EXECUTIVE SUMMARY

Integrated Work Plan

for the Next Generation Air Transportation System

Joint Planning and Development Office | Version FY12

NextGen

Next Generation Air Transportation System
Joint Planning and Development Office

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Executive Summary

With the 2003 enactment of the *Vision 100 – Century of Aviation Reauthorization Act* (P.L. 108-176), Congress issued a mandate to create the Joint Planning and Development Office (JPDO) to manage the public/private partnership required to bring the Next Generation Air Transportation System (NextGen) online by 2025. As authorized under "Vision 100," the JPDO is charged with creating and carrying out an integrated plan for NextGen to include: "the national vision statement," "a description of demand and performance characteristics" required, "a multi-agency research and development roadmap" necessary to overcome the most significant technical obstacles, "a description of the NextGen operational concepts," and a "timeline" to develop and deploy the system. In accordance with the requirements of the legislation, the Secretary of Transportation and the Federal Aviation Administration (FAA) Administrator delivered to Congress the *Next Generation Air Transportation System Integrated Plan* (NGATS Integrated Plan), which set forth the national vision for air transportation in 2025. To achieve the vision, goals, and objectives identified in the NGATS Integrated Plan, the systems and processes of today's National Airspace System (NAS) must be rigorously and systematically transformed through the sustained, coordinated, and integrated efforts of many stakeholders. The transformation will be achieved through the deployment of new operational concepts and capabilities, twenty-first century technologies, and long-term transformations to the national system of airports.

To support this endeavor, the JPDO compiled, developed, and maintains a comprehensive suite of planning information to foster communication, understanding, and consensus among the NextGen stakeholder community. The planning information takes into account the research, development, and implementation plans, commitments, and contributions of private industry and Federal partner agencies, as well as the potential future solutions needed to achieve the goals and benefits of NextGen. This significant collection of information is captured throughout three foundational JPDO-developed artifacts: the NextGen Concept of Operations (ConOps), Enterprise Architecture (EA), and Integrated Work Plan (IWP). These foundational artifacts describe *what* the NextGen end-state will be, *how* it will operate, *when* NextGen capabilities and potential improvements will be introduced, and *who* will be responsible for implementing the capabilities and improvements. Leveraging the JPDO's Configuration Management process, the JPDO will periodically update the foundational artifacts to encompass the input and feedback from the aviation community, including hundreds of aviation professionals, engineers, subject matter experts, analysts, and planners across the Federal government, industry, and the public. The annual update is a critical component of the JPDO's mission to support the collaborative planning and deliberation needed to prioritize needs, establish commitments, coordinate efforts, and focus resources on the work needed to achieve NextGen.

PURPOSE

This document summarizes the Fiscal Year 2012 version of the NextGen IWP, highlighting the fundamental changes made since the release of Version 1.0 in September 2008 and the efforts undertaken by the JPDO to validate and enhance the maturity of the IWP. Equally important, this Executive Summary also provides an overview of the near-, mid-, and far-term operational improvements described in the IWP, organized around a set of NextGen capabilities that describe, at a high level, the outcomes of implementing the improvements. Lastly, this Executive Summary provides a preview of next year's JPDO objectives, which have an inherent focus on enhancing the information needed to drive the portfolio analysis and enable decision making across the NextGen stakeholder community. This document is also intended to complement, not replace, the broad range of communication, planning, and analytical information, attributes, and dependencies maintained in the NextGen Joint Planning Environment (JPE) - a JPDO-sponsored, web-accessible tool that provides full access to centralized NextGen planning information and supports interactive analysis for decision making. Readers seeking additional detail not found in this summary should visit the JPE, available at www.jpdo.gov.

As NextGen planners iteratively reach common understandings, and as research, implementation, models, policy, budget realities, and other findings are assessed, the NextGen vision will continue to evolve and mature. Accordingly, the IWP and other planning artifacts will continue to be updated by the JPDO to reflect the evolution and maturation of the NextGen vision.

OVERVIEW OF THE IWP STRUCTURE

The inherent complexities of the transformational change to the NAS require the detailed execution of many implementation activities in a synchronized, integrated, and systematic manner. Accordingly, the NextGen IWP is intended to be a master planning document that depicts the collaborative efforts of the stakeholders responsible for implementing the NextGen vision. It is important to note that the IWP describes numerous paths to realize the expected outcomes but not the specific program steps, resources, or implementation activities such as facility rollout, training, or decommissioning of systems. The detailed planning is the responsibility of the NextGen implementing partners.

The evolution to NextGen, as identified in the IWP, is described using a set of integrated planning elements that define the building blocks for achieving NextGen. The planning elements include descriptive attributes such as target initial operational or availability date, suggested stakeholder's role assignments for primary and/or collateral responsibility, and dependencies with other planning elements in the IWP. The IWP sequences the planning elements and describes the research, development, program, and policy activities that are needed to achieve the NextGen concepts and capabilities. The five basic planning element types within the IWP are listed below:

- **Operational Improvement:** Operational Improvements describe the operational changes needed to achieve the operational concepts defined in the ConOps and EA. It describes a specific stage in the transformation of operations and the performance improvements expected at that point in time. The improvements described in each of the Operational Improvements are needed to achieve the NextGen capabilities and each Operational Improvement is mapped to only one capability.
- **Enabler:** An Enabler describes the initial realization of a specific NextGen functional component needed to support one or more Operational Improvements or other Enablers. Enablers describe both materiel components such as communication, navigation, and surveillance systems; and non-materiel components such as procedures, algorithms, and standards. The realization of these components is necessary to achieve the improvements they support. A single Enabler may support multiple Enablers or Operational Improvements.
- **Development Activity:** Development activities describe the results needed from ongoing development or demonstration programs to support other NextGen planning efforts.
- **Research Activity:** Research activities describe basic or applied research programs and the results needed to support other NextGen planning efforts.
- **Policy Issue:** Many of the Operational Improvements and Enablers require policy changes to support their realization, particularly related to interoperability, standardization, and governance.

Policy Issues are intended to encourage decision-maker consideration of viable options. These options can range from further analysis and open discussion for issues that are currently not well defined or understood, to specific policy recommendations for more mature issues.

As noted earlier, planning elements have stakeholder roles defined within the IWP. The proposed stakeholder role assignment attribute indicates the primary or collateral responsibilities of the organization associated with the particular planning element. As the IWP matures and the planning elements are validated, it is expected that the attributed designation will transition from a "suggested office" to "the office." The following describes each of the role assignments proposed by the JPDO:

- **Suggested Office of Primary Responsibility (SOPR):** The SOPR is expected to provide the overall ownership and leadership necessary to achieve the planning element. For Operational Improvements, this will generally be achieved through the realization of many Enablers, Research and Development Activities, and Policy Issues. The SOPR for an Operational Improvement, therefore, may need to provide internal resources, as well as coordinating external resources, to achieve the Operational Improvement. For Enablers or Research and Development Activities, the SOPR may have more direct control of the work, but may also coordinate the use of external resources, as needed. As commitments are received, the SOPR designations will change to OPR designations.
- **Suggested Office of Collateral Responsibility (SOCR):** As a complex initiative, many, if not all of the NextGen IWP elements will be achieved through the support, cooperation, and coordination of many organizations. In addition to the SOPR, a SOCR has been designated for many planning elements. As a SOCR, an organization is expected to support the SOPR in achieving the Operational Improvement or Enabler. This support can be provided in many ways, including the provisions of funds, staffing, facilities, intellectual capital, or other needed resources. As commitments are received, the SOCR designations will change to OCR designations.

The sequencing of IWP planning elements creates a highly interdependent environment of predecessor and successor relationships. The relationships and dependencies between IWP planning elements are modeled to illustrate support towards the achievement of one or more Operational Improvements. A summary of the potential supporting relationships is provided in Table 1:

Table 1: Supporting Relationship between IWP Planning Elements

	Supporting Relationship				
IWP Element Type	**OI**	**EN**	**DA**	**RA**	**PI**
Operational Improvement (OI)	●				
Enablers (EN)	●	●			
Development Activities (DA)		●	●		●
Research Activities (RA)		●	●	●	●
Policy Issue (PI)	●	●	●	●	●

As depicted in Table 1, a Policy Issue may support one or more IWP elements of any type. Research Activities may support Enablers, Development Activities, Policy Issues, or other Research Activities. Development Activities may support Enablers, Policy Issues, or other Development Activities. Enablers may support one or more Operational Improvements, or support other Enablers that in turn support Operational Improvements. Due to challenges associated with presenting the interdependence and relationship complexities of the IWP in a written document, the JPDO is using the JPE (available at www.jpdo.gov) to capture the full set of relationships and dependencies among the IWP planning elements.

SUMMARY OF CHANGES

The IWP and many of the planning elements have matured since the last release of the NextGen IWP. Over 400 comments were addressed using the JPDO's Configuration Management process and are now incorporated, as adjudicated, into the IWP version FY12. The main sources of change include: deferred comments from previous releases of the IWP; comments submitted during the 2009 open commenting period; comments related to improvements and enabling solutions identified in the JPDO Aircraft Working Group Avionics Roadmap; updates to PI completion dates; and changes identified during this year's data validation efforts with Federal partner agencies. The JPDO worked collaboratively with the NextGen partners and aviation professionals from the JPDO Working Groups to adjudicate the comments and proposed changes. The IWP version FY12 also represents the reorganization of the planning elements around the NextGen capabilities. The remainder of this section summarizes these changes.

IWP Reorganization around NextGen Capabilities

The NextGen planning information and resulting artifacts have been designed around high-level concepts and roles within the NAS. To facilitate consistent interpretation and definition across the NextGen stakeholder community, the JPDO reorganized the comprehensive suite of planning information into a scalable and flexible framework that provides a unified view of the NextGen enterprise and enables organizations to make informed decisions founded on consistent planning and analysis data and information. The high-level concepts and roles are not lost in the framework, but rather repositioned around capabilities necessary for the achievement of the goals and objectives described in the *NGATS Integrated Plan*.

The Joint Planning Framework, Figure 1, represents an evolution in the structure and analytical approach used to guide the development and application of the NextGen ConOps, EA, and IWP. This framework also enables transparency and enforces the uniqueness needed to provide a line of sight between the capabilities, their supporting operations (i.e., activities and improvements), and the materiel and non-materiel investments (i.e., enablers, research, development, and policy) needed to achieve the operational improvement and the full efficacy associated with the capability. The framework also supports traditional portfolio analysis activities, including the analysis of cost, benefits, schedule, and risk factors, and adds an additional level of fidelity to enable the JPDO analysis of capability performance and the alignment of investments against strategic performance objectives.

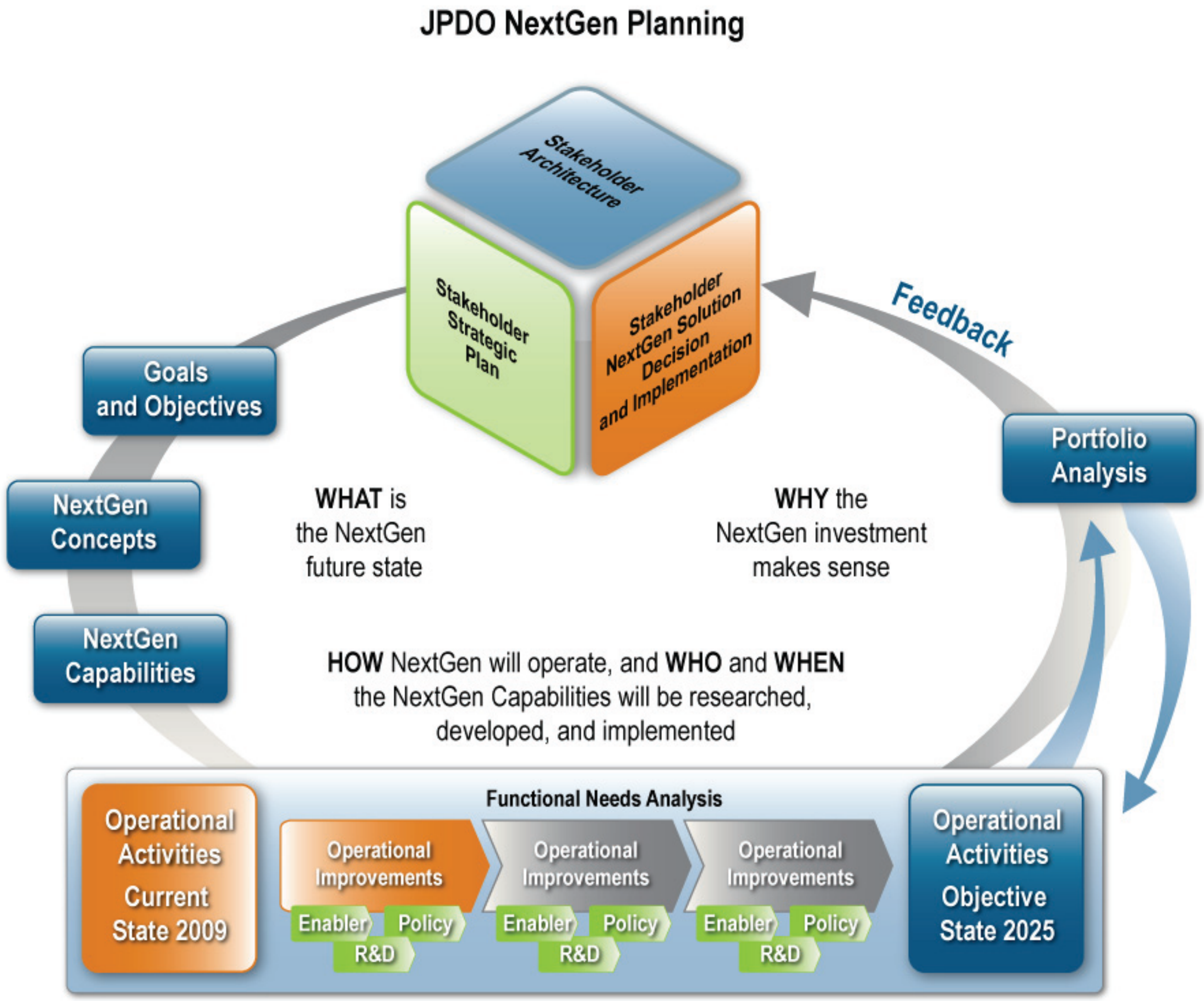

Figure 1: Joint Planning Framework

The IWP version FY12 represents the reorganization of the IWP planning elements under nine NextGen capabilities. The NextGen capabilities represent transformational improvements to the current NAS. Each capability is expressed in operational terms and can be implemented through various combinations of enabling solutions, such as policies, programs, and systems. The capabilities have been adopted to provide consistency and more specific language around the expected outcomes of NextGen. The nine NextGen capabilities are:

- Provide Collaborative Capacity Management
- Provide Collaborative Flow Contingency Management
- Provide Efficient Trajectory Management
- Provide Flexible Separation Management
- Provide Integrated NextGen Information
- Provide Air Transportation Security
- Provide Improved Environmental Performance
- Provide Improved Safety Operations
- Provide Flexible Airport Facility and Ramp Operations

With the NextGen capabilities, the JPDO has an effective framework to organize the significant collection of information and can begin to provide a coherent and compelling value proposition for the 2025 air transportation system. The NextGen capabilities and their transformational objectives are further described in the Capability Transformation Summary section of this Executive Summary.

IWP Data Validation and Maturity

Previous versions of the IWP were the result of collaboration among the various JPDO Working Groups and aviation subject matter experts. Although Federal partner agency input was a component of Working Group membership, there was no explicit partner agency endorsement, element content validation, or acceptance of primary/collateral responsibility designation when the IWP Version 1.0 was published. The need for explicit partner agency endorsement was the impetus for the JPDO data validation activities that began in early 2009. As each planning element is validated by the NextGen Federal partner agencies and aligned with their plans, the result is a reflection of the near-term priorities of each agency. Table 2 provides a summary of each Federal partner agency's planning elements.

Table 2: Number of Federal Partner Agency IWP Planning Elements

NextGen Federal Partner Agency	OI	EN	DA	RA	PI	Total
DOC	4	38	7	1	0	50
DOD	2	15	3	5	3	28
DHS	22	38	11	8	14	93
FAA	87	247	51	55	53	493
NASA	0	4	8	32	0	44

The JPDO engaged the Federal partner agencies in a collaborative review and validation process to further develop, mature, and improve the IWP Version 1.0 planning elements, achieve endorsement, tighter alignment, and better integration. The process included a partner agency review of IWP planning elements where suggested primary responsibility was indicated and collaborative workshops focused on enhancing element descriptions to reflect their current agency plans and/or roadmaps. Due to the diverse nature of each Federal partner agency's suggested IWP responsibilities and the breadth of the agency's associated IWP elements, a tailored validation strategy was needed for each agency.

Significant progress was made towards IWP validation, and valuable insight was obtained by going through an iterative validation process with each agency. For example, the JPDO originally planned that partner agencies would accept primary responsibility for all associated near-, mid-, and far-term planning elements assigned to them. This ended up not being the case. Rather, in cases where partner agencies were not ready to accept primary responsibility for some of the planning elements, the JPDO agreed to remain the advocate until enough data (e.g., research outcomes) became available for the partner agencies to make an explicit acceptance decision.

To track the progress of the validation effort and the maturity of the IWP planning elements, the JPDO developed and instituted the following five-level maturity model. The maturity model is used internally to assess the maturity of the planning element's content and also the status of its progression to initial operating capability or availability. In addition, the model is intended to help focus the JPDO's future validation efforts on the least mature elements of the IWP. The five maturity levels are described in the following bulleted list:

- **Maturity Level 1 –** The planning element is developed by the JPDO and accepted for inclusion into the IWP. The planning element is sufficiently described and all required element attributes are populated.
- **Maturity Level 2** – The suggested office of primary responsibility has formally acknowledged that the planning element is within in its mission area.
- **Maturity Level 3** – The suggested office of primary responsibility has formally accepted the role of office of primary responsibility and fully concurs with the planning element's title, description, and date.
- **Maturity Level 4** – The office of primary responsibility concurs with the planning element's prerequisites.
- **Maturity Level 5** – The planning element is aligned to programs/investments within the office of primary responsibility.

Table 3 displays a summary count of the Federal partner agency planning elements at each maturity level. These numbers reflect the results of this year's data validation effort and only reflect elements for which the Federal partner agencies are identified as the responsible organization.[1] PI planning elements are not included in Table 3 because they are assessed against a different maturity model and tracked internally – they require continuous agency interaction and significant qualitative analysis beyond data validation.

Table 3: IWP FY12 Planning Element Maturity

Number of IWP Planning Elements at each Maturity Level					
NextGen Federal Partner Agency	Maturity Level				
	1	2	3	4	5
DOC	-	-	-	50	-
DOD	25	-	-	-	-
DHS	75	-	-	4	-
FAA	369	9	62	-	-
NASA	23	8	-	13	-

The following paragraphs summarize the status of the 2009 validation process and the maturity of each Federal partner agency's IWP planning elements:

Department of Commerce (DOC)

The DOC reviewed and provided official feedback on all 50 of its associated IWP planning elements; concurred with the planning element descriptions; and accepted the role of office of primary responsibility.

Department of Defense (DOD)

The DOD Lead Service Office (LSO) for NextGen provided official feedback on 11 of its 25 associated IWP planning elements. Of the 11, five planning elements were deemed to be outside the DOD mission area and the remaining six planning element descriptions remain under review. The LSO is currently working a plan to review

[1] IWP planning elements for other NextGen partners (e.g., Industry) are not represented in the table. They are currently assessed at Maturity Level 1.

the other 14 planning elements. In summary, some progress was made to finalize changes and obtain formal concurrence with the DOD element descriptions; however, they will not be reflected in the IWP version FY12.

Department of Homeland Security (DHS)

The DHS proposed six new planning elements for inclusion in the IWP version FY12. Four of the six planning element descriptions have been approved, and responsibility has been formally accepted. The other two planning elements were accepted by the DHS as having collateral responsibility. There is also an ongoing effort within the DHS to identify the appropriate office to review and claim responsibility for the remaining 75 planning elements. The JPDO is working with the DHS to develop a plan for validation and acceptance of these planning elements.

Federal Aviation Administration (FAA)

Through a series of successful working sessions with key FAA personnel, 71 of their associated OI planning element descriptions were reviewed and aligned with the FAA's EA. The FAA accepted primary responsibility for 62 of the 71 OIs. A plan to address the remaining 15 OIs and 247 Enablers is currently underway and will continue through the 2010 validation effort. Efforts to address the FAA's associated research, development, and policy planning elements are also being developed.

National Aeronautics and Space Administration (NASA)

NASA's elements are divided among three Aeronautics Research Mission Directorate programs: Airspace Systems, Fundamental Aero, and Aviation Safety. NASA provided official feedback on all 28 planning elements associated with the Airspace Program – 13 of which were approved and responsibility was accepted. The other 15 planning elements were partially accepted, deemed not within NASA's mission area, or transferred to another NextGen stakeholder. The JPDO is awaiting feedback on the remaining 16 planning elements associated with the Fundamental Aero and Aviation Safety programs and is developing a strategy with NASA's JPDO Technical Integration Manager to complete the validation of the outstanding elements during 2010.

CAPABILITY TRANSFORMATION SUMMARY

The IWP version FY12 represents the reorganization of the IWP planning elements under the nine NextGen capabilities. This section further describes the NextGen capabilities and summarizes their expected near- (2009–2012), mid- (2012–2018), and far-term (2018 and beyond) transformational objectives. Each capability's transformational summary is derived from the supporting operational improvement and materiel and non-materiel solution descriptions found in the IWP. The Capability Evolution Roadmaps found within this section graphically summarize the specific operational improvements that support the evolution of each NextGen capability.

Provide Collaborative Capacity Management

Collaborative capacity management provides the ability to dynamically balance anticipated/forecasted demand and utilization, and allocate NAS resources through proactive and collaborative strategic planning with enterprise stakeholders and automation (e.g., decision support systems), using airspace and airport design requirements, standards, and configuration conditions with the consideration of other air transportation system resources.

Transformation Objective

The transformational objective of this NextGen capability is to meet overall system goals, based on user plans, through the allocation of existing NAS assets, including personnel, airspace, services, and facilities. Future airspace needs to be flexible, dynamic, and adaptable based on traffic demand, equipage, user priorities, and weather conditions. Operational improvements are necessary to evolve from today's operational model, where capacity is often managed using a limited set of inflexible rules and static directives, to a future state where capacity is dynamically adjusted based on a wide range of rules. These rules leverage advanced automation technologies designed to safely accommodate demand and constraints while allowing full situational awareness and decision making.

In the near-term, a significant improvement identified focuses on optimizing and managing airspace in near real time, based on actual flight profiles, leveraging advanced technology and situational information. This can be achieved in part by improving utilization of Special Use Airspace (SUA) when not in use by military or other scheduled users. Through the use of real-time management and scheduling decision support tools, as well as enhanced automation-to-automation communications and collaboration, decision makers are able to dynamically manage airspace for special use, thus increasing real-time access to and use of unused airspace.

In the mid-term, operational improvements are intended to integrate new airspace designs with terminal procedures and separation standards, particularly important in major metropolitan areas with multiple airports, as well as manage airspace flexibly by extending surveillance, communications, and automation capabilities. Other improvements support flying more efficient flight paths; for instance, using Automatic Dependent Surveillance-Broadcast (ADS-B) to provide general aviation (GA) operators improved access to busy terminal airspace, facilitating more direct routing. Another example is improvements that allow all aircraft to file/request user preferred routes, which will allow the use of more efficient flight paths. Aircraft may request a desired route using existing waypoints or other route coordinates through data or voice communications. ADS-B equipped aircraft may benefit by having traffic situational awareness and filing routes more acceptable by the Air Navigation Service Provider (ANSP). Enhancements to flexible airspace management provide automation that supports reallocation of trajectory information, surveillance, communications, and display information to different positions or different facilities, enabling increased flexibility to modify or change sector boundaries and airspace volume definitions in accordance with pre-defined configurations. The ANSP’s ability to reconfigure airspace and services in response to changing demand will improve NAS efficiency and reduce congestion and delay. Integrated arrival and departure airspace management will allow terminal transition areas to extend into current en route airspace, allowing reduced separation standards. Reduced separation standards will permit a greater number of Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures to be flown within the transition airspace, increasing throughput. These improvements allow greater flexibility for aircraft reroutes around severe weather or other disruptions. In addition, capacity and runway throughput are increased through the reduction of lateral separation requirements. With the use of precision navigation, on-board displays and alerting technology, independent converging approaches are conducted while maintaining Visual Meteorological Condition (VMC) arrival rates in Instrument Meteorological Conditions (IMC).

In the far-term, improvements integrate demand and resource information from collaborative decision making into a single decision support tool, allowing strategic resources (e.g., airspace, sectors, personnel, facilities, and NAS systems) to be modeled in parallel with systemic changes in demand. Future traffic loads are modeled against various solutions to mitigate adverse impacts to users. Once NAS-wide modeling efforts are accomplished and analyzed, the ANSP and stakeholders use decision management systems to achieve consensus, increasing capacity while minimizing adverse impacts to users. Full collaborative decision making is achieved through advanced communication and information sharing systems, enabling timely, effective, and informed decision making based on shared situational awareness. Decision makers request information when needed, publish information as appropriate, and use subscription services to automatically receive desired information through the net-centric infrastructure service. Access to airspace is further enhanced through more advanced, automated real-time scheduling and dynamic status updates of SUA. Airspace is negotiated daily between ANSP and military operators to determine effective flow and airspace strategies that meet the needs of all airspace users. This type of operational improvement will allow more timely and increased access to the NAS information and increased situational awareness, providing the maximum flexibility to all users and minimizing the impact on traffic flows. Finally, capacity is increased through the flexible and dynamic allocation and designation of airspace, based on the type of operations to be flown within that airspace. Airspace designation will determine the level of aircraft performance requirements for flying within a particular airspace.

Provide Collaborative Flow Contingency Management

Flow contingency management provides optimal, synchronized, and safe strategic flow initiatives and ensures the efficient management of major flows of traffic while minimizing the impact on other operations in collaboration with enterprise stakeholders, through real- or near-real-time resolutions informed by probabilistic decision making within established capacity management plans.

Transformation Objective

The transformational objective of this NextGen capability is to alleviate the demand capacity imbalance that could originate as a result of excessive demand for a particular airspace, or reduced capacity because of operational constraints, in a manner that is equitable across stakeholders. All operational improvements for this capability are targeted for the midterm time frame.

In the mid-term, using increasing levels of collaboration and integration among ANSP, aircraft operators, and aircraft, proposed flight plans are evaluated against constraint volumes and adjusted by the filer, using feedback provided, to accommodate changing conditions or imbalances. Flight plans and trajectories are adjusted during flight, using integrated processes and digital communication between the flight deck and ANSP automation. Individual flight-specific changes, resulting from Traffic Management Initiatives (TMI), will be disseminated and uniquely tailored to accommodate and balance the needs of each user with NAS demands, capacities, and constraints, rather than broadly apply global TMIs to multiple flights. To mitigate the risk of chronic sector-level demand and capacity imbalances, the ANSP adjusts sectors and resources to meet anticipated demand, promoting efficiency and ensuring safety. This includes proactively adjusting airspace and resource scheduling based on predictive capabilities. Enhancements to sector-demand prediction are derived from anticipated demand. Sector planning is accomplished using flight day management and forecast demand. ANSP resources and airspace are adjusted to meet anticipated demand.

Provide Efficient Trajectory Management

Efficient trajectory management provides the ability to assign trajectories that minimize the frequency and complexity of aircraft conflicts within the flow through the negotiation and adjustment of individual aircraft trajectories and/or sequences when required by resource constraints.

Transformation Objective

The transformational objective of this NextGen capability is to evaluate and adjust individual trajectories to provide appropriate access to airspace system assets (dependent upon aircraft capabilities) and separation assurance to all aircraft, ultimately providing the most efficient trajectory while also saving users' time and fuel.

In the near-term, operational improvements will focus on providing flight trajectories using time-based metering improvements that create greater efficiency. Time-based management is used for sequencing multiple arrival and departure streams over separate assigned fixes, resulting in both a reduction of "lost landing" opportunities at the runway threshold and improved routing upon departure. The use of the most economical power setting from cruise to approach and the accompanying reductions in environmental impact are achieved by Optimized Profile Descent (OPD) improvements. Additionally, the use of Required RNP and RNAV technologies will improve arrival/departure operations, resulting in increased access, capacity, and efficiency when implemented with the separation management capability.

In the mid-term, interactive flight planning from any location will be enabled as flight planning activities are accomplished from the flight deck as readily as any location. ANSP automation will allow the user to enter the flight plan incrementally, with feedback on conditions for each flight segment, enabling users to quickly reach a flight plan agreement, optimizing their business objectives. Airborne and ground automation will provide the capability to exchange flight planning information and the negotiation of flight trajectory contract amendments in near real time, while automated Clearance Delivery and Frequency Changes will help streamline departure activities and minimize miscommunications. Precision aircraft approaches, using technology such as the ground-based augmentation system (GBAS), will allow broader access at more airports and increased access to currently under-utilized regional airports. Subsequently, surface safety will increase through the implementation of tools that provide greater situational awareness for controllers and pilots in the prevention of runway incursions. Surface automation will be greatly enhanced with improved low-visibility surface operations that allow ANSP and airport operators to use integrated surveillance data to efficiently coordinate and prioritize surface movement of aircraft and vehicles. Aircraft and ground vehicle movements are supported by improvements in surface traffic management through a combination of advanced displays, alert mechanisms, and other ground and aircraft-based monitoring and automation systems. This will increase efficiency and safety of surface traffic while facilitating a reduced environmental impact.

In the far-term, access to airports with near-zero ceiling and/or visibility is available where needed through a combination of complementary airborne and ground functionality to aid the pilot in approach guidance and acquisition of the runway environment for safe operations. In addition, with the introduction of a Net-Centric Virtual Facility (Remotely Staffed Towers) and Automated Virtual Towers, a broad range of ANSP services are provided without the need of full tower infrastructure and local staff. ANSPs will have improved conflict alert aids available for use. Some separation responsibility is delegated to aircraft equipped with “sense and avoid” or synthetic aperture-type capabilities. Traffic management initiatives and flight plan data will be available to flight operators and ANSPs via net-centric/shared information capabilities that improve common situational awareness. Decision support tools will also assist ANSPs with planning taxi routes and arrival/departure sequencing. Specifically, metroplex operations will be enhanced by the full integration of trajectory, separation, and capacity management functions, including surface and terminal airspace operations. By scheduling and managing all operations with full situational awareness, the ANSP and flight operators can efficiently collaborate to balance the demands of all users and maximize the utilization of the runway and airspace capacity. Surface movement efficiency and safety are further increased, especially in low-visibility conditions, with tagging and tracking of surface vehicle positions and then sharing or displaying this information to operators and the ANSP. Enabling efficient trajectory management and procedures with the intent of optimizing aircraft arrivals, departures, and surface operations will also inherently reduce aircraft fuel burn, emissions, and noise – thereby having a diminished impact on the environment.

The full realization of trajectory management for all phases of flight is enabled by automation and data exchanges for trajectory negotiation and separation management. This allows aircraft and ANSP systems to negotiate and optimize multi-domain trajectories in real time with full awareness of user preferences and constraints such as weather, restricted airspace, and airport status, while decreasing human errors and increasing certainty of aircrafts paths, overall capacity, and the efficient use of resources.

Provide Flexible Separation Management

Flexible separation management establishes and maintains safe separation minimums from other aircraft, vehicles, protected airspace, terrain, weather, etc., by predicting conflicts and identifying resolutions (e.g., course, speed, altitude, etc.) in real time, and accommodates increasing capacity demands and traffic levels by using automation (e.g., decision support systems) while also introducing reduced separation standards.

Transformation Objective

The transformational objective of this NextGen capability is to increase system capacity and improve efficiency and predictability of the NAS, while maximizing airport operating capacity by implementing safe aircraft separation standards. The operational improvements will focus on the reduction of oceanic profiles, airborne merging and spacing, more closely spaced arrival operations, and delegated self-separation procedures.

In the near-term, ADS-B provides reduced separation minimums and flight following services. Improved surveillance also enables the ANSPs to use radar-like separation standards and services. The ADS-B positional reports are incorporated into the surveillance data processing systems and displayed to controllers.

In the mid-term, enhancements for reduced oceanic separation further introduce the availability of user-preferred oceanic profiles for capable aircraft, which is increased through pair-wise altitude change maneuvers with ground-based separation responsibility. Aircraft-to-aircraft oceanic longitudinal and lateral spacing is reduced to 10 miles during altitude change maneuvers. Pair-wise maneuvers (in-trail climbs and descents) are enabled through the use of improved oceanic cooperative surveillance information. Data communications between aircraft, and between the aircraft and the ANSP, enable real-time control instructions by the ANSP and aircraft-to-aircraft delegation of separation authority.

Aircraft-to-aircraft separation through enhanced surveillance is delegated by the ANSP and enabled by new procedures and data received from on-board displays. Digital communication is used to reduce controller and aircraft crew workload. Maneuvers, such as airborne merging and spacing, are increasingly delegated to the aircraft, and trajectories are constantly modified to meet projected capacity demand. As aircraft separation capabilities increase, separation responsibility is also increasingly delegated from ANSP control to capable aircraft, allowing for more closely spaced arrivals, thus improving airport and runway efficiency and flexibility.

In the far-term, delegated separation improvements are also achieved in other ANSP-managed airspace. Reduced and more efficient separation procedures are applied in new high-density en route airspace, based on required performance criteria as well as the reduced separation and enhanced procedures in oceanic airspace. Additionally, departure capacity will increase for single runways due to the reduction in the longitudinal wake separation standards. Runway capacity is increased with the allowance of more than one aircraft on the runway at a given time for specific situations. Arrival capacity is also increased for single runways due to the reduction in the longitudinal wake separation standards in IMC. These enhancements improve operator routing and operational efficiency, and increase ANSP productivity. The ANSP delegates separation responsibility to capable aircraft with on-board displays to perform specific separation operations, including passing, crossing, turn-behind, and other simple maneuvers. This does not include separation for complex situations that would require on-board conflict alerting.

In self-separation airspace, capable aircraft are responsible for separating themselves from one another, and the ANSP provides no separation services, enabling preferred operator routing with increased ANSP productivity. During self-separation operations in designated areas, aircraft-to-aircraft separation is delegated to the flight deck for aircraft equipped with ADS-B and on-board conflict detection and alerting. Finally, based upon concept exploration and a feasibility analysis, NextGen is envisioned to support delegated separation involving the more complex procedures, including the possibility of maintaining separation from more than one aircraft at a time during crossing, merging, or passing procedures.

Provide Integrated NextGen Information

Integrated NextGen information provides authorized aviation stakeholders timely, accurate, and actionable information (e.g., weather, surveillance, aeronautical information, operational and planning information, and position, navigation and timing information) to shorten decision cycles and improve situational awareness using a net-centric environment managed through enterprise services that meets the information exchange requirements of the NextGen stakeholder community.

Transformation Objective

The transformational objective of this NextGen capability is to create an environment that gets the right information, at the right time, in the right format, and under the right protection, to authorized decision makers and their decision support tools. Integrated NextGen Information is an emergent and enabling enterprise capability that depends on and results from the implementation of operational improvements that provide core NextGen capabilities (e.g., capacity, trajectory, flow contingency, and separation management, air transportation security). The Integrated NextGen Information capability will be provided to aviation stakeholders through enterprise management services of the net-centric environment and physical infrastructure, assuring its availability and security, and through content management services that provide discovery, storage, and delivery of information from producers to consumers. Key to the success of these enablers is the ability to monitor and maintain situational awareness of the health, security, and mission readiness of the net-centric information enterprise.

In the near-term, improvements build a foundational net-centric environment by implementing and upgrading physical infrastructure; integrating existing interagency enterprise networks into an interoperable information sharing environment that meets minimum NextGen requirements for safety, security, and network management; incorporating information from modular legacy sources and new decision support tools; and developing and implementing the security policies (i.e., physical and cyber), information sharing standards and protocols, enterprise governance mechanisms, and standards for the content management framework. Content management services will enable authorized stakeholders to provide, discover, and consume timely and accurate NextGen-relevant information through available enterprise-wide services (e.g., discovery, display, cataloging, compiling, distributing, storing, retrieving, caching, sharing, and mediating), trusted aviation stakeholder partnerships, and aligned data policies, regulations, and standards (including data conflict resolution).

Benefits from these improvements are realized immediately as they begin to enable advancements in NAS operations such as improved air domain awareness, weather information assimilated into decision making, and integration of regulatory and operational risk information. Improvements to air domain awareness are realized as cooperative, non-cooperative, and ground surveillance information from legacy systems are integrated with information from initial ADS-B and Automatic Dependant Surveillance-Contract (ADS-C) solutions and used in decision support tools and display systems. Risk management improvements implement information management and decision support tools. Near-term NextGen weather improvements integrate weather observations systems with decision support tools and develop policies and governance for the 4-D Weather Cube.

In the mid-term, improvements incorporate additional data types and information sources into the content management framework and improve integration and interoperability of systems across the net-centric enterprise. Air domain awareness is further enhanced as flight risk management systems are integrated with more dynamic risk assessment and decision support capabilities to provide increased response coordination. In the weather domain, user-defined operational capabilities are improved, and advancements in decision support tools begin to leverage new sources and types of weather observation data, which enable the 4-D Weather Cube capability that provides adaptive sensor control, enhanced forecast products, and a common weather picture. Improvements to risk management enable further integration and expansion of risk factors into decision-making criteria.

In the far-term, improvements provide the full Integrated NextGen Information capability. Enterprise and content management improvements link producers and consumers of information in a robust, scalable, resilient, secure, and globally interconnected net-enabled environment in which information is timely and shared consistently among authorized aviation users, systems, and platforms. Information structures and management frameworks are in place and operational to support full consideration of risk information during decision cycles across the enterprise. Completing the integration of weather observation sources and decision tools enables full 4-D Weather Cube capability to improve forecasts and minimize weather impact to NAS operations. Air Domain Awareness coupled with a risk management system incorporates integrated surveillance information and risk profiles to provide situational awareness across the NAS and enable a unified, national command, control, and communications architecture to respond to threats and incidents in the NAS.

Provide Air Transportation Security

The capability to provide Air Transportation Security relies on the concept of layered, adaptive security based on risk assessment and risk management thus yielding the ability to identify, prioritize, and assess national defense and homeland security situations and appropriately adjust resources to facilitate the defeat of an evolving threat to critical NAS infrastructure and key resources using a collaborative approach (e.g., appropriate tactics, techniques, and procedures) without unduly limiting mobility, making unwarranted intrusions on civil liberties, and minimizing impacts to airline operations or aviation economics.

Transformation Objective

The transformational objective of this NextGen capability is to improve the operational efficiency and effectiveness of air transportation security from reservation to destination with adaptive security technologies, policies, and procedures that are scaled and layered to address potential threats across multiple domains, including people, baggage, cargo, airspace, airports, and aircraft, while meeting the traffic and passenger flow demands posed by the NextGen system.

In the near-term, key operational improvements are expected to reduce the potential of high-risk passengers and personnel becoming security threats to aviation. To achieve this objective, the plan is for gradual improvements in passenger screening, credentialing, and identification, including enhanced biometric technologies and vetting capabilities that are integrated with modernized watch list systems. Beyond passenger screening, there will be improvements in aviation worker screening and credentialing, from initial employment to termination, using random checks and biometric technologies. Also expected in the near term are integrated risk-based planning and security resource management practices based on new policies and procedures that require the timely sharing of operational risk data.

In the mid-term, aviation security improvements include enhancements to aircraft, airports, and airspace. Aircraft and Unmanned Aircraft System (UAS) security is established through a variety of technological, personnel, and procedural improvements that help mitigate potential threats related to unauthorized aircraft diversions, hijacking, and disruption. The threat of aircraft and UAS destruction or use as a weapon is reduced through improvements to aircraft threat containment and redundant flight control capabilities. Threats of unauthorized people and vehicles entering airport airside, landside, and vendor supply areas are reduced by employing integrated access control systems and facility surveillance networks that help proactively identify potential risks. Airspace surveillance and security are improved through the realization of ADS-B, as well as improvements to the management of Security Restricted Airspace (SRA) and increased sharing of flight risk and flight object behavior assessment data. Enhanced automation will enable sharing and tracking SRA waivers across all security stakeholders and integrate the data with flight risk management systems to enhance overall Shared Situational Awareness (SSA).

Additional mid-term aviation security efficiencies are obtained from new policies, procedures, and standards that certify elements of the air transportation supply chain. This is achieved by the introduction of improvements to cargo and mail processing and transportation through the use of Secured and Certified Supply Chain Entities (SSCE and CSCE) that pre-screen cargo/mail for chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) prior to entering the air transportation system. In addition, existing screening equipment will be enhanced to achieve higher accuracy, greater throughput, and a reduction in overall footprint. This is expected to enhance passenger screening for CBRNE and weapons by integrating and digitally linking embedded sensors and other technologies located throughout the terminal buildings, departure curbs, and approach roadways to airport security command centers. This improvement establishes a foundation for providing instantaneous alert and threat recognition functionality across the network of local and national security operation centers. Screening operations are further improved, which increases levels of threat detection, lowers false alarm rates, and increases passenger and cargo throughput. New policies and bilateral agreements also will introduce international passenger and cargo processing efficiencies as international manifests are shared between aircraft operators and security service providers across a net-centric environment.

In the far-term, enhancements begin to fully integrate CBRNE detection systems, baggage identification and tracking systems, and multi-sensor fusion capabilities using net-centric technologies. Policies will drive aircraft and UAS technology enhancements that include on-board systems that protect against external threats such as light amplification by stimulated emission of radiation (LASERS), man-portable air defense systems (MANPADS), and electromagnetic pulse (EMP). Additional policies will be necessary to establish an integrated operational picture with national command and control, resulting in a network of airport security operation centers connected to a national transportation security operation center. To achieve this, implemented improvements will identify and establish national-to-local integration of command and control capabilities that unify security operations protocols, communications, procedures, and tactics related to security incident response and recovery. Additional improvements will further exploit net-centric capabilities to integrate and share airport access control system and surveillance network data with law enforcement organizations at multiple levels. Operational security capability improvements will provide enhanced accessibility and coordination of real-time SRA information, such as flight object data, to improve airspace planning, configuration, and distribution capabilities that make SRA more adaptive to flight risk determination and more flexible for use.

Provide Improved Environmental Performance

Improved Environmental Performance ensures environmental management considerations, including flexibility in identifying, preventing, and proactively addressing environmental impacts, are fully integrated throughout the air transportation system decision-making process, through increased collaboration and improved tools, technologies, operational policies, procedures, and practices that are consistent and compatible with national and international regulations.

Transformation Objective

The transformational objective of this NextGen capability is to balance sustained aviation growth with environmental goals by facilitating and promoting an effective and common Environmental Management System (EMS) that is adopted by all applicable aviation organizations. The intent of the EMS is to fully integrate environmental protection goals and objectives into the core business and operational decision making process throughout the air transportation system.

In the near-term, operational improvements initiate the implementation of an EMS Framework, which provides the construct for describing the environmental policies, procedures, regulations, goals and metrics, and tools and technologies. The framework establishes the foundation for efforts that develop environmental metrics needed to improve the understanding of aviation impacts on noise, air and water quality, fuel burn, and global climate; improvements to impact modeling and assessments used to monitor and predict environmental performance; the initiation of long-term outreach programs to encourage the adoption and implementation of the EMS; and initial piloting of the environmental goals and decision support tools that help address, plan, and mitigate environmental issues within a subset of U.S. aviation organizations.

In the mid-term, initial improvements to aircraft engines, airframe technologies, and new developments in alternative fuels are introduced. These improvements provide reductions in aircraft noise, emissions, and fuel burn and are sufficient to achieve FAA's continuous low emissions, energy, and noise (CLEEN) program goals and NASA's N+2 future aircraft design concepts. Additional improvements introduce the increased use of "drop-in" alternative aviation fuels that are compatible with existing infrastructure and aircraft fleet in an effort to obtain Hydrotreated Renewable Jet (HRJ) certification. Environmental improvements supporting a wide range of aircraft operations are also introduced in this time frame. Such improvements include solutions that provide environmentally friendly air traffic procedures (e.g., optimized profile descents) and surface operations, as well as avionics (e.g., flight management systems) capable of supporting environmental performance metrics. The EMS framework is further expanded to refine the goals and decision support tools and increases access to environmental information for planning and mitigation purposes.

In the far-term, further reductions in aircraft noise, emissions, and fuel consumption will be realized from enhancements to aircraft engines and airframe technologies. These results are further enhanced through advancements in environmental management system tool suites, such as impact modeling and assessment capabilities that provide higher-fidelity data to drive decision making and optimization of NAS infrastructure resources.

Provide Improved Safety Operations

Improved safety operations ensure safety considerations are fully integrated throughout the air transportation system through increased collaboration and information sharing, improved automation (e.g. decision support systems), prognostic safety risk analysis, and enhanced safety promotion and assurance techniques that are consistent and compatible with national and international regulations, standards, and procedures.

Transformation Objective

The transformational objective of this NextGen capability is to facilitate and promote a common vision and culture of safety that allows for sustained aviation growth throughout the global air transportation system. This vision and culture includes a combination of safety goals and metrics that drive aviation system improvement activities and investments; fully integrated safety policies, procedures, and operational practices; and automated systems and technologies that are consistently designed and implemented for enhanced safety.

In the mid-term, a safer NAS requires the implementation of operational improvements that proactively address all aspects of safety from design to implementation. The development and systematic application of standardized safety management practices throughout government and industry are expected to reduce the risk of incidents and accidents throughout the system. This improvement is intended to provide a consistent approach for achieving acceptable levels of safety risk in processes such as the operation of aircraft, certification of procedures and equipment, and the conduct of maintenance, and establishes the mechanisms necessary to deliver and monitor safety performance. In addition to safety policies and standards, new developments and enhancements to safety data sharing and information analysis capabilities are introduced and are expected to improve system-wide risk identification, integrated risk analysis and modeling, and risk management. During this time frame, improvements are introduced to the reliability and airworthiness of aircraft, the accuracy of aircraft operational information and system health management, and the enhanced aircraft systems supporting crash survivability. As safety risk management practices are institutionalized and feedback is incorporated, improvements are implemented that increase the effectiveness and efficiency of system safety assessments, design certainty, safety assurance of operational procedures, and advanced training for off-nominal situations.

In the far-term, established safety practices (e.g., safety policy, safety risk management, safety assurance, and safety promotion) are complemented with advancements in technologies that identify contributing factors and causes of incidents and accidents, tools that automate vulnerability detection, and improvements in fault management. Improvements to information sharing build on established processes and analysis capabilities by expanding their coverage and increasing data accessibility. This enables the automation of safety risk identification and notification processes, enhances safety mitigation evaluations, and increases the confidence of analytical results. The consistency and compatibility of safety practices and systems across the global aviation community will be achieved through increased partnership and participation in international aviation safety standards development. Furthermore, harmonized regulations, standards, and procedures—especially for the transport of dangerous goods across multiple transportation modes—are introduced and are expected to establish equivalent levels of safety across air transportation system boundaries. Lastly, safety enhancements to ground-based systems that improve system health management and crash survivability are introduced, and pilot, controller, and aviation operations personnel situational awareness is improved as a result of risk-reducing system interfaces and supported by technological advancements in safety risk identification and mitigation.

Provide Flexible Airport Facility and Ramp Operations

Flexible airport facility and ramp operations provides the ability to reallocate or reconfigure the airport facility and ramp assets to maintain acceptable levels of service that will accommodate increasing passenger and cargo demand levels, or changes in operational requirements, through infrastructure development, predictive analyses, and improvements to technology (e.g., automation and decision support systems) and procedures.

Transformation Objective

The transformational objective of this NextGen capability is to accommodate the increases in demand enabled by Air Traffic Management (ATM) improvements with commensurate improvements to airside and terminal/landside operations as well as development of new airport infrastructure. Near-term improvements to the airport facility and ramp operations, such as increases to operational capacity of existing runways and the efficiency of surface operations, are achieved through advancements in ATM-related procedures and technologies described in the Efficient Trajectory Management capability. Airside and landside improvements are expected to begin in the midterm and extend to the far-term, with advances in net-centric-enabled information sharing that fosters improved situational awareness and responsive decision making.

In the mid-term, advances in information sharing allow airport and aircraft operators to synthesize real-time data and proactively manage resources to improve efficiency, safety, and security in airside operations. Movement of ground support equipment (GSE) on the airport surface is monitored and proactively managed as part of a net-centric-enabled surface management system. This ensures GSE clearance from active runways and taxiways and safe separation from aircraft. GSE is also able to efficiently and safely navigate during low-visibility conditions. The tactical management of routine and emergency airport operations is improved by data sharing and resource management capabilities, including the sharing of real-time airport condition information with regional and national emergency response resources, users, ANSP, and security providers. Improvements to terminal/landside operations seek to reduce the time needed to get from the curb to the gate. Passenger flows inside terminal buildings are more efficient and predictable during peak periods with improvements to terminal layouts, signage, and security and baggage processing. At airports with limited room to expand their terminal facilities, off-airport passenger and baggage processing and security screening are done at remote facilities to mitigate crowding and delays in legacy, congested terminal buildings. Effective and efficient ground access is also important so that passengers and cargo can get to and from the airport with reasonable trip times and costs. Consolidated, real-time information on available ground transportation modes is integrated into itineraries, allowing travelers to make informed decisions about ground transportation. In addition to improving the operational efficiency of airside and landside functions at airports, preservation will be advanced in the mid-term through coordinated efforts for sustainability, advocacy, and regional planning in order to maintain a robust network of regional airports and promote community access to the NAS.

In the far-term, airside facilities are able to remain open and fully functional during most severe weather conditions with advancements in technology, systems, and procedures that help airport operators mitigate weather impacts and proactively schedule inspections, maintenance, and weather-response activities. Aircraft deicing/anti-icing and treatment of airport surfaces during winter weather events are also improved with use of decision support tools to align resources with demand and integrate predictive weather capabilities into decision making. In addition, icing holdover times are incorporated into aircraft Four Dimensional Trajectories (4DT) in order to facilitate departure queuing and to enhance safety. While NextGen ATM capabilities will improve existing runway capacity, new runways are still required at some congested airports. As a result, comprehensive, regional planning efforts use NextGen-enabled design standards to guide the development of new closely spaced parallel runways as well as expanded taxiway and ramp areas. Because airport development efforts are long term, ongoing endeavors that will occur throughout the near-, mid-, and far-term time frames, the IWP seeks to assess the cumulative benefit of airport improvements at the NextGen end-state in 2025 rather than track improvements at specific airports.

NextGen Capability Evolution Roadmaps

As previously stated, each of the NextGen capability's transformational summaries are derived from the supporting operational improvement and materiel and non-materiel solution descriptions found in the IWP version FY12. The following roadmaps complement the transformational summaries and highlight the specific operational improvements that support the evolution of each NextGen capability.

Provide Collaborative Capacity Management (2023)	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
OI-0346 Improved Management of Airspace for Special Use					●													
OI-0310 Improved GA Access to Traverse Terminal Areas						●												
OI-0382 Strategic User Requests						●												
OI-0307 Integrated Arrival/Departure Airspace Management								●										
OI-0351 Flexible Airspace Management								●										
OI-0334 Independent Converging Approaches in IMC										●								
OI-0406 NAS Wide Sector Demand Prediction and Resource Planning													●					
OI-0365 Advanced Management of Airspace for Special Use																●		
OI-0366 Dynamic Airspace Performance Designation																●		
OI-0385 Full Collaborative Decision Making																●		

Provide Collaborative Flow Contingency Management (2015)	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
OI-0408 Provide Full Flight Plan Constraint Evaluation with Feedback						●												
OI-0303 Traffic Management Initiatives with Flight Specific Trajectories							●											
OI-0361 Resource Planning								●										

Provide Efficient Trajectory Management	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
OI-0319 Time-Based Metering into En Route Streams	●																	
OI-0309 Use Optimized Profile Descent			●															
OI-0311 Increased Capacity and Efficiency Using RNAV and RNP			●															
OI-0320 Initial Surface Traffic Management					●													
OI-0304 Flexible Entry Times for Oceanic Tracks						●												
OI-0305 Continuous Flight Day Evaluation							●											
OI-0321 Enhanced Surface Traffic Operations							●											
OI-0325 Time-Based Metering Using RNAV and RNP Route Assignments							●											
OI-0352 Automated Clearance Delivery and Frequency Changes							●											
OI-0317 Low Visibility/Ceiling Approach Operations								●										
OI-6005 Environmentally and Energy Favorable En Route Operations—Level 1								●										
OI-6008 Environmentally and Energy Favorable Terminal Operations—Level 1								●										
OI-0330 Time-Based and Metered Routes with OPD									●									
OI-0383 Improved Runway Safety Situational Awareness for Controllers									●									
OI-0384 Improve Runway Safety Situational Awareness for Pilots									●									
OI-0381 GBAS Precision Approaches										●								
OI-0306 Provide Interactive Flight Planning from Anywhere											●							
OI-0322 Low Visibility Surface Operations											●							
OI-0327 Full Surface Traffic Management with Conformance Monitoring											●							
OI-0331 Improved Management of Arrival/Surface/Departure Flow Operations											●							
OI-0388 Low Visibility Takeoff Operations											●							
OI-0389 Low Visibility/Ceiling Landing Operations											●							
OI-0390 Low Visibility/Ceiling Departure Operations											●							
OI-0409 Remotely Staffed Tower Services											●							
OI-0337 Flow Corridors—Level 1 Static													●					
OI-0338 Efficient Metroplex Merging and Spacing													●					
OI-0410 Automated Virtual Towers													●					
OI-6021 Environmentally and Energy Favorable Terminal Operations—Level 2													●					
OI-6022 Environmentally and Energy Favorable En Route Operations—Level 2													●					
OI-0360 Automation-Assisted Trajectory Negotiation and Conflict Resolution														●				
OI-0339 Integrated Arrival/Departure and Surface Traffic Management for Metroplex															●			
OI-0350 Flexible Routing																●		
OI-0340 Provide Surface Situation to Pilots, Service Providers and Vehicle Operators for Near-Zero-Visibility Surface Operations																		●
OI-0368 Flow Corridors—Level 2 Dynamic																		●
OI-0369 Automated Negotiation/Separation Management																		●
OI-0370 Trajectory-Based Management—Gate-To-Gate																		●

Provide Flexible Separation Management	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24 (2025)	25
OI-0318 Arrival Time-Based Metering—Controller Advisories	●																	
OI-0347 ADS-B Separation				●														
OI-0316 Enhanced Visual Separation for Successive Approaches					●													
OI-0400 Wake Turbulence Mitigation: Departures—Wind-Based Wake Procedures						●												
OI-0326 Airborne Merging and Spacing—Single Runway							●											
OI-0349 Automation Support for Mixed Environments							●											
OI-0356 Delegated Separation—Pair-Wise Maneuvers							●											
OI-0329 Airborne Merging and Spacing with OPD								●										
OI-0355 Delegated Responsibility for Horizontal Separation (Lateral and Longitudinal): Terminal								●										
OI-0401 Wake Turbulence Mitigation for Arrivals: CSPRs								●										
OI-0333 Improved Parallel Runway Operations									●									
OI-0335 Closely-Spaced Parallel Runway Operations in IMC										●								
OI-0343 Reduced Horizontal Separation Standards, En Route—3 Miles												●						
OI-0354 Reduced Oceanic Separation and Enhanced Procedures												●						
OI-0402 Single Runway Departure Wake Mitigation												●						
OI-0341 Limited Simultaneous Runway Occupancy													●					
OI-0403 Single Runway Arrival Wake Mitigation														●				
OI-0359 Self-Separation Airspace—Oceanic															●			
OI-0362 Self-Separation Airspace Operations															●			
OI-0386 Expanded Radar-like Services to Secondary Airports															●			
OI-0348 Reduce Separation—High Density Terminal, Less Than 3-miles																		●
OI-0363 Delegated Separation—Complex Procedures																		●
OI-0387 Dynamic, Pairwise Wake Turbulence Separation																		●

Provide Integrated NextGen Information	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24 (2025)	25
OI-2010 Net-Enabled Common Weather Information Infrastructure						●												
OI-2020 Net-Enabled Common Weather Information—Level 1 Initial Capability						●												
OI-4500 Integrated Flight Risk Management and Risk Mitigation—Level 1 Static							●											
OI-2021 Net-Enabled Common Weather Information—Level 2 Adaptive Control/Enhanced Forecast											●							
OI-2023 Initial Integration of Weather Information into NAS Automation and Decision Making											●							
OI-2022 Net-Enabled Common Weather Information - Level 3 Full NextGen															●			
OI-2024 Full Integration of Weather Information into NAS Automation and Decision Making																●		
OI-4502 Integrated Flight Risk Management and Risk Mitigation—Level 2 Dynamic																		●

Provide Air Transportation Security	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
																		2025 ●
OI-4101 Integrated Passenger Screening, Credentialing and Identification—Level 1					●													
OI-4106 Integrated Passenger Screening, Credentialing and Identification—Level 2						●												
OI-4103 Integrated Aviation Worker Screening and Credentialing							●											
OI-4400 Improved Processing of Cargo and Mail Transported via SSCE and CSCE							●											
OI-4520 Integrated Risk-Based Planning and Management of Security Resources							●											
OI-4401 Improved Cargo and Mail Screening—Level 1 Components								●										
OI-4511 Operational Security Capability for Threat Detection and Tracking, NAS Impact Analysis and Risk-Based Assessment								●										
OI-4201 Reduced Threat from Unauthorized Persons Entering Airport—Level 1 Components									●									
OI-4203 Reduce CBRNE Threats from Entering Airport									●									
OI-4300 Improved Baggage Screening—Level 1 Component									●									
OI-4600 Reduced Threat of Aircraft and UAS Destruction or Used as a Weapon									●									
OI-4105 Improved Passenger Checkpoint Screening—Level 1										●								
OI-5011 Integrated International Passenger Arrival Processing										●								
OI-4301 Improved Baggage Screening—Level 2 Integrated											●							
OI-4403 Improved Cargo and Mail Screening—Level 2 Integrated											●							
OI-4601 External Aircraft/UAS Threat Protection											●							
OI-4107 Improved Passenger Checkpoint Screening—Level 2														●				
OI-4521 Integrated Command/Control for Security Incident Response and Recovery														●				
OI-4202 Reduced Threat from Unauthorized Persons Entering Airport—Level 2 LEO Integration															●			
OI-4512 Operational Security Capability with Dynamic Flight Risk Assessment for Improved Security Airspace Planning and Management																		●

Provide Improved Environmental Performance	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
													2021	●				
OI-6014 Implement EMS Framework—Level 1				●														
OI-6012 Implement NextGen Environmental Engine and Aircraft Technologies—Level 1								●										
OI-6017 Increased Use of Alternative Aviation Fuels								●										
OI-6020 Implement EMS Framework—Level 2											●							
OI-6023 Implement NextGen Environmental Engine and Aircraft Technologies—Level 2														●				

Provide Improved Safety Operations	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25 (2025)
OI-3004 Improved Operational Processes Using the Safety Management System (SMS)							●											
OI-3101 Enhanced Aviation Safety Information Analysis and Sharing							●											
OI-3102 Improved Safety for NextGen Evolution										●								
OI-3106 Increased International Cooperation for Aviation Safety													●					
OI-3107 Improved Safety Across Air Transportation System Boundaries													●					
OI-3108 Improved SMS Standards and Effectiveness													●					
OI-3109 Enhanced (Automated) Aviation Safety Information Sharing and Analysis Scope and Effectiveness													●					
OI-3103 Improved Safety of Operational Decision Making																		●
OI-3104 Enhanced Safety of Airborne Systems																		●
OI-3105 Enhanced Safety of Ground-based Systems																		●

Provide Flexible Airport Facility and Ramp Operations	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25 (2025)
OI-5006 Coordinated Ramp Operations Management							●											
OI-5000 Airport Preservation								●										
OI-5009 Improved Tactical Management of Airport Operations								●										
OI-5010 Advanced Winter Weather Operations—Level 1								●										
OI-5012 Airport Intermodal Ground Access								●										
OI-4204 Common and Synchronized Airport Emergency and Disaster Response									●									
OI-5014 Efficient Passenger Flows In Terminal Buildings										●								
OI-5015 Off-Airport Passenger and Baggage Processing										●								
OI-5002 Improved Strategic Management of Existing Infrastructure (Airside)													●					
OI-5003 Improved Strategic Management of Existing Infrastructure (Landside)													●					
OI-5110 Advanced Winter Weather Operations—Level 2													●					
OI-5008 Advanced Weather Capability for Airside Facilities															●			
OI-5004 New Airside Airport Infrastructure																		●
OI-5005 New Landside Airport Infrastructure																		●
OI-5111 Advanced Winter Weather Operations—Level 3																		●

NEXT YEAR'S OBJECTIVES

The JPDO realizes considerable work remains to mature and validate the NextGen planning information, specifically the precision of the elements within the IWP and EA. Through the annual validation process, the JPDO will work in close collaboration with the stakeholder community to obtain clearer descriptions of the proposed solutions and associated performance needed to achieve the NextGen improvements. The JPDO will continue to identify, facilitate, and integrate the activities, commitments, and contributions of Federal partner agencies, industry, and other key stakeholders to ensure the NextGen transformation is realized.

The JPDO recognizes the need to develop an interoperable system with the international community. Coordination and collaboration on policy, system standards, operational procedures, avionics capabilities, and equipage milestones across international borders will promote global harmonization. To this end, as a critical next step of NextGen planning, the JPDO will seek to identify international activities and their relationship to NextGen milestones to ensure seamless global operations and to align timelines for NextGen Operational Improvements with the implementation of future systems around the world.

The JPDO will also leverage deliverables produced by other consensus-forming, aviation-related initiatives, such as the RTCA NextGen Task Force 5 and NASA/FAA Research Transition Teams, to identify potential enhancements and updates to the NextGen planning information. As new information is captured, it will provide the additional depth needed for detailed analysis of priorities, performance, benefits, risk, cost, and research and technology maturity. The JPDO recognizes this level of fidelity is necessary to perform objective alternative analysis, derive the case for NextGen, and inform stakeholder investment decision making.