500 per year	— 500 per year	— 500 per year
Terminal Automation Modernization – Replacement (TAMR)		— Initial investment decision		— Final investment decision	
Terminal Flight Data Management (TFDM)			— Final investment decision for Segment 1	— Initial investment decision for Segment 2	— Final investment decision for Segment 2
Ground-based Augmentation System		— Newark LAAS installation			

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Separation Management - Wake Turbulence Mitigation for Departures (WTMD) *Begins the process of reducing aircraft separation during take-offs on CSPR runways to mitigate decreased airport acceptance rates (AAR) due to increased separation for trailing aircraft from large aircraft.*	Submission of the RFP to industry	Request proposals from industry to install a Wake Turbulence Mitigation for Departure System to determine if wake turbulence (separation) delay can be reduced.	**ATO-T Terminal Weather Group J. Hill**	Q1	Q2	Q3	Q4
Wake Turbulence - Re-Categorization *Redefine the basis for the air navigation service provider's (ANSP) required minimum spacing between aircraft to mitigate the effects of wake turbulence and contribute towards more efficient use of airspace.*	Develop a recommendation for an alternative set of wake separation standards.	In 2013, replace today's safe but capacity inefficient procedures for separating aircraft to ensure wake turbulence mitigation with ATC automation tools to manage aircraft in a mixed navigation and wake performance environment. (Capability - Automation Support for Mixed Environment).	**ATO-R Operation Services Group Steve Lang**	Q1	Q2	Q3	Q4
Flight and State Data Management - Surface/Tower/ Terminal Systems Engineering *TFDM integrates flight data management, decision support services provided by the Arrival/Departure Management Tool (A/DMT); provides clearances for surface movements and exchange of flight information between ANSP providers and users of flight information.*	Tower Flight Data Management (TFDM) Engineering Model: deliver the preliminary requirements document	Identify requirements necessary to develop an engineering model for the TFDM system; delivers Enhanced Surface Traffic Operations and Full Surface Situation Information capabilities in 2014.	**ATO-T Systems Engineering Group Kip Spurio**	Q1	Q2	Q3	Q4
	Arrival Departure Management Tool (A/DMT) Engineering Model: deliver the preliminary requirements document	Identify requirements necessary for (the A/DMT) system design, scope, and specifications.	**ATO-T Systems Engineering Group Kip Spurio**	Q1	Q2	Q3	Q4
	Trajectory modeling for the terminal area; deliver the preliminary requirements document	Identify requirements necessary for designing a prototype decision support tool that predicts aircraft flight trajectory in the terminal domain.	**ATO-T Systems Engineering Group Kip Spurio**	Q1	Q2	Q3	Q4
Separation Management - Closely Spaced Parallel Runway Operations *This enables parallel runway improvements, reducing impact to airport/runway throughput in lower visibility conditions. Together with the Precision Runway Monitoring (PRM) system (already in use at Atlanta's Hartsfield International Airport), the system allows controllers to land planes almost simultaneously on parallel runways, saving time and simplifying operations for controllers and airlines alike.*	Conduct initial simulator trials of CSPO	Identify requirements to provide enhanced procedures (including cockpit and ground improvements) that enable parallel runway improvements, reduce impact to airport/runway throughput in lower visibility conditions in 2013.	**ATO-P Chief SE Group Ron Stroup**	Q1	Q2	Q3	Q4

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Separation Management - Approaches, New Navigation Initiatives *There are approximately 271 RVR systems in the NAS, of which 212 are forward scatter NG RVR Systems and 54 are older transmissometer systems. A new PC-Based RVR contract was awarded and first article systems were delivered for testing March 2007.*	Complete installation of a RVR at one airport site for validation and data collection to support implementation of RVR enhancements to improve lower visibility operations	Provide real-time data for system development and solution implementation for lower approach minima during periods of Instrument Meteorological Conditions (IMC).	**ATO-W** **Tech Ops** **Mitch Narins**	Q1	Q2	Q3	Q4
	Complete installation of low power (terminal) DME at one site for validation and data collection. (RNAV DME)	Support the use of Category I runways during runway visual range (RVR) conditions down to 1,800 feet; allow use of DME-DME area navigation (RNAV) down to 1,000 feet above ground level and enable more aircraft to achieve lower altitudes during IMC.	**ATO-W** **Tech Ops** **Mitch Narins**	Q1	Q2	Q3	Q4
Separation Management - Approaches, Optimize Navigation Technology *Includes existing approach lighting systems, other lighted navigation aids, precision and non-precision approach systems, terminal, and en-route navigation systems.*	Award the Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights) (MALSR) lamp contract	Procure contractor services to conduct analyses of the physical, electrical (electronic), and economic evaluation to systems to determine what type of technology insertion or changes in the system would result in improved operating efficiency to increase flexibility in the terminal environment in 2014.	**ATO-W** **Tech Ops** **Lansine Toure**	Q1	Q2	Q3	Q4
Trajectory Management - Arrivals (RNAV/RNP with 3D and Required Time of Arrival) *Trajectory Based Management will be accomplished using fully defined 3D paths to more orderly and predictable traffic patterns and has the potential to reduce controller workload and allow the airplane to precisely follow a continuous path using the accuracy of Required Navigation Performance operations.*	Complete Concept development for RNAV/RNP 3D and control by Required Time of Arrival (RTA) procedures	Leverages existing ground technologies and functionality while exploiting airborne navigational capabilities already available on most commercial production and in-service airplanes.	**ATO-P** **Chief** **Systems Eng** **Group** **Ron Stroup**	Q1	Q2	Q3	Q4
	Conduct modeling and simulation to optimize procedure design 3D RNAV and RNP	Validate the concept, identify requirements and collect additional data to enhance efficiency and provide greater capacity and reduce fuel consumption. This increases aircraft flow and will introduce additional routes and flexibility to reduce delays in 2012 and capability for enhanced surface traffic operations.	**ATO-P** **Chief** **Systems Eng** **Group** **Ron Stroup**	Q1	Q2	Q3	Q4
Flight and State Data Management - Avionics *Focuses on taxi conformance monitoring (avionics) for efficiency.*	Complete Concept of Operations for flight deck moving maps that support taxi instructions, taxi conformance monitoring, and surface separation	Identify requirements and procedures. Clearance delivery and pushback into movement or non movement areas is accomplished by voice and/ or data communications to the aircraft, aided by situational awareness derived from surveillance sensors and conformance monitoring tools presented directly on the ANSP display in 2014.	**ATO-P** **Advanced** **Technology** **Development** **Prototype Group** **Tom Prevost**	Q1	Q2	Q3	Q4

Improve Collaborative Air Traffic Management

This solution set focuses on delivering services to accommodate flight operator preferences to the maximum extent possible.

Mid-term Operational Capabilities:
- *Continuous Flight Day Evaluation*
- *Traffic Management Initiatives with Flight Specific Trajectories (Go Button)*
- *Improved Management of Airspace for Special Use*
- *Trajectory Flight Data Management*
- *Provide Full Flight Plan Constraint Evaluation with Feedback.*

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
Collaboration Air Traffic Management (CATM)	✓ Final investment decision made for CATM Work Package 2 – Arrival Uncertainty Management – Weather Integration – Collaborative Airspace Constraint Resolution – Airborne Reroute Execution	— Final investment decision for CATM Work Package 3 – Integrated Departure Arrival Capability – Collaborative Information Exchange – TSD Re-engineering			
Aeronautical Information Management (AIM)		— Initial investment decision	— Final investment decision for Segment 1		— Final investment decision for Segment 2

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Flow Control Management - Strategic Flow Management Integration (Integration Execution of Flow Strategies into Controller Tools) *Provides for improvements of the en-route ATC automation. These improvements include automatic identification of aircraft affected by the Traffic Management Initiative (TMI); electronic communication of the TMI information in a timely manner to the relevant ATC operational positions; tools to implement the TMI; to help monitor how well aircraft are conforming to the TMI; and tools that suggest controller actions to achieve the flow strategy.*	Perform preliminary requirements analysis, design, development and testing of the en route automation to receive pre-departure reroutes from TFM and display them to en route controllers	Supports the flight specific TMI initiatives by integrating flow strategies into Controller tools.	**ATO-E Domain Engineering Group Craig Marina**	Q1	Q2	Q3	Q4
Flow Control Management - Strategic Flow Management Enhancement *Explores the long-term TFM concept to establish the TFM roadmap that will identify overlap, dependencies, gaps, and future needs.*	Develop Traffic Flow Management (TFM) Roadmap; identify and investigate the components that will be integrated into the overall NextGen solutions	Serves as the basis for a target architecture for the midterm (2018) that can support the NextGen strategic flow while delivering the midterm functionality. (Provides capability for Full Collaborative Decision Making and NAS EA decisions for CATM WP4.)	**ATO-R TFM Programs Group Midori Tanino**	Q1	Q2	Q3	Q4
Flow Control Management - Strategic Flow Management Departures (Departure Trajectory Flow Management) *Explores departure flow planning capability improvement through information analysis, prototype development, and demonstration.*	Conduct information analysis and prototyping to incorporate data such as surface, ICAO flight plan, TIM, and weather data into departure flow planning	Identify requirements for system design and development that achieves a capability for timely, effective, and informed decision-making based on improved situational awareness in 2017.	**ATO-R TFM Programs Group Midori Tanino**	Q1	Q2	Q3	Q4
Flight and State Data Management - Common Status and Structure Data (SSD) *Develops an infrastructure for a single and reliable aeronautical information exchange service used for providing a common operating picture of aeronautical information supporting air traffic management.*	High Level CSSD Concept of Operations and Enterprise Architecture	Analyze the use of a cross-domain data brokerage or information exchange capability to collect, provide configuration management for, and distribute a common picture of aeronautical information between ATM stakeholders. Delivers capability for On-Demand NAS Information and Continuous Flight Day Evaluation in 2013.	**ATO-R Aeronautical Information Mgt Group Brett Brunk**	Q1	Q2	Q3	Q4

FY09 Solution Set Work Plan (cont'd)

New Air Traffic Management (ATM) Requirements *Develop operational requirements for the use of Traffic Collision Avoidance Systems (TCAS) in a precision RNP operating environment; establish standards for various frequency bands used for mobile wireless communications; and identify new requirements for advanced air traffic management automated decision support tools.*	Complete development of an L-band Digital Communications System prototype to allow initiation and validation of an L-band communications standard	Provides globally harmonized standards that will support future NextGen data communications requirements.	**ATO-P NextGen Integration and Implementation Pam Whitley**	Q1	Q2	Q3	Q4
	Develop concepts of use for C-band airport surface wireless communications, including preliminary requirements and supporting architecture documentation	Validate the IEEE 802.16e C-band standard to support the integration of both mobile and fixed surface assets concept of use.	**ATO-P NextGen Integration and Implementation Pam Whitley**	Q1	Q2	Q3	Q4
	Assess TCAS effectively in the NextGen environment	Identify operational shortfalls and preliminary performance requirements, including interoperability with ground separation assurance functionality, to improve TCAS effectively in the NextGen environment.	**ATO-P NextGen Integration and Implementation Pam Whitley**	Q1	Q2	Q3	Q4
	Complete development of test bed infrastructure to enable initiation and validation of an aviation specific IEEE 802.16e wireless communication standard	Develops and validates an airport surface wireless communications network standard that supports NextGen surface applications including ADS-B, SWIM, ASDE-X, and surface TBO, while leveraging existing commercial IEEE 802.16e standard.	**ATO-P NextGen Integration and Implementation Pam Whitley**	Q1	Q2	Q3	Q4
	Develop concepts of use for an L-band terrestrial communications system, including preliminary requirements and supporting architecture documentation.	Defines an air-ground and air-air communications system that addresses future communications needs for all continental airspace users, and enables NextGen services such as full TBO, UAS operations, and SWIM-Air applications.	**ATO-P NextGen Integration and Implementation Pam Whitley**	Q1	Q2	Q3	Q4
ATC/Technical Operations Human factors - Controller Efficient/Air Ground Integration *Human factors research provides higher efficiency levels in air traffic control and identifies the new role for controllers as more responsibility shifts to the flight crew.*	Conduct human factors assessment of NextGen activities including modeling, demonstrations to identify gaps, and provide recommendations for resolution	Derive measures of controller performance for use in selection, training, and system development necessary to achieve the capacity targets of NextGen for self-separation; define responsibilities between pilots and controllers and between humans and automation.	**ATO-P Human Factors Research & Engineering Group Dino Piccione**	Q1	Q2	Q3	Q4
	Initial assessment of human performance during merging/ spacing operations and develop test and mitigations for potential errors	Derive measures of controller performance for use in selection, training, and system development.	**ATO-P Human Factors Research & Engineering Group Dino Piccione**	Q1	Q2	Q3	Q4
	Initial evaluation of impact optimized profile descent operations will have on ATM display, automation systems, and pilot and controller workload	Define requirements for integrated en route and terminal situation displays, procedures, and impacts to human systems integration.	**ATO-P Human Factors Research & Engineering Group Dino Piccione**	Q1	Q2	Q3	Q4

Reduce Weather Impact

This solution set includes improvements to weather information and its use to improve safety, capacity, and efficiency.

Mid-term Operational Capabilities:
– Trajectory-Based Weather Impact Evaluation

Schedule of Implementation Commitments

Project	FY08	FY09	FY10	FY11	FY12
NextGen Weather Processor (NWP)	✓ Completed concept and requirements documents	— Investment decision (IARD) for NWP Work Package 1 (WP1) and NNEW WP1 functionality to enter investment analysis	— Initial Investment Decision for NWxP WP1 w/6-hour convective forecast	— Final investment decision for NWP WP1	— Final investment decision for NWP WP2 to accept enhanced aircraft observations (turbulence and humidity)

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Weather Observation Improvements *Optimize weather observation capabilities, e.g., integrated radar technology or other new sensors, to support NAS operations.*	Complete multi-function phased array radar technology research plan	Identify requirements and system design to optimize weather observational information required for NextGen to support accurate forecasts of future weather impacting NAS operations, leading to a NextGen surface observing capability starting in FY16 and a NextGen Weather Radar capability starting in FY20.	**ATO-P New Weather Capabilities Group Guillermo Sotelo**	Q1	Q2	Q3	Q4
Weather Forecast Improvements *Develop NextGen weather capabilities to improve forecast accuracy and timeliness to enable better weather decision making in the NAS.*	Establish advanced 0-6h convective forecast demonstration	Provide improved forecasts and weather information tailored for integration into traffic management decision support systems.	**ATO-P New Weather Capabilities Group Guillermo Sotelo**	Q1	Q2	Q3	Q4

Improve Safety, Security, and Environmental Performance

This solution set involves activities directly related to ensuring that NextGen systems contribute to steadily reducing risks to safety and to information commensurate with increases in system capacity, while mitigating adverse effects on the environment and ensuring environmental protection that allows sustained aviation growth.

Mid-term Operational Capabilities:

Safety:
- *Safety Management System Implementation*
- *Safety Management Enterprise Services*
- *Aviation Safety and Information Analysis and Sharing*

Security:
- *Operational Security Capability for Threat Detection and Tracking, NAS Impact Analysis and Risk-Based Assessment*
- *SSA and Information Systems Security (ISS) Integrated Incident Detection and Response*
- *Information on System Security and Surveillance Integration/Protection*

Environmental Performance:
- *Enhanced Air Traffic Procedures, Improved Environmental Technologies and Sustainable Alternative Aviation Fuels, and Integrated Environmental Modeling*
- *Environmental Management System (EMS) Implementation and Environmental Policy Support.*

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When
Security Integrated Tool Set (SITS) *Provides planning and coordination of security measures in the NAS.*	Perform risk-reduction activities to identify operational and system requirements in the air domain security concept	Due to the relative immaturity of this mission area, these analyses and exercises will further refine the system definition and reduce the overall risk in system acquisition and initial SITS capability.	**ATO-R Traffic Flow Management Programs Group Joe Lahoud**	TBD (pending final determination as a new start)
***Systems Safety Management Transformation** *Implement a cross-cutting risk management system and manage the overall NextGen transformation process to ensure that safety is not only maintained but improved.*	Aviation Safety Information Analysis and Sharing (ASIAS) - Complete baseline of the enhanced ASIAS planning documentation, including information on infrastructure, data/information protection policies, information access policies, procedures, equipment, tools, processes, data architectures, resources and budgets, building upon existing ASIAS baseline	Allow data sharing among aviation users, and deliver analysis capabilities (critical in the continuing effort to reduce the fatal accident rate).	**AVS Aviation Safety Info Analysis Rob Pappas**	TBD (pending final determination as a new start)

FY09 Solution Set Work Plan (cont'd)

Environment & Energy - Noise/ Emission Reduction & Validation Modeling	Conduct analysis to explore advanced algorithms and approaches for terminal procedures that reduce noise and air quality emissions and quantify potential benefits and design and conduct a simple experiment to demonstrate viability and validate benefits	Identify requirements for new environmental technologies that optimize the reduction of greenhouse gas emissions, improve air quality, and reduce jet noise. (Advanced Terminal operational procedures are needed to achieve even greater reductions in environmental impacts.)	**AEE Aviation Policy, Planning, & Environment Lourdes Maurice**	TBD (pending final determination as a new start)
	Conduct analysis to explore advanced algorithms and approaches for surface (taxi/ramp) operations that reduce emissions, and quantify potential benefits and design and conduct a simple experiment to demonstrate viability and validate benefits	Define existing and planned environmental mitigation methods to counter NAS constraints of today and for NextGen metrics to better assess and control noise, air quality impacts that may influence climate impacts from anticipated NextGen commercial aircraft operations. (Advanced surface operational procedures are needed to achieve even greater reductions in environmental impacts.)	**AEE Aviation Policy, Planning, & Environment Lourdes Maurice**	TBD (pending final determination as a new start)
	Conduct evaluation of potential benefits of CLEEN aircraft technologies on the NAS	Ensure more energy efficient aircraft operate in the NAS, in addition to application of alternative fuels; accelerate the development of technologies under the Consortium for Low Energy, Emissions, and Noise (CLEEN) program.	**AEE Aviation Policy, Planning, & Environment Lourdes Maurice**	TBD (pending final determination as a new start)
	Initiate expansion of existing integrated environmental models to analyze noise and emissions regional impacts of new NAS operations	Assess and predict the impact of change; develop and institute reduction techniques and assess their cost-benefit.	**AEE Aviation Policy, Planning, & Environment Lourdes Maurice**	TBD (pending final determination as a new start)

Transform Facilities

This solution set focuses on delivering a facility infrastructure that supports the transformation of air navigation service delivery unencumbered by legacy constraints. NextGen facilities will provide for expanded services; service continuity; and optimal deployment and training of the workforce, all supported by cost-effective and flexible systems for information sharing and back-up.

Mid-term Operational Capabilities
– Integration, Development, and Operations Analysis Capability
– NextGen Facilities
– Net-Centric Virtual Facility

FY09 Solution Set Work Plan

Description/Title	What	Why	Who	When			
Future Facilities Investment Planning *Deliver a facility infrastructure that supports the transformation of air navigation service delivery unencumbered by legacy constraints.*	Complete initial investment readiness decision for NextGen network facilities	Identify requirements and system design for NextGen facilities to provide expanded services supported by cost-effective and flexible systems for information sharing and backup in 2016.	**ATO-P Systems Engineering Future Facilities Chuck Dudas**	Q1	Q2	Q3	Q4
Integration, Development, & Operations Analysis Capability *Supports concept development and evaluation of air traffic management services in a trajectory-based NAS.*	Establish initial laboratory infrastructure to support a NextGen integration and evaluation capability at the Technical Center	Provide a real-time, flexible, scalable, and component/ object oriented simulation environment where concepts, technologies, and systems can be developed, tested, and validated.	**ATO-P Laboratory Services NextGen Integration Vince Lasewicz**	Q1	Q2	Q3	Q4
Virtual Tower (Staffed and Autonomous) *Provide full air traffic management services from a ground level facility to flights in and out of one or more airports.*	Finalize NextGen towers demonstration test plan	Validate the Staffed NextGen Towers (SNT) operational concept and develop preliminary program requirements.	**ATO-P AT Systems Concept Dev Gp Michele Heiney**	Q1	Q2	Q3	Q4
NextGen Test Bed *Build a microcosm of future integrated NAS environment for the areas of interest.*	Complete alternatives assessment for location of NextGen test bed.	NextGen capabilities transform the NAS, and an open test bed environment that allows government and industry to develop and validate innovative solutions is necessary.	**ATO-P Technology Development and Prototyping Gp Paul Fontaine**	Q1	Q2	Q3	Q4

Acronyms

NextGen's operational capabilities will provide air traffic controllers with improved tools to handle more complex traffic while improving service.

Acronyms

ADS-B	Automatic Dependent Surveillance - Broadcast
AIM	Aeronautical Information Management
AIRE	Atlantic Interoperability Initiative to Reduce Emissions
ANSP	Air Navigation Service Provider
ARTCC	Air Route Traffic Control Center
ASDE-X	Airport Surface Detection Equipment – Model X
ASPIRE	Asia and South Pacific Initiative to Reduce Emissions
ASIAS	Aviation Safety Information Analysis and Sharing
ATC	Air Traffic Control
ATM	Air Traffic Management
ATMAC	RTCA's Air Traffic Management Advisory Council
ATN	Aeronautical Telecommunications Network
ATO	Air Traffic Organization
ATOP	Advanced Technologies and Oceanic Procedures
CAAFI	Commercial Alternative Aviation Fuels Initiative
CANSO	Civil Air Navigation Services Organization
CARTS	Common Automated Radar Terminal System
CDTI	Cockpit Display of Traffic Information
CLEEN	Consortium for Lower Energy Emissions and Noise
CMU	Communications Management Unit
CSPO	Closely Spaced Parallel Operations
CSPR	Closely Spaced Parallel Runways
D-ATIS	Digital Automated Terminal Information System
EMS	Environmental Management System
EFB	Electronic Flight Bags
EFVS	Enhanced Flight Vision System
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
FANS	Future Air Navigation System; refers to the data communications system used in oceanic airspace
FIS-B	Flight Information Services – Broadcast
FMS	Flight Management System
FY	Fiscal Year
GBAS	Ground-based Augmentation System
GLS	Global Navigation Satellite System Landing System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IOC	Initial Operating Capability
ITWS	Integrated Terminal Weather System
JFK	John F. Kennedy International Airport
JPDO	Joint Planning and Development Office
JRC	Joint Resources Council
LAAS	Local Area Augmentation System
LAX	Los Angeles International Airport
LED	Light Emitting Diodes
LP	Localizer Performance
LPVs	Localizer Performance with Vertical Guidance approaches

NAPA	National Academy of Public Administration
NAS	National Airspace System
Navaid	Navigational Aid
NextGen	Next Generation Air Transportation System
NMI	Nautical miles
NNEW	NextGen Network Enabled Weather
NVS	NAS Voice Switch
NWxP	NextGen Weather Processor
PARTNER	Partnership for Air Transportation Noise and Emissions Reduction
REDAC	FAA's Research, Engineering and Development Advisory Committee
RNAV	Area Navigation
RNP	Required Navigation Performance
RNP AR	Required Navigation Performance Authorization Required
RVR	Runway Visual Range
RVSM	Required Vertical Separation Minima
RWSL	Runway Status Lights
SAAAR	RNP Special Aircraft and Aircrew Authorization Required procedure
SESAR	Single European Sky Air Traffic Management Research
SIDS	RNAV Standard Instrument Departures
SMS	Safety Management System
STA	Scheduled Time of Arrival
STARS	Standard Terminal Automation Replacement System
STMS	Surface Traffic Management System
SVS	Synthetic Vision System
SWIM	System-Wide Information Management
SUA	Special Use Airspace
TAF	Terminal Area Forecast
TBO	Trajectory Based Operations
TFM-M	Traffic Flow Management - Modernization
TIS-B	Traffic Information Services - Broadcast
TMA	Traffic Management Advisor
TRACON	Terminal Radar Approach Control
UAT	Universal Access Transceiver
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System
WARP	Weather and Radar Processor
WTMD	Wake Turbulence Mitigating Departures