



**U.S. Department of
Transportation**

Office of the Secretary
of Transportation

The Inspector General

Office of Inspector General

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The Honorable James L. Oberstar
Chairman, Committee on Transportation
and Infrastructure
United States House of Representatives
Washington, DC 20515

The Honorable John L. Mica
Ranking Republican Member,
Committee on Transportation
and Infrastructure
United States House of Representatives
Washington, DC 20515

The Honorable Jerry F. Costello
Chairman, Subcommittee on Aviation
Committee on Transportation
and Infrastructure
United States House of Representatives
Washington, DC 20515

The Honorable Thomas E. Petri
Ranking Republican Member,
Subcommittee on Aviation
Committee on Transportation
and Infrastructure
United States House of Representatives
Washington, DC 20515

Dear Chairmen Oberstar and Costello and Ranking Members Mica and Petri:

At your request, we are reviewing the Federal Aviation Administration's (FAA) efforts to develop the Next Generation Air Transportation System (NextGen) and its response to the RTCA¹ Government/industry task force recommendations, issued in September 2009, for operational improvements to NextGen in the midterm (through 2018). Chairman Costello asked us to testify on our results thus far at a November hearing that was subsequently cancelled. Because of the central role NextGen plays in reauthorizing FAA programs and its budgetary implications, you asked us to formally transmit our results with respect to (1) FAA's progress in responding to the task force report, (2) potential barriers to implementing the task force recommendations and realizing benefits, and (3) ongoing problems with a key modernization effort that could materially affect the pace of NextGen.

In summary, FAA is incorporating RTCA's recommendations in its NextGen plans but has not specified how it will execute key initiatives for addressing delays in major metropolitan areas. For example, FAA is still working to establish definitive

¹ Organized in 1935 as the Radio Technical Commission for Aeronautics, RTCA, Inc., is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance, and air traffic management system issues. It functions as a Federal Advisory Committee.

milestones to integrate new airspace designs and procedures at metroplex locations.² FAA also has yet to establish a mechanism for integrating metroplex initiatives with programs to better manage airport surface operations. At the same time, FAA faces several organizational, policy, logistical, and training challenges that could impede NextGen implementation in the midterm; these include working across diverse agency lines of business and establishing policies on data sharing. FAA must also resolve implementation problems with critical modernization projects, such as En Route Automation Modernization (ERAM)—a \$2.1 billion NextGen tool for processing flight data—which has experienced software problems and delays at key sites. Delays with ERAM will have a cascading effect on other fundamental NextGen programs now and well into the future, including the task force’s recommended improvements for the high-altitude environment. The following discusses these issues in greater detail.

BACKGROUND

Since 2006, our reports and testimonies have identified NextGen as a high-risk effort and one of the Department’s top management challenges for fiscal years 2008 through 2011, and we have made numerous recommendations to help FAA achieve its NextGen goals. To gain operator acceptance and solidify commitments from both Government and industry, FAA asked RTCA to reach a consensus on the NextGen operational improvements planned for the 2012 to 2018 timeframe, help develop plans to maximize NextGen benefits, and justify industry investment in mid-term capabilities. In September 2009, RTCA delivered its final report to FAA.³ The task force findings and recommendations are consistent with our work, covering areas such as maximizing the use of equipment already on aircraft and new procedures and enhancing information sharing among FAA and airspace users to reduce delays. The RTCA report also identified the following key issues:

- Users are willing to support FAA communications, navigation, and surveillance infrastructure programs that require user investments only if those programs provide a clear and unambiguous path to immediate and tangible benefits to the users.
- Focusing on delivering near-term operational benefits, rather than on the entire infrastructure, would help gain operator confidence in FAA plans and encourage users to invest in NextGen. A key element for accomplishing this is obtaining industry and FAA agreement on common metrics to measure benefits.
- Assigning responsibility, accountability, authority, and funding within the Agency is critical to accomplish all associated and necessary non-infrastructure tasks (i.e., development of procedures and policy) and to achieve NextGen benefits.

² A geographic area covering many airports, serving major metropolitan areas with a diversity of aviation users and aircraft operators.

³ RTCA, “NextGen Mid-Term Implementation Task Force Report,” September 9, 2009.

The RTCA task force made 34 recommendations: 28 in 5 primary areas calling for FAA to take advantage of existing technologies and on-aircraft equipment that can quickly generate user benefits, 2 cross-cutting recommendations that are integral to supporting improvements in each of the 5 areas, and 4 overarching recommendations to encourage operator investment and enhance confidence within the aviation community in FAA's ability to implement new capabilities (see enclosure for details). The report also acknowledged that major programs, such as ERAM and Automatic Dependent Surveillance-B (ADS-B),⁴ are fundamental to achieving mid-term benefits envisioned for NextGen but did not make specific recommendations for these programs.

FAA'S NEXTGEN PLAN INCLUDES TASK FORCE RECOMMENDATIONS BUT LACKS A DETAILED IMPLEMENTATION STRATEGY

FAA endorsed the task force's recommendations by incorporating them into its current NextGen Implementation Plan (NGIP).⁵ However, it has not published a detailed plan for completing key actions to benefit major metropolitan areas. In addition, earlier this year, RTCA identified other implementation gaps, such as differences in milestones and locations for targeting improvements.

FAA Is Developing Metroplex Teams but Has Not Identified Specific Timeframes for Implementing Key Initiatives

A critical task force recommendation is to improve airspace efficiency in metropolitan areas, such as Chicago, New York, and Southern California. FAA recently devised a strategy to prioritize locations and plans to start with Dallas, Texas, and Washington, DC. However, FAA is still working to establish definitive milestones to integrate new airspace designs and procedures and a strategy to measure benefits at these and other airports beyond January 2011 (see table 1 on the next page).

FAA's NextGen Management Board⁶ developed and recommended a set of criteria for prioritizing airport sites, which it submitted to a new RTCA advisory committee—the NextGen Advisory Committee (NAC)—to gain industry approval. The NAC is working to gain consensus from a broader group of aviation representatives beyond

⁴ ADS-B is a surveillance system that uses information from satellite-based systems to identify and track aircraft positions.

⁵ The NGIP is an annual plan that sets out FAA's vision for NextGen, now and into the midterm. The plan further identifies the goals FAA has set for technology and program deployment and the commitments FAA has made in support of that vision.

⁶ The NextGen Management Board is chaired by FAA's Deputy Administrator with representatives from all key Agency lines of business. The Board is the ultimate authority in managing NextGen and is empowered to force timely resolution of emerging NextGen implementation issues.

air traffic, including airport representatives.⁷ For now, however, it remains uncertain when key locations that have system-wide impacts, like New York, will be addressed.

Currently, FAA is primarily focused on developing prototype study teams and has convened two—one in Dallas and one in Washington, DC—to develop recommendations for upgrading airspace procedures at those airports.

Table 1. FAA Timeframes for Implementing Recommendations Related to Metroplexes

Team	Task
May 2010	
Mock study team	Completed its review at Denver Metroplex to simulate how a study team would develop recommendations for a particular metroplex site.
September - December 2010	
Two prototype study teams	Develop recommendations for procedures and airspace upgrades at the Dallas-Fort Worth and Washington, DC, metroplexes.
January 2011	
Mature study teams	Build on lessons learned from the prototype study teams. This will lead to design and implementation teams for prototype sites. Process will continue until a total of 23 sites are completed.
Beyond January 2011	
Design and Implementation teams	Leverage structure in moving toward implementation of integrated airspace procedures. Goal is for each site to take 18 to 30 months to complete.

Source: FAA

FAA also recently began planning a way to select members for the metroplex design and implementation teams. While the RTCA task force believes FAA has done a good job of getting the right mix of people on the two prototype study teams, it has also told FAA that it will be difficult to get appropriate people on future metroplex study and design teams due to the limited number of available FAA and industry representatives with the expertise needed. This issue could be further complicated because study and design team responsibilities will be collateral duties, and FAA plans to have multiple teams conduct work at the same time. Further, while RTCA task force officials are encouraged by FAA's efforts to initiate the metroplex work, they are concerned because FAA's approach does not yet integrate other task force recommendations, such as better managing airport surface operations. RTCA task force officials have stated that preliminary results of the first study teams show a need for better coordination with officials responsible for surface programs.

⁷ The NAC, which had its first meeting on September 23, 2010, is a Federal advisory committee that will develop a common understanding of NextGen priorities in the context of overall NextGen capabilities and implementation constraints, with an emphasis on the midterm (through 2018). The NAC will include representation from affected user groups, including operators, manufacturers, air traffic management, aviation safety, airports, and environmental experts. It replaced the Air Traffic Management Advisory Committee (ATMAC), which completed its work in October 2010. FAA plans to have the NAC make recommendations for how to measure implementation benefits.

The Task Force Identified Implementation Gaps That May Hinder Industry's Willingness To Commit to NextGen Initiatives

The RTCA task force identified 20 gaps between its recommendations and FAA's NGIP (see table 2). Many of these relate to differences in milestones and locations and the task force's recommendation that FAA develop and document more specific plans.

Table 2. Key Implementation Gaps Identified by the RTCA Task Force

Area	Gap	Current Status
Airport Surface Operations	Establish a single manager to handle implementing surface recommendations.	FAA was originally unsure of the need for a single surface lead manager; however, FAA has recently stated it remains committed to establishing one by the end of 2010.
Runway Access	Adopt dates and locations included in the task force recommendations.	FAA has adopted task force dates and locations in some cases; however, locations and dates for key recommendations (e.g., a precision surveillance system specifically for runways and a new automated tool to maximize benefits of routes) remain undefined or subject to future FAA business cases.
High-Altitude Cruise	Pursue integration of an automated controller tool for managing aircraft with other Traffic Flow Management tools in 2011 rather than 2013.	FAA believes that deployment in 2013 is reasonable; however, the task force believes that delay in integration leads to conflicting and erroneous information in other systems.
Data Communications	Additional collaboration needed to understand and mitigate constraints on implementation.	FAA is meeting with individual flight operators and will work implementation issues through the DataComm contract. To reduce risk, industry needs assurance that the implementation date for en route services is a stable commitment. FAA has already delayed this capability a year from 2016 to 2017.

Source: NextGen Implementation Working Group

According to FAA, it has addressed these gaps. However, FAA's plans for implementing RTCA recommendations do not reflect a tactical approach for delivering benefits in the near term. Many of the gaps identified by RTCA involve differences in where or when FAA plans to implement specific activities in response to the RTCA recommendations. FAA contended that there was no gap as long as its action plans delivered capabilities within the task force's recommended overall timeframes—even if some activities were delayed or implemented elsewhere. However, individual industry operators make their investment decisions based on both the timing and location of specific activities. RTCA task force officials maintain that FAA needs to provide detailed action plans and document its rationale for deviations from recommended actions. On October 28, FAA provided RTCA with its rationale and stated that it plans to update its NGIP, which is due next March. While

RTCA task force industry representatives recognize that FAA has closed some of the gaps, they remain concerned with FAA timelines and state that if the timeline for some capabilities related to FAA's Data Communications (DataComm) Program are moved to 2017, as FAA has proposed, operators will need to revisit their business cases and willingness to commit to advance NextGen at certain locations. Although gaps remain, RTCA task force officials have agreed to wait for the updated NGIP to determine whether the updated NGIP addresses industry's concerns.

SIGNIFICANT CHALLENGES COULD UNDERMINE FAA EFFORTS TO IMPLEMENT TASK FORCE RECOMMENDATIONS

FAA faces several organizational, policy, logistical, and training challenges that could impede its efforts to implement the RTCA task force recommendations and delay expected benefits. To complete RTCA recommendations, FAA will have to effectively work across diverse agency lines of business—including its Aircraft Certification Service, Flight Standards Service, and Air Traffic Organization—which it has not done effectively in the past. For example, as we testified in July 2009, organizational barriers and fragmented efforts hindered FAA's process to approve new flight procedures.⁸ Task force leaders also pointed out that FAA's culture of focusing on large, nationwide infrastructure programs, such as ADS-B, rather than a focused, integrated approach for specific locations was a factor impeding progress.

Policy challenges include adopting the “best-equipped, best-served policy” recommended by RTCA. FAA's current policy calls for aircraft to be cleared for landing on a first-come, first-served basis regardless of their equipage. According to RTCA, the new policy would give priority to users equipped with new systems, which would encourage airspace users to equip their aircraft with advanced avionics and thereby advance NextGen. This will require extensive analyses to determine if the policy can be safely implemented, including addressing concerns about mixed equipage as aircraft transition to the NextGen system. Contractor and industry experts believe that between 80 and 100 percent of aircraft at any given location should be equipped with new NextGen systems to realize benefits and limit the potential for introducing new hazards. Transitioning to the recommended policy would also require FAA to respond to concerns about equity among users.

Policies governing information sharing will also need review. The task force recommended that FAA revamp its systems to accommodate the agile flow of information with airlines' operations centers and airports—a major element of NextGen. While FAA and the airline industry are developing new systems and strategies for sharing information, both are concerned about data security, ownership, and compatibility with varied information technology systems. In the past, FAA data

⁸ OIG Testimony Number CC-2009-086, “Challenges in Implementing Performance-Based Navigation in the U.S. Air Transportation System,” July 29, 2009. OIG reports and testimonies are available on our website: www.oig.dot.gov.

sharing agreements with airlines and airports were on a case-by-case basis. Unresolved policy issues include the role of Government and whether a competitive industry market for privately enhanced information products will exist.

At the same time, FAA faces several logistical challenges, which, if left unresolved, could significantly delay NextGen implementation. For example, making better use of existing runways, as RTCA recommends, requires updated safety assessments for new, complex runway configurations—such as closely spaced parallel runways and converging or intersecting runways—at several busy airports. While such assessments are needed, they could take up to 4 years to complete.

Our July 2009 testimony also noted the challenges FAA faces in implementing Area Navigation (RNAV) and Required Navigation Performance (RNP).⁹ These issues were also included in RTCA's recommendations, but FAA has yet to determine how to implement them. FAA's current method for implementing new RNP procedures relies heavily on existing routes with no added capacity; as a result, air carriers are not widely using them. Also, FAA has not integrated new flight procedures with its ongoing airspace redesign projects, which also limits their usability. Further, environmental impact statements, required for new flight procedures that maximize benefits, can take up to 8 years to complete. FAA is examining ways to streamline the process for implementing new procedures and completed its initial review and report in September 2010.¹⁰

Finally, FAA is challenged to develop effective training programs on new NextGen systems and procedures. Our work has shown that FAA's training often consists of briefings rather than comprehensive courses on RNAV/RNP. As FAA begins developing more advanced airspace routes in metropolitan areas, it will face difficulties with providing extensive training for controllers—many of whom are recent hires assigned to complex facilities, such as New York and Chicago. Further, the nearly 11,000 new controllers FAA plans to hire through 2019 will have to first work with existing systems and procedures and then move to new NextGen roles and responsibilities, which will require them to transition from controlling to managing air traffic. Industry experts note that investments in more simulators are needed to support expanded controller training.

⁹ New satellite-based routes and procedures are commonly referred to as RNAV and RNP. For RNAV, pilots can use a combination of Global Positioning System (GPS) and other self-contained systems on-board aircraft to fly any desired flight path. RNP is a form of RNAV that adds monitoring and alerting capabilities to the cockpit to alert the pilot when the aircraft cannot meet specified navigation performance requirements. RNP has the potential to allow more "lanes" or routes in the same airspace, creating additional capacity where needed.

¹⁰ FAA Report, Navigation Procedures Project - Final Report, September 2010.

PROBLEMS WITH ERAM COULD MATERIALLY AFFECT FAA'S MID-TERM NEXTGEN PLANS

The RTCA task force's report stated that FAA's efforts with major programs such as ERAM are fundamental to achieving mid-term benefits envisioned for NextGen. Since 2002, FAA has planned for the ERAM program to replace hardware and software at facilities that manage flight data for high-altitude traffic in the National Airspace System.¹¹ FAA originally planned to deploy ERAM to all en route facilities by the end of 2010 at a cost of \$2.1 billion. However, due to software problems at its initial operating site, ERAM is experiencing cost increases and schedule slips that could impact other transformational NextGen programs and FAA's timeframes for implementing the task force's improvements targeted for the high-altitude environment.

ERAM Software Problems at Initial Site Have Caused Schedule Delays and Cost Overruns

During testing at the key initial operating site in Salt Lake City, FAA and its contractor, Lockheed Martin, encountered significant software-related problems that have pushed schedules out almost a year and increased cost estimates by more than \$65 million above original estimates. Examples of problems include interface issues between the key sites and other air traffic facilities, radar processing failures, errors that tag flight data to the wrong aircraft, and hand-off problems between controllers. To compensate for these problems, controllers were forced to rely on a large number of workarounds that increased workload and fatigue and diverted them from managing traffic.

As a result, after a number of operational runs, FAA indefinitely postponed the in-service and operational readiness decisions¹² for ERAM at Salt Lake City—originally planned for December 2009. In March 2010, FAA placed a moratorium on further operational ERAM testing at the key sites to fix the more than 200 problems identified, reassess its efforts, and develop a new course of action. FAA does not believe that ERAM is fundamentally flawed and is working with Lockheed Martin to address the identified problems, improve the system's stability, and achieve the in-service decision at Salt Lake City. FAA has resumed testing, and senior FAA

¹¹ ERAM replaces the current En Route automation system, which consists of the more than 30-year old Host computer system hardware, software, its backup system, as well as more than 800 computer display workstations at FAA's Air Route Traffic Control Centers. The system processes flight radar data, provides communications and generates display data to air traffic controllers.

¹² An in-service decision (ISD) authorizes deployment of a system into the operational environment. It occurs after demonstration of initial operational capability at the key test site. The decision establishes the foundation for operational readiness to be declared at key site and subsequent sites following completion of joint acceptance and inspection by the operating service organization and certification of compliance with information security requirements. The in-service decision is based on testing to verify performance and operational readiness. For ERAM, the Operational Readiness Demonstration (ORD) is the final certification required for the system to become operational and for FAA to no longer retain the HOST Computer system as a backup.

officials state that system stability is improving, testing is underway at additional sites, and progress is being made in achieving continuous operations without the need to fall back to the legacy system.

The current problems with ERAM are disconcerting since the system passed testing at FAA's Technical Center and achieved Government acceptance.¹³ When we asked why these issues were not caught at the FAA Technical Center, FAA testing officials stated that many of the problems encountered could only be identified in a live environment and that testing in a laboratory environment could not replicate actual field conditions. FAA test officials also note that controllers are adjusting to a new system that does not perform in the same manner as its legacy system. We will examine these issues in greater detail during our ongoing ERAM review.

FAA program officials state that revised cost and schedule parameters for completing ERAM will be available this month. The next major milestones focus on getting Salt Lake City fully operational and completing the independent operational assessment.¹⁴ Program officials state that they recently completed the initial portion of this assessment and are preparing the preliminary report. The final report is expected in early 2011. This schedule could slip further as FAA and Lockheed Martin are now planning to add new capabilities while attempting to resolve problems identified in earlier versions of the software. This is a watch item because updated software releases at the key site have exhibited new problems (e.g., inter-facility interface issues that lock up the system) and caused recurrence of old ones.

Our work shows that considerable work and risk lie ahead to deliver ERAM systems that meet requirements to 20 of the Nation's air traffic facilities. A recent MITRE analysis cautions that FAA's initial corrective action plan was not comprehensive and that additional time and resources will be necessary to accommodate site-specific operational differences in ERAM.¹⁵ A key measure of ERAM success depends on how the system performs at large complex sites like Chicago or New York Center. Performance at these large locations will be the driving factor behind potential future delays and cost overruns.

FAA has already expended almost \$1.8 billion on ERAM and is now spending almost \$15 million a month to field the system. FAA originally planned to spend \$131 million in fiscal year 2011 but now estimates that it will require an additional

¹³ Government acceptance (GA) of ERAM by the FAA Technical Center requires meeting specific criteria established for the project baseline. These criteria include successfully completing developmental testing activities per the Statement of Work, listing all problem trouble reports, demonstrating that all contractual requirements are satisfied, and completing both functional and physical configuration audits. At GA, the Government (i.e., FAA with ERAM) assumes full control and responsibility of the system.

¹⁴ Independent Operational Assessment, formally called Independent Test and Evaluation (IOT&E), is an assessment of a new system's operational effectiveness and operational suitability performed by an Air Traffic Service (ATS) Test Team on systems designated for IOT&E by ATS.

¹⁵ MITRE Corporation and Massachusetts Institute of Technology/Lincoln Laboratory Report, Independent Assessment of the ERAM Program, October 15, 2010. For official use only and not approved for public release.

\$70 million this year to correct problems with ERAM. Yet, this is a “down payment”—not the cost to complete the program as originally planned. Delays in implementing ERAM will force FAA to sustain aging equipment longer than planned and retrain controllers so they are familiar with both the legacy and ERAM systems. While FAA is in the process of finalizing cost and schedule estimates for completing ERAM, our work and the MITRE study suggest it will take between 3 to 6 years and as much as \$500 million more to complete the effort. A cost escalation of this magnitude will affect FAA’s capital budget and could force the Agency to reallocate funds from other modernization projects to pay for ERAM.

Continued Problems With ERAM Will Impact Other NextGen Programs and Efforts

As we have cautioned in our prior reports and testimonies, continuing problems with ERAM will have a cascading effect on FAA’s NextGen efforts. For example, of the eight currently identified NextGen portfolios, ERAM is a critical component of five of them, including collaborative air traffic management and automation needed to support aircraft separation. Further, our analysis of FAA’s transformational programs shows critical interdependencies between ERAM and three other transformational programs—two of which have already been allocated more than \$500 million to integrate and align with ERAM (see table 3).

Table 3. ERAM Interdependencies and FAA’s NextGen Transformational Programs

Transformational Program Description	ERAM Interdependencies
Automatic Dependent Surveillance-Broadcast (ADS-B)	
Uses aircraft avionics and ground-based systems to provide information on aircraft location to pilots and traffic controllers.	FAA plans to provide the ERAM program as much as \$50M to display ADS-B data for use by controllers in the high-altitude environment.
Data Communications (DataComm)	
Provides two-way data communication between controllers, automation platforms, and flight crews. DataComm is intended to supplement rather than replace voice communications in all phases of flight.	FAA plans to provide the ERAM program as much as \$400M to develop an interface that provides controller-pilot message processing and displays information to controllers in the en route centers.
System-Wide Information Management (SWIM)	
Provides a more agile exchange of information through a secure, NAS-wide information web that will connect FAA systems and improve interaction with other agencies, air navigation service providers, and airspace users.	FAA plans to provide the ERAM program with as much as \$117.7M (for SWIM Segment 1 only) to modernize and enhance its flight data processing and external interfaces with terminal air traffic control and the Traffic Flow Management systems.

Source: OIG analysis of FAA documents

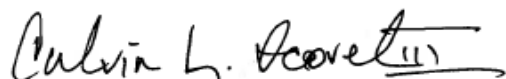
Continued problems and delays with ERAM will also impact other related NextGen efforts. For example, the MITRE report points out that schedule delays with ERAM will impact FAA's traffic flow management efforts and new routes that rely on equipment already on aircraft. Also, aside from the MITRE report, FAA enterprise architecture documents indicate that ERAM delays will affect FAA's development of trajectory-based operations¹⁶ and the transition to a common automation platform for terminal and en route operations. In addition, future software enhancements that will add new NextGen capabilities (i.e. flexible and dynamic airspace), estimated to cost a billion dollars, could also be impacted by prolonged ERAM delays.

CONCLUSION

The RTCA task force's recommendations are an important step for transitioning to NextGen and a way for FAA to build confidence among users in its ability to implement NextGen and deliver much needed benefits. Yet, much work remains for FAA to effectively implement RTCA's recommendations and modernize the aviation system. Unless FAA effectively addresses RTCA's recommendations and resolves problems with ERAM, its ability to meet mid-term goals for NextGen and safeguard taxpayers' investment remains uncertain.

We discussed our results with the Deputy Administrator and the Vice President for NextGen and incorporated their views where appropriate. We will continue to review FAA's responsiveness to the task force recommendations and the barriers that could limit the realization of much needed benefits, with a focus on efforts to address delays at metroplex locations. In a separate review, we are assessing progress with ERAM and its impact on NextGen. If you have any questions about our ongoing reviews, please contact me at (202) 366-1959 or Jeffrey B. Guzzetti, Assistant Inspector General for Aviation and Special Program Audits, at (202) 366-0500.

Sincerely,



Calvin L. Scovel III
Inspector General

Enclosure

cc: Federal Aviation Administrator

¹⁶ Trajectory-based operations focus on more precisely managing aircraft from departure to arrival with the benefits of reduced fuel consumption, lower operating costs, and reduced emissions.

Key RTCA Task Force Recommendations for NextGen's Mid-Term Phase

Area	Recommended Capability
Airport Surface Operations	Improve the management of airport taxiways, gates, and parking areas by revamping systems for sharing information between FAA, airline operations centers and airports. Candidate locations include all major airports beginning with the New York area airports.
Runway Access	Improve the use of converging or closely spaced runways during low visibility conditions. Candidate airports include Kennedy, Las Vegas, and Newark.
Metroplex Airspace	Improve the capacity of airspace that affects multiple airports near large metropolitan areas, including Chicago, New York/New Jersey, and Southern California.
High-Altitude Cruise	Improve high-altitude flights by, among other things, increasing the availability of real-time data on the status of airspace used jointly by civilian and military aircraft. The first candidate location is Minneapolis Center.
Access to the National Airspace System	Improve service at smaller airports by implementing more precision approaches and departures and expanding ways to track aircraft in non-radar airspace. Full range of candidate locations is still under development.
Cross-Cutting	
Integrated Air Traffic Management	Create an Integrated Air Traffic Management System that leverages new technologies and collaboration with users and implement solutions to traffic flow problems that are effectively integrated across air traffic control domains to achieve service providers' and users' efficiency goals.
Data Communications	Improve cruise and transition operations by using data communications to enable more efficient use of available or forecast capacity in the National Airspace System. Increase the ability to better adapt to changing conditions through improved dissemination of tactical reroutes around weather forecast and congestion.
Overarching	
	Achieve existing separation standards.
	Incentivize equipage.
	Streamline the operational approval and certification processes for new flight procedures.
	Establish institutional mechanisms for transparency and collaboration in the planning, implementation, and post-execution assessments.

Source: OIG analysis of RTCA Task Force Report