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Subcommittee on Aviation
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Actions Needed to Meet Expectations for the Next Generation Air Transportation System in the Mid-Term

**Statement of
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Chairman Costello, Ranking Member Petri, and Members of the Subcommittee:

We appreciate the opportunity to testify today on the Federal Aviation Administration's (FAA) Next Generation Air Transportation System (NextGen). As you know, NextGen represents a transition from a ground-based air traffic control system to a satellite-based air traffic management system. When fully implemented, NextGen is expected to significantly enhance capacity, reduce delays, and provide economic and environmental benefits through reductions in carbon emissions, fuel consumption, and noise.

NextGen is a high-risk effort involving multi-billion dollar investments by both FAA and industry. The problems we have reported on with NextGen prompted us to identify NextGen as one of the Department's top challenges. Last month, an RTCA¹ task force reported its findings on NextGen and made a number of recommendations on what FAA needs to achieve in the near- and mid-term—actions that FAA endorsed and are consistent with our work.

Today, I will discuss three areas: (1) challenges FAA faces in transitioning to NextGen in the near- and mid-term, (2) observations on the findings in the task force's report, and (3) actions needed now for the advancement of NextGen goals.

In summary, the cost, schedule, and benefits for NextGen are uncertain. Our work shows that a number of operational and management issues must be addressed to successfully transition to NextGen and implement task force recommendations. The findings of the task force are not only consistent with our work but also identify several new areas that will require FAA's attention, including adjustments to current Agency plans and budgets. It is essential that FAA go beyond endorsing the task force's recommendations and develop plans to initiate action, make corresponding

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 (CNS/ATM) system issues. It functions as a Federal Advisory Committee.

changes to budgets and plans, and develop metrics for assessing progress and measuring benefits.

I will discuss these issues in further detail.

OPERATIONAL AND MANAGEMENT CHALLENGES MUST BE ADDRESSED TO SUCCESSFULLY TRANSITION TO NEXTGEN

Over the past year, we have identified a number of operational and management challenges FAA faces in implementing NextGen. A top priority will require making fundamental changes in how FAA implements new navigation procedures—Area Navigation (RNAV) and Required Navigation Performance (RNP)—which are key to achieving NextGen’s benefits.² We also identified major management issues that need to be addressed, such as establishing firm requirements that can translate into cost and schedule baselines for NextGen capabilities and revamping the agency’s Acquisition Management System. Until these challenges are addressed, FAA will be unable to effectively manage NextGen or implement task force recommendations.

Maximizing RNAV and RNP Benefits

As we noted in July 2009, several areas require sustained management attention to get RNAV and RNP navigation procedures on track and ultimately achieve the expected economic and environmental benefits of NextGen.

First, we reported that air carriers have not widely used the new RNP procedures, which rely heavily on laying RNP routes over existing routes. While this approach has allowed the agency to meet its annual RNP production goals, they do not

² RNAV is a method of navigation in which aircraft use avionics, such as Global Positioning Systems, to fly any desired flight path without the limitations imposed by ground-based navigation systems. RNP is a form of RNAV that adds on-board monitoring and alerting capabilities for pilots; thus, allowing aircraft to fly more precise flight paths.

maximize the benefits that can be achieved through RNP procedures. Further, FAA does not track data that would allow it to determine which RNP procedures are being used and why. In addition, we found that out-of-date air traffic policies on how to use the new procedures at airports with parallel runways have precluded their use. For example, absent updated policies, controllers at the Hartsfield-Jackson Atlanta International Airport have yet to clear an aircraft for landing using the 10 RNP procedures FAA implemented in May 2007.

We also reported that continuing operational concerns and insufficient training for controllers and pilots have limited the use of RNAV/RNP procedures at some airports. For example, at the Dallas/Fort Worth International Airport, pilots have used incorrect RNAV departure waypoints and flown off the correct flight path. To mitigate this problem, FAA developed a process for pilots to read back the runway assignment and first waypoint before taking off. While the process was implemented at Dallas Fort Worth on June 1, 2009, NAS-wide implementation is pending completion of a further safety study.

In addition, we noted that FAA has not clearly defined the role non-government third parties will play in developing RNAV/RNP procedures,³ and FAA program officials and airlines disagree on the extent to which third parties should be used. FAA does not plan to use third parties to help speed the adoption of RNP procedures for NextGen. However, industry representatives are skeptical of FAA's ability to deliver the more complex procedures in a timely manner and continue to believe third parties could help speed up the adoption of quality RNP procedures.

Moreover, FAA's use of third parties to develop public procedures may not present a sound business case. Third parties have not developed these in the past, and the extent to which air carriers will hire them to do so is still unknown. It will depend on

³ In 2007, FAA entered into agreements with two third parties to design, integrate, test, and validate public RNP procedures.

whether air carriers believe it is cost beneficial to pay third parties to develop public procedures, which could potentially benefit their competitors. Third-party development of special procedures, which are tailored to the requesting airline's specific needs, also presents challenges. Historically, FAA has approved special procedures on a limited, case-by-case basis. RNAV/RNP program officials are concerned that air carriers will increasingly request third parties to develop special procedures—rather than rely on FAA's public procedures—further increasing the complexity of airspace management and the workload of air traffic controllers.

Making Business and Management Decisions to Move from Planning to Implementation in the Mid-Term

FAA's transition from planning to implementation of NextGen will be difficult. Based on our reviews of FAA plans and discussions with agency officials and stakeholders, we have identified five business and management issues that must be addressed to reduce implementation risks.

First, FAA must continue to refine the NextGen mid-term architecture, establish requirements, and make decisions about new and existing systems. In response to a recommendation we made last year, FAA is developing a general blueprint for the 2018 time frame, which highlights more than 340 key decisions that must be made to reach this mid-point milestone. A number of these decisions involve existing programs that will serve as “platforms” for NextGen and, as such, must be made in the next 2 years. Modifications to existing systems, including the \$2.1 billion Enroute Automation Modernization (ERAM)⁴ effort, are expected to cost billions of dollars. It is less certain today than it was when we testified in March 2009 how FAA will realize NextGen's capabilities. For example:

⁴ ERAM a \$2.1 billion program that provides new hardware and software for facilities that manage high-altitude traffic, and is a linchpin for the NextGen system. ERAM is expected to serve as a foundation for NextGen, so any schedule delays will affect the pace of introducing new capabilities.

- FAA has been slow to make decisions outlined in its NextGen Mid-term Enterprise Architecture. Of the 51 decision points targeted for fiscal year 2009, FAA only made 11 decisions, including 6 of 13 considered as high priority. For example, FAA made decisions for proceeding with a satellite-based precision landing system and navigation aids to support RNAV/RNP. However, FAA did not make decisions for enhancing an existing traffic flow management system or a new program for metering air traffic to increase arrivals and departures at high-density airports.
- FAA is still working on a “gap analysis” of the current system and the vastly different NextGen. FAA’s analysis thus far shows that major gaps exist with respect to automation—new capabilities that will allow controllers to better manage traffic. According to FAA, it may take an additional 1½ to 2 years from now to develop requirements for the mid-term.
- An analysis⁵ sponsored by FAA’s Joint Planning and Development Office indicates that NextGen capabilities originally planned for 2025 could cost the Government and airspace users several times the current projected cost estimate of \$40 billion. Further, it is likely that some of NextGen’s advanced automated air and ground capabilities will not be implemented until 2035 or later.

Second, FAA needs to assess the safety of new systems and procedures. A key transition issue for NextGen is determining whether throughput at already congested airports can be increased. This is particularly important for airports with complex runway configurations, including closely spaced parallel or converging/intersecting runways. Updated safety assessments are also needed to ensure unanticipated hazards are not introduced, particularly during periods of low visibility. Another safety

⁵ The analysis—is referred to as the NextGen portfolio or “trade space” analysis. The analysis began in October 2008, and interim results were available in May 2009. FAA is continuing to update and revise the analysis.

concern involves the impact of “mixed equipage” where controllers will be expected to manage aircraft with different capabilities and procedures. Assessing and addressing the impacts of mixed equipage are important for several mid-term efforts, including RNAV/RNP, data link communications for controllers and pilots, and Automatic Dependent Surveillance-Broadcast (ADS-B).⁶ As such, FAA needs to develop plans to mitigate differences with aircraft equipage, including developing effective training for controllers and pilots and adjusting existing air traffic control systems. FAA may also have to segregate specific airspace for properly equipped aircraft.

Third, FAA must manage NextGen capabilities as portfolios. This is important because several systems, new procedures, and airspace changes funded through different accounts will be required to work together to deliver benefits. For example, to increase airport arrival rates, new procedures, changes to controller systems (in facilities that manage high-altitude flights and airspace in the vicinity of airports), and adjustments to airspace will be required. However, our work as well as an FAA study⁷ point out, FAA’s Acquisition Management System⁸ was not designed for managing NextGen investments as portfolios. Rather, FAA’s acquisition system focuses on baselines and specific capital programs—not a collection of investments. To effectively manage multiple NextGen efforts, FAA must follow through on its plans to modify its system and clearly assign responsibility, authority, and accountability for mid-term initiatives in its NextGen Implementation Plan.

Fourth, FAA must assess its ability to implement multiple capabilities in a given time period and identify and address critical interdependencies. NextGen’s new systems and procedures create extraordinary integration challenges. While FAA has taken

⁶ ADS-B is a surveillance system that uses information from satellite-based systems to identify and track aircraft positions.

⁷ “Independent Assessment of FAA Acquisition Management System,” April 22, 2008.

⁸ FAA’s Acquisition Management System is the policies and procedures the Agency relies on to make major investments.

some action to avoid complex integration issues, FAA and stakeholders need a firm understanding of the interdependencies between systems, procedures, and training programs needed to deliver NextGen capabilities. This is important given the fact that approximately one-third of the controller workforce is composed of controllers in training. Since 2004, we have issued a series of reports focusing on FAA's programs for developing the next generation air traffic controller workforce.⁹ FAA is taking steps to address our concerns, such as appointing a national director for training; however, FAA lacks up-to-date programs to train controllers on new capabilities, such as how to manage RNP equipped aircraft. FAA and the industry need to establish realistic transition benchmarks that point to when new training (for controllers and pilots), equipment (new avionics and ground systems), and procedures need to be in place at specific locations.

Finally, FAA needs to secure the necessary skill sets and expertise to execute NextGen. In response to a recommendation we made in February 2007, FAA commissioned the National Academy of Public Administration (NAPA) to assess the skill sets needed for NextGen implementation. In its September 2008 report, NAPA identified 26 competencies where FAA lacks both the skills and capabilities to execute NextGen.¹⁰ These include program management, software development, contract administration, and systems engineering with an understanding of human factors considerations. FAA has identified an additional 175 staff positions that it plans to fill in 2009 and another 162 positions for 2010 to address identified skill requirements to support NextGen.

⁹ Over the next decade, FAA plans to hire and train nearly 15,000 new controllers to replace those who are retiring,

¹⁰ Report by a panel of the National Academy of Public Administration, "Identifying the Workforce to Respond to a National Imperative - The Next Generation Air Transportation System (NextGen)," September 2008.

RTCA TASK FORCE FINDINGS UNDERSCORE OUR WORK

To help chart a course for NextGen, FAA tasked RTCA to forge a consensus on NextGen's top priorities in the mid-term. In September, the task force reported its findings, which emphasized what can be achieved in the next 3 to 5 years. Overall, RTCA's findings and recommendations are consistent with our work and identify additional areas that need attention. RTCA also raises policy questions that decisionmakers will need to address in further detail.

Our Findings and Recommendations Cut Across Most RTCA Areas of Concern

The task force made 28 recommendations to FAA aimed at leveraging equipment already on aircraft and new procedures, enhancing information sharing among FAA and airspace users, and reducing delays in the air and on the ground. The report reflects the industry's perspective and focuses on achieving a rapid return on FAA and industry investments. The task force's report represents the first time stakeholders have committed to near- or mid-term efforts. Table 1 summarizes the task force's recommendations for the mid-term that parallel our work and those that highlight additional areas of concern.

Table 1. Key RTCA Task Force Recommendations for NextGen Mid-Term

Recommended Capability	Description
Recommendations consistent with OIG conclusions	
Runway Access	Improve the use of converging or closely spaced runways during low visibility conditions. Candidate airports include JFK, 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 as well as expansion of ways to track aircraft in non-radar airspace. Full range of candidate locations is still under development.
Additional recommendation made by task force	
Airport Surface Operations	Improve the management of airport taxiways, gates and parking areas by revamping systems for sharing information between FAA, airlines operations centers and airports. Candidate locations include all major airports beginning with the New York area airports.

Source: OIG Analysis of Task Force Report

Our findings and recommendations cut across four of the five areas RTCA has targeted: runway access, metroplex airspace, high altitude cruise, and access to the national airspace system. For example, the task force places considerable emphasis on the need to shift from the quantity of RNAV/RNP to the quality of the routes that are not overlays of existing procedures. The task force parallels our work on the need to address exactly how various technologies and procedures can unlock congested airports and improve arrival rates under all weather conditions. In addition, the task force emphasized the need to manage NextGen capabilities as portfolios and establish clear lines of authority, responsibility, and accountability. While we recognize the need for an integrated approach, the task force takes it a step further and advocates

such an approach for specific locations. For example, the task force recommends establishing joint FAA/industry “tiger teams” with expertise on controller, pilot, airspace redesign, and safety issues that focus on the quality of procedures at specific airports.

The RTCA findings and recommendations identify a number of new areas for FAA’s attention. For example, the task force calls for a major re-evaluation of airport surface operations to enhance use of taxiways, gates, and airport parking areas. FAA’s major modernization efforts for airports have historically focused on improving safety, not efficiency. Moreover, the task force calls for the deployment of capabilities at major metropolitan areas or at a regional level rather than just a nationwide deployment of systems.

Implementing RTCA’s recommendations will require FAA to adjust budgets and plans, as well as establish milestones for initiatives. In addition, FAA will face other challenges—or barriers—in implementing RTCA’s recommendations for NextGen.

- The task force’s recommendations focus on first steps—not the full range of technologies in FAA’s NextGen plans. As a result, there is still no consensus on major NextGen initiatives—most notably “ADS-B In”¹¹ and how to achieve the air-to-air benefits of the technology and new cockpit displays. The task force viewed “ADS-B In” as a high cost investment with a very long payback period. As we noted in March 2009, airspace users have raised legitimate concerns about costs and a lack of clearly defined benefits with this new satellite-based technology.
- To implement task force recommendations aimed at better using existing runways, FAA will need to conduct updated safety assessments for using

¹¹ “ADS-B In” refers to the receipt and display of traffic information in the cockpit allowing pilots to “see and avoid” other aircraft operating in their proximity. This is where the most benefits from ADS-B are expected, particularly with respect to enhancing capacity at congested airports. However, to use it, it requires a cockpit display. This display would also allow pilots to make better use of runways in bad weather.

complex runway configurations including, closely spaced and parallel runways at Dallas/Love, JFK, and Minneapolis St. Paul airports.

- FAA also needs to address longstanding concerns about terminal modernization—the equipment controllers rely on to manage aircraft in the vicinity of airports. For example, software enhancements will be needed to allow controllers to merge and space aircraft to maximize the benefits of RNAV/RNP. However, FAA has only begun planning and developing requirements and therefore, these improvements have not been baselined. Without making adjustments to terminal systems, FAA will not be able to maximize benefits for RNAV/RNP and ease capacity constraints in airspace surrounding major metropolitan areas.

RTCA Recommendations Focus Attention on NextGen Policy Questions

To implement its recommendations for the near-term, RTCA assumed that government sources of funding would not be forthcoming. However, the task force report noted that incentives would be needed to advance NextGen, and discussed several alternatives, such as providing financial incentives possibly in the form of low-interest loans, direct subsidies for equipment, or income tax credits. The concept of a “NextGen Equipage Bank” was also discussed along with technologies that could be considered for financial assistance. However, the task force did not answer how much money would be needed or when.

Whether incentives should be used is a policy decision for Congress. However, there needs to be a clear understanding of exactly how the incentives would be used, especially since FAA has not finalized the requirements for key capabilities, such as the satellite-based systems for surveillance and new cockpit displays. A full consideration of the strengths and weaknesses of various incentives as well as their timing and potential impact is critical. Cost sharing arrangements have merit because

risks are shared between Government and industry. If incentives are used, they must be properly designed to achieve their objectives at a minimal cost to taxpayers.

A related policy concern focuses on a proposed “best-equipped, best-served” concept as a way to advance NextGen. The concept, first mentioned in FAA’s January 2009 NextGen Implementation Plan, gives preferential treatment to airspace users equipped with new systems. Historically, however, FAA’s policy for providing air traffic control services has been “first come, first served.” A best-equipped, best-served policy would, therefore, represent a significant change to how traffic is managed. The details of such a policy would need to be developed to ensure equity among users and implementation at specific locations.

ACTIONS NEEDED TO SET REALISTIC EXPECTATIONS FOR NEXTGEN

NextGen is an important initiative to enhance capacity, reduce delays, and fundamentally change the way air traffic is managed in the United States. Yet, the costs, benefits, and milestones for the mid-term remain uncertain. Our work shows that FAA has not fully laid the groundwork for key capabilities, such as RNAV/RNP, or established firm requirements for existing or new acquisitions that can translate into reliable cost and schedule baselines.

A considerable level of oversight is needed for NextGen. At the request of the Chairman and Ranking Member, we will monitor FAA’s progress in responding to the task force’s recommendations and corresponding impacts on Agency budgets and plans. There are several actions needed now to set realistic expectations for NextGen. Specifically, FAA must

- develop plans to initiate action and establish a 5-year funding profile for the NextGen mid-term;

- develop metrics for assessing progress, measuring benefits, and identifying problems to put timely corrective actions in place;
- refine how a “best equipped, best served” policy could be implemented; and
- develop and implement a strategy for linking near- and mid-term efforts with NextGen long-term plans for its major transformational programs, such as ADS-B.

That concludes my statement, Mr. Chairman. I would be happy to address any questions you or other members of the Subcommittee may have.