Before the Committee on Transportation and Infrastructure
Subcommittee on Aviation
United States House of Representatives

Federal Aviation Administration: Actions Needed To Achieve Mid-Term NextGen Goals

Statement of
The Honorable Calvin L. Scovel III
Inspector General
U.S. Department of Transportation

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

We appreciate the opportunity to discuss the Federal Aviation Administration's (FAA) development of the Next Generation Air Transportation System (NextGen) and what the Agency can achieve toward this effort in the near and mid term. The National Airspace System is an integral part of the Nation's economy and handles almost 50,000 flights per day and more than 700 million passengers per year.

Developing NextGen is a high-risk effort involving billion-dollar investments from both the Government (new ground systems) and airspace users (new avionics). The challenges with NextGen are multi-dimensional and involve research and development, complex software development and integration for both existing and new systems, workforce changes, and policy questions about how to spur aircraft equipage.

As the Subcommittee is aware, civil aviation faces uncertain times. U.S. airlines have been buffeted by the softening economy and volatile fuel costs. As a result, airlines have taken a considerable amount of capacity out of the system. As of November 2008, airlines reduced scheduled domestic flights by 13 percent and grounded approximately 360 aircraft. However, these airline cutbacks have helped to reduce delays. While 2007 trends in flight delays continued in the first half of 2008 (more than 1 in 4 flights were either delayed or cancelled), delays declined by 24 percent in the second half of the year at most airports. Yet, high levels of delay continued at more heavily congested airports such as Newark International, John F. Kennedy International, and Atlanta Hartsfield-Jackson International.

Notwithstanding the uncertainty facing the industry, FAA is presented with an opportunity to strategically position itself for a rebound in air travel demand. Our work shows that much work remains for FAA to set reasonable expectations for what can be delivered, establish priorities and realistic funding estimates, quantify benefits, and develop viable transition plans for NextGen.

Secretary Lahood is making NextGen one of his top priorities for the Department. The Secretary is committed to providing more clarity with respect to what can be achieved from NextGen investments.

After more than 4 years of planning, FAA must take a number of actions to advance NextGen. My remarks today will focus on four points.

- First, while FAA is developing NextGen, it must also sustain the existing system. This includes maintaining ground-based radars, navigation equipment, and aging facilities. This will be important since about 30 existing projects form platforms for NextGen initiatives.

We found that FAA must make numerous critical decisions over the next several years that will have significant budgetary implications and materially affect the pace of NextGen. For example, FAA must decide what is needed for displays and automation systems that controllers rely on to manage traffic in the vicinity of airports. Costs have not been formally "baselined" but are projected to be around $600 million. Also, FAA will decide whether to restart development of a satellite-based precision approach landing system (Local Area Augmentation System). The costs for this system are projected to be $500 million.

- Second, it will be important for FAA to maintain focus on near-term efforts that can enhance the flow of air traffic. These include new airport infrastructure projects, airspace redesign projects, and performance-based navigation initiatives (i.e., Area Navigation and Required Navigation Performance or RNAV/RNP).

  In our September 2008 report on short-term capacity initiatives, we found that RNAV/RNP routes and procedures have significant potential to enhance capacity, reduce fuel burn, boost controller productivity, and reduce noise emissions.[1] These new routes take advantage of avionics already installed on aircraft and represent an important bridge from today's system to mid-term NextGen goals.

  To reach their full potential, however, RNAV/RNP routes need to be fully integrated with airspace redesign initiatives as future routes shift away from localized operations to "networking" city pairs (e.g., Washington, DC, and Chicago, Illinois). It is also important to note that the more demanding—and beneficial—RNAV/RNP routes are only available to specially equipped aircraft and flight crews.

  To help speed the introduction of RNAV/RNP routes, FAA is relying on non-Government third parties to develop and implement new procedures. At the request of the Chairman, we are examining (1) the extent to which FAA is relying on third parties and (2) whether FAA has sufficient mechanisms in place to provide oversight.

- Third, FAA must complete the "gap analysis" of the current system and the vastly different NextGen system, which is targeted for 2025, and develop an interim architecture or technical blueprint. FAA is focusing considerable attention on NextGen's mid-term goals, now targeted for 2018, but has not reached consensus with stakeholders on how best to move forward, and fundamental issues need to be addressed.

  FAA has begun the gap analysis but will not complete it until this summer. Completing this analysis is important because FAA's documents we reviewed

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[1] OIG Report Number AV-2008-087, "Observations on Short-Term Capacity Initiatives," September 26, 2008. OIG reports and testimonies are available on our website: www.oig.dot.gov.

show that mission and performance gaps still exist. Further, while FAA has made progress with developing the interim NextGen architecture, it has not yet developed firm requirements that can be used to develop cost and schedule estimates for modifications to existing programs or new acquisitions.

To help chart a course for NextGen in the mid term, FAA is working with RTCA[2]—a joint FAA/industry forum—to forge a consensus on what should be the top priorities, what should be implemented, and what actions are needed to realize benefits. The RTCA task force is scheduled to complete its work this summer.

- Finally, there are number of business and management actions FAA needs to take to help shift from NextGen planning to mid-term implementation. These include (1) establishing priorities and Agency commitments with stakeholders and reflecting them in budget and plans; (2) managing NextGen initiatives as portfolios and establishing clear lines of responsibility, authority, accountability; (3) acquiring the necessary skill mix for managing and executing NextGen; and (4) examining what can reasonably be implemented in given time increments.

I will now discuss these issues in further detail.

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[2] 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.
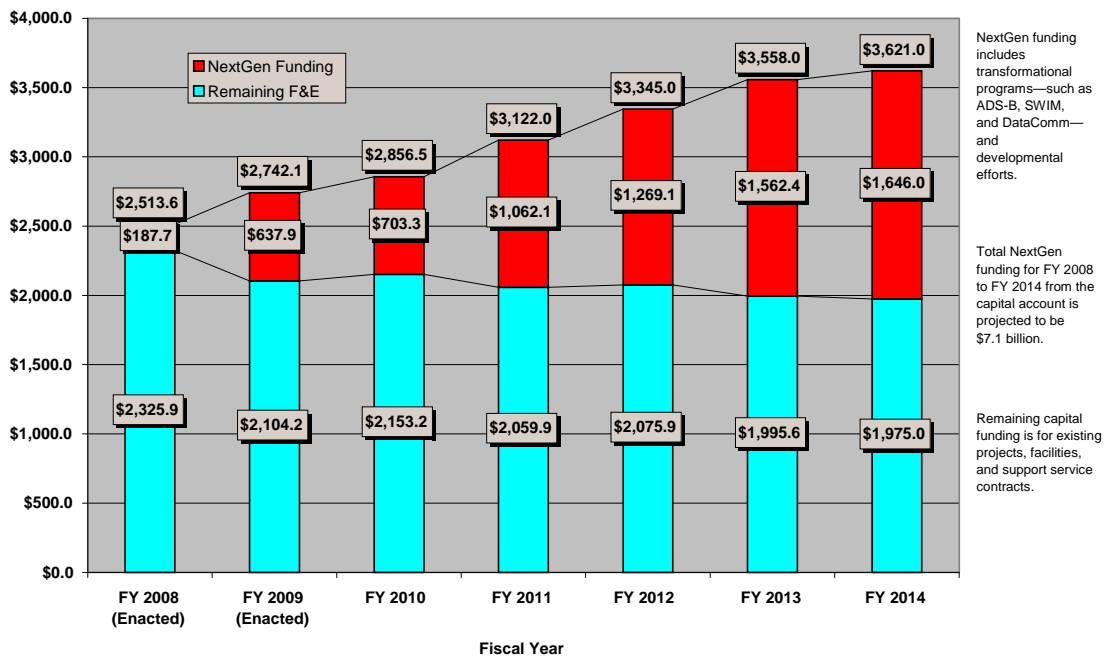
FAA FACES CHALLENGES IN SUSTAINING THE NATIONAL AIRSPACE SYSTEM AND DEVELOPING NEXTGEN

It will be critical for FAA to keep ongoing projects on track—as many form platforms for NextGen—and maintain aging facilities. In 2009, FAA plans to spend $2.7 billion for capital funding, an increase of 9 percent over last year's enacted level. FAA is starting a new chapter in modernization with NextGen, and the Agency's capital account is now being shaped by these initiatives. Between fiscal year (FY) 2008 and FY 2014, FAA plans to spend $22 billion for capital efforts, including $7.1 billion specifically for NextGen projects. We note that much of the projected funding for NextGen is focused on developmental efforts, including demonstration projects.[3]

Perspectives on FAA's Capital Account and NextGen Funding

FAA plans to spend more than $630 million in 2009 on NextGen-related programs, which include a satellite-based system called Automatic Dependent Surveillance-Broadcast (ADS-B) and a new information sharing system called System-Wide Information Management (SWIM). Figure 1 illustrates FAA's planned investments in ongoing projects and NextGen initiatives from FY 2008 to FY 2014.

Figure 1. FAA Capital Funding for FY 2008 to FY 2014
($ Totals in Millions)

Source: FAA

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[3] Developmental efforts are funded through the Engineering, Development, Test, and Evaluation portion of the capital account.

In FY 2010, FAA plans to request more than $800 million for NextGen. In addition to specific capital projects totaling $703 million as shown in figure 1, FAA is also requesting $57 million for Research, Engineering, and Development projects, $48 million for support service contracts, $26 million for NextGen-related personnel expenses, and $13 million from the Operations account.

Progress and Problems with FAA Acquisitions

In April 2008, we reported on progress and problems with 18 major FAA acquisitions valued at $17.5 billion.[4] Overall, we are not seeing the significant cost growth and schedule slips with FAA major acquisitions that occurred in the past. This is because FAA has re-baselined[5] a number of efforts and taken a more incremental approach to managing major acquisitions. When comparing revised baselines, only 2 of the 18 projects we reviewed have experienced additional cost growth ($53 million) and delays (5 years) since our last report in 2005.[6] However, from program inception, six programs have experienced cost growth of nearly $4.7 billion and schedule delays of 1 to 12 years.

While FAA's incremental approach may reduce risk in the near term, it has left several programs with no clear end-state and less visibility into how much they will ultimately cost. A case in point involves modernizing facilities that manage traffic in the vicinity of airports, which is commonly referred to as "terminal modernization."

We are concerned that there is no defined end-state for terminal modernization, and past problems with developing and deploying STARS leave FAA in a difficult position to begin introducing NextGen capabilities. Future terminal modernization costs will be shaped by (1) NextGen requirements, (2) the extent of FAA's terminal facilities consolidation, and (3) the need to replace or sustain existing (legacy) systems that have not been modernized.

FAA Must Make Several Critical Decisions To Successfully Transition Current National Airspace Systems to NextGen

According to FAA, approximately 30 existing capital programs will serve as "platforms" for NextGen. For example, the $2.1 billion En Route Automation Modernization (ERAM) program, which provides new hardware and software for facilities that manage high-altitude traffic, is a linchpin for the NextGen system. Because ERAM is expected to serve as a foundation for NextGen, any schedule delays will affect the pace of introducing new capabilities.

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[4] OIG Report Number AV-2008-049, "Air Traffic Control Modernization," April 14, 2008.
[5] Re-baselining a project is important to establish reliable cost and schedule parameters. It is consistent with Office of Management and Budget guidance for managing major acquisitions.
[6] OIG Report Number AV-2005-061, "Status of FAA's Major Acquisitions: Cost Growth and Schedule Delays Continue To Stall Air Traffic Modernization," May 26, 2005.

In February 2007, we recommended that FAA examine existing modernization projects to determine if they were still needed and, if so, what adjustments would be required.[7] FAA concurred with our recommendation and stated that it had begun this assessment. Over the next 2 years, FAA must make numerous critical decisions about ongoing programs. We identified five areas involving decisions that will have significant budgetary implications and affect the pace of NextGen in the mid term (see examples in table 1).

Table 1. Critical Decisions for Existing Systems

Critical Decision Area	Description
Terminal Modernization	FAA plans to make an initial investment decision on how to modernize displays and computers that controllers use to manage traffic in the vicinity of airports. Currently, costs have not been baselined but are projected to be around $600 million. A final investment decision leading to a contract award is expected in late 2010.
Satellite-Based Navigation and Landing Systems	In 2009, FAA plans to decide to restart development for the Local Area Augmentation System (LAAS).[8] Costs have not been baselined but are projected to be around $500 million. FAA will also decide in 2009 if additional enhancements will be needed for the Wide Area Augmentation System (WAAS). Planning documents we reviewed suggest modifications to WAAS could cost as much as $1.5 billion.
Traffic Flow Management	FAA relies on Traffic Flow Management to manage traffic and reduce the impacts of bad weather. This year, FAA plans to decide what additional capabilities will be incorporated into the system. This decision is for the collaborative air traffic management Work Package 3. Costs have not been baselined, but FAA projects they will be about $450 million.
En Route Automation	FAA plans to make initial decisions in FY 2010 on what adjustments will be made to the $2.1 billion ERAM system. Costs remain uncertain but could be in the billions of dollars.
Data Communications	FAA plans to make the final investment decision for the first segment of Data Communications in FY 2010. Costs are uncertain, but the Segment 1 investment decision is expected to include $400 million specifically for upgrades to ERAM.

Note: Cost projections for FAA projects have not been baselined.

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[7] OIG Report Number AV-2007-031, "Joint Planning and Development Office: Actions Needed To Reduce Risks With the Next Generation Air Transportation System," February 12, 2007.

[8] The Local Area Augmentation System (LAAS) is a ground-based augmentation to GPS that focuses its service on the airport area for precision approach, departure procedures, and terminal area operations. LAAS is expected to provide the extremely high accuracy, availability, and integrity necessary for Category I, II, and III precision approaches and will provide the ability for flexible, curved approach paths.

FAA Faces Significant Challenges with Key NextGen Transformational Programs

FAA has established initial cost and schedule baselines for the first segments of two key NextGen initiatives: ADS-B and SWIM. Our work shows that both programs face considerable risk associated with development and implementation and will require significant oversight.

ADS-B

In August 2007, FAA awarded a service-based contract for the ADS-B ground infrastructure worth $1.8 billion (if all options are exercised). FAA estimates that ADS-B will cost about $1.6 billion in capital costs for initial implementation segments through 2014, including a nationwide ground system for receiving and broadcasting ADS-B signals. In FY 2009, FAA plans to spend $300 million on ADS-B—the largest single budget line item for an acquisition.

A key challenge facing FAA—and NextGen implementation—is realizing the full benefits of ADS-B. FAA plans to fully implement the *ADS-B Out* phase in the 2020 timeframe, which will require aircraft to broadcast their position to ground systems. However, most capacity and safety benefits from the new system will come from *ADS-B In*, which will display information in the cockpit for pilots. FAA has not yet finalized requirements for *ADS-B In*.

Our work shows that FAA must address several risks to realize the benefits of ADS-B. These include: (1) gaining stakeholder acceptance and aircraft equipage, (2) addressing broadcast frequency congestion concerns, (3) integrating with existing systems, (4) implementing procedures for separating aircraft, (5) assessing potential security vulnerabilities, and (6) finalizing requirements for *ADS-B In* and new cockpit displays. Given FAA's history with developing new technologies and its approach to ADS-B, in which the Government will not own the ground infrastructure, this program will require a significant level of oversight. We will report later this year on the risks facing ADS-B and the strengths and weaknesses of FAA's contracting approach.

SWIM

In June 2007, FAA baselined the first 2 years of segment 1 of SWIM (planned to occur between FY 2009 and FY 2010) for $104 million. FAA's latest Capital Investment Plan cost estimate for SWIM is $285 million. We are currently examining the overall status of SWIM and the risks facing a nationwide deployment.

Challenges facing the program include determining requirements and interfaces with other FAA systems, including ERAM and Air Traffic Management programs. Moreover, FAA must integrate SWIM with other Federal agencies' operations to realize NextGen benefits and develop a robust cyber security strategy and design.

FAA also needs to establish the architecture, strategy, and overall design for SWIM. Finally, FAA has yet to determine additional segments and the cost to fully implement the program. As a result, FAA is pursuing SWIM in a decentralized way and providing other programs with funds to develop interfaces with the system.

Sustaining FAA's Vast Network of Aging Facilities

A key cost driver for NextGen is determining to what extent FAA realigns or consolidates air traffic control facilities. This has significant cost implications for the number of controller displays and related computer equipment needed to manage traffic. In the American Recovery and Reinvestment Act,[9] Congress provided FAA with $200 million for FAA facilities.

In December 2008, we reported that many FAA air traffic control facilities have exceeded their useful lives, and their physical condition continues to deteriorate.[10] In some cases, facilities deteriorated so badly that they required urgent and repeated actions. While the average facility has an expected useful life of approximately 25 to 30 years, 59 percent of FAA facilities are over 30 years old (see table 2).

Table 2.   Average Age of FAA Facilities

Type of Facilities	Average Age
Air Traffic Control Towers	29 years
Terminal Radar Approach Control Facilities	26 years
En Route Control Centers	43 years

Source: FAA

FAA points out that flexible ground communication networks do not require facilities to be near the traffic they manage. FAA often cites its aging facilities and the related expense of maintaining such a large number of facilities to justify consolidating the air traffic control system into a smaller number of facilities. However, there are technical and security prerequisites for major consolidation, such as implementing new "voice switching" technology to allow for more flexible communication and enhanced automation.

FAA's 2007 reauthorization proposal called for a "Realignment and Consolidation of Aviation Facilities Commission" to conduct an independent review and make recommendations to the President. The current House reauthorization proposal (H.R. 915) also recognizes the issue of consolidation and the need for further examination.

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[9] Pub. L. No. 111-5 (2009).
[10] OIG Report Number AV-2009-012, "FAA's Management and Maintenance of Air Traffic Control Facilities," December 15, 2008.

FAA plans to spend $17 million in FY 2009 to examine various alternatives for revamping its facilities. FAA should ensure that this analysis clearly addresses the technological and security prerequisites as well as key cost drivers, benefits, and logistical concerns associated with consolidations so decision makers in Congress and the Administration will know what can reasonably be accomplished. This is a critical action item because until important, strategic decisions are made regarding consolidations, FAA will be unable to define its long-term funding capital requirements.

SEVERAL NEAR-TERM EFFORTS ARE IMPORTANT TO ENHANCE THE EFFICIENCY OF THE NATIONAL AIRSPACE SYSTEM

Because of the developmental nature of many NextGen initiatives, it will be important to keep a number of near-term efforts on track. At the request of the Chairman, we examined in September 2008 what initiatives have the most potential to enhance capacity and reduce delays within the next 5 years. We found that, while there is no "silver bullet," there are several initiatives that can help boost capacity and enhance the flow of air traffic even before NextGen is fully in place.

New Airport Infrastructure

According to FAA, building new runways provides the largest increases in capacity. Currently, there are four key runway projects underway at Boston, Charlotte, Chicago (O'Hare), and New York (John F. Kennedy) airports. These projects are expected to be complete by 2014. These capacity benefits, however, cannot be realized without new air traffic control procedures and improved airspace redesign.

Challenges that could impede the progress of new runway projects include the years of planning required, extensive environmental reviews, coordination among numerous stakeholders, and legal issues. Another challenge is making corresponding improvements to an airport's infrastructure (e.g., terminal gates and passenger waiting areas) to accommodate the increased traffic. Unfortunately, building a new runway is not an option for some airports, like New York's LaGuardia Airport, which does not have the physical infrastructure to support a new runway.

Airspace Redesign

Airspace redesign efforts are critical to realize the full benefits of runways and can enhance capacity without new infrastructure. Currently, FAA is pursuing six airspace redesign projects nationwide, including a major but controversial effort to revamp airspace in the New York/New Jersey/Philadelphia area. Once implemented, FAA

believes this effort could reduce delays by as much as 200,000 hours. FAA plans to spend $11.2 million on airspace redesign projects in FY 2009.[11]

FAA has done a better job of coordinating airspace changes with Agency stakeholders and linking projects to its capital account[12] since we reported on the airspace redesign program in 2005.[13] We remain concerned, however, that FAA's airspace redesign efforts still do not function as a "national" program since FAA facilities are now using their own resources to redesign airspace without coordinating with Headquarters. There are still challenges concerning roles and responsibilities and decision-making authority for airspace redesign efforts. FAA is developing procedures to address this problem, but those have yet to be finalized.

Performance-Based Navigation Initiatives

FAA is pursuing two initiatives that rely on aircraft avionics for improved route precision: RNAV and RNP. RNAV allows aircraft to fly any desired flight path without the limitations imposed by ground-based navigation systems. RNP adds an on-board performance monitoring and alerting capability for pilots and allows aircraft to fly more precise flight paths into and out of airports. This reduces fuel burn, boosts controller productivity, reduces noise emissions, and increases capacity.

The development of RNAV/RNP routes has gained considerable industry support. For example, Southwest Airlines announced plans to spend $175 million to equip at least 500 aircraft and train over 5,800 pilots over the next 6 years to implement RNAV/RNP.

As of February 6, 2009, FAA has published more than 500 routes and procedures and made this capability available at more than 100 airports. In 2008, FAA published 49 RNAV routes and 63 RNP procedures. The Agency intends to publish at least 50 RNAV and 50 RNP procedures for FY 2009 and at least that same amount per year through FY 2012, with priority given to new routes for airports in the congested New York, Chicago, and Dallas areas.

Challenges facing this initiative include close coordination with airspace redesign as future RNAV/RNP routes shift away from localized operations toward "networking" routes between city pairs (e.g., Washington, DC, and Chicago, Illinois). It is also important to note that current RNAV/RNP routes are only available to well-equipped aircraft and trained aircrews, and air carriers must meet certain qualifications to fly

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[11] For FY 2009 FAA has requested $11.2 million in funding from its operations and capital accounts, totaling $8.2 million and $3 million, respectively.

[12] Prior to 2007, FAA's airspace program was funded solely from the Operations account. By linking each project's requirements to both the operations and capital budgets, the Agency will be better able to address procedural, environmental, technical, and staffing requirements to complete projects.

[13] OIG Report Number AV-2005-059, "Airspace Redesign Efforts Are Critical To Enhance Capacity but Need Major Improvements," May 13, 2005.

these special airport approaches.[14]   To get the full benefits of RNAV/RNP, modifications to FAA automation systems will likely be required.

To help speed the introduction of RNP, FAA is relying on non-Government third parties to develop and implement new procedures. At the request of the Chairman, we started a review last month focusing on FAA's plans to oversee these parties' activities. Our objectives are to (1) assess the extent to which FAA is relying on third parties for the development of new procedures and (2) determine whether FAA has established sufficient mechanisms and staffing to provide safety oversight of third parties.

FAA MUST COMPLETE A GAP ANALYSIS AND REFINE THE MID-TERM NEXTGEN ARCHITECTURE

Last April, FAA concurred with our recommendation to conduct a "gap analysis" of the current National Airspace System and the vastly different NextGen system and develop an interim architecture for the 2015 timeframe. Completing this analysis and refining other key NextGen planning documents would help highlight transition issues and establish requirements that could be used to develop reliable cost and schedule parameters for NextGen. Also, important policy questions exist about how to spur aircraft equipage and how to best organize FAA to manage and execute NextGen.

FAA Must Address Key Planning Elements To Achieve NextGen's Mid-Term Goals

FAA is focusing considerable attention on mid-term goals for NextGen, which are planned for the 2018 timeframe. However, we found that FAA needs to address fundamental issues with three key elements to achieve these goals.

Gap Analysis of the Current and NextGen Systems

This effort is important because FAA intends to rely on existing automation systems to provide the basis for NextGen through the mid-term phase of the effort. A key question focuses on the most cost-effective way to implement changes for displays and computers that controllers use to manage traffic in the vicinity of airports. FAA has begun this analysis and expects to complete it this summer.

NextGen Implementation Plan

FAA's January 2009 plan[15] provides a framework for what NextGen will resemble in 2018 and reflects the need to link FAA and stakeholder investments. However, FAA and stakeholders point out that the plan does not yet reflect a consensus on how to move forward, and much work is required to set priorities, quantify expected benefits,

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[14]   In this case, we are referring to special instrument flight procedures that are known as RNP Special Aircraft and Aircrew Authorization Required (SAAAR). RNP SAAAR is the certification required by FAA to allow aircrew to use RNP avionics during RNP approaches. RNP SAAAR helps aircraft fly more precise approaches and departures, thereby increasing operational efficiency and reducing operating costs, noise, and emissions.

[15]   FAA's *NextGen Implementation Plan*, January 30, 2009.

address integration issues, and clarify timing and location of equipment needs. In addition, the plan will need to illustrate the operational, regulatory, policy, and procedural issues that need to be resolved to implement NextGen capabilities. Also, stakeholders point out that the plan does not yet clearly assign responsibility, authority, or accountability for mid-term initiatives.

NextGen Mid-Term Architecture

FAA has made progress in developing components of a general blueprint for the 2018 timeframe. It has also developed "road maps" for, among other things, automation, communication, navigation, and surveillance efforts. FAA's current blueprint highlights more than 340 key decisions that it must make to reach the envisioned mid-point NextGen architecture. However, FAA has not yet established firm requirements that can be used to develop the cost and schedule estimates for modifications to existing programs or new acquisitions. FAA's documents caution that ground systems continue to be developed from "the bottom up,"[16] which results in mission and performance gaps. Further, air and ground elements are not yet synchronized, and FAA must determine which trade-offs to make regarding which capabilities will reside in aircraft versus FAA ground systems. FAA officials told us they expect to complete these efforts later this summer.

To help chart a course for NextGen in 2018, FAA tasked RTCA (a joint Government/industry forum) to forge a community-wide consensus on what should be implemented and what actions will be needed to realize benefits. The RTCA task force has an ambitious agenda; it is expected to make recommendations to help FAA prioritize efforts, frame the business case for new systems (for FAA and airspace users), and define the necessary actions to achieve benefits in 2018. The task force plans to complete its work this summer.

NextGen Implementation Presents Congress with Important Policy Questions

NextGen planning documents call for users to equip with a range of new avionics including ADS-B, data link for communications for controllers and pilots, and new navigation equipment. Stakeholders have argued that $4 billion of stimulus funds should be used to equip aircraft and accelerate NextGen efforts, including $2 billion specifically for ADS-B. Congress did not provide funds in the American Recovery and Reinvestment Act of 2009 to help airspace users equip with NextGen systems, but the issue remains important in how FAA moves forward with NextGen in the mid term.

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[16] FAA's "bottom-up" approach focuses on the modifications to existing systems. This approach is evolutionary and is a necessary step but creates the risk of building in overly complex integration solutions, replicating requirements in multiple systems, and increasing related costs. A "top-down" approach, conversely, would focus more on where to put key NextGen capabilities and seek ways to reduce complex integration issues. Both approaches are needed to help arrive at the most cost-effective way to implement NextGen.

As stakeholders point out, there is a precedent for helping airspace users equip specifically with ADS-B avionics. FAA purchased ADS-B avionics for operators in Alaska as part of the Capstone initiative.[17] This provided a base of properly equipped aircraft and allowed FAA to examine the costs and benefits of the new technology.

In a recent report on implementing ADS-B, stakeholders noted that incentives for ADS-B deployment could take a number of forms.[18] These include purchasing equipment for operators, an investment tax credit, an adjustment to current excise taxes for ADS-B-equipped aircraft, or research and development tax credits specifically for avionics manufacturers.

Whether such incentives should be used is a policy decision for Congress. However, FAA has never managed such a large effort to equip aircraft in the continental United States. A clear understanding of exactly what the incentives would be used for is needed, especially because FAA has not finalized the requirements for key capabilities, such as *ADS-B In*. In our opinion, a full consideration of the strengths and weaknesses of various incentives as well their timing and potential impact is critical. One possibility is cost-sharing arrangements, which have merit because they distribute risks between the Government and airspace users. FAA could also use incentives to demonstrate and refine NextGen capabilities and provide detailed information on how to certify equipment, such as new cockpit displays.

Observations on FAA's Reorganization of NextGen Efforts

The question of whether FAA is properly organized to implement NextGen is important because it will drive the success of the effort. NextGen development cuts across all lines of the FAA's Air Traffic Organization (ATO). It also involves FAA's airport and certification offices. We believe that clear lines of accountability and budget authority will be essential for managing NextGen.

The overall governance of the NextGen effort has been the subject of debate, and stakeholders have raised concerns that FAA is not properly organized to manage or execute a multibillion-dollar effort. Furthermore, there continues to be friction between the ATO and Joint Planning and Development Office (JPDO), which was mandated by Congress to pursue a multi-agency approach for NextGen. This friction is due in part to vastly different planning horizons. The ATO is an organization that operates constantly but has a short planning horizon. The JPDO, on the other hand, is focused on planning how to introduce cutting-edge technologies and transform the National Airspace System by the 2025 timeframe.

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[17] The Capstone Project was a joint industry and FAA research and development effort to improve aviation safety and efficiency in Alaska. Under Capstone, FAA provided avionics equipment for aircraft and the supporting ground infrastructure.

[18] Report from the ADS-B Aviation Rulemaking Committee to the Federal Aviation Administration, "Recommendations on Federal Aviation Administration Notice No. 7–15, *Automatic Dependent Surveillance—Broadcast (ADS–B) Out* Performance Requirements to Support Air Traffic Control (ATC) Service; Notice of Proposed Rulemaking," September 26, 2008.

In May 2008, FAA announced a reorganization of its NextGen efforts, which included establishing a Senior Vice President for NextGen and Operations Planning within the ATO; this individual reports to the ATO Chief Operating Officer. FAA has also established an office for NextGen Integration and Implementation to support the Senior Vice President.

Under this framework, the JPDO now reports to the Senior Vice President for NextGen and Operations Planning. In the past, the JPDO reported directly to the FAA Administrator and the Chief Operating Officer. While FAA believes the change will help move NextGen concepts closer to implementation, it could also give the appearance that the JPDO has been reduced in stature and importance. We offered observations on this matter last September.[19]

- First, the roles and responsibilities of the JPDO and the ATO office for NextGen Implementation and Integration need better definition. According to FAA, the JPDO will focus on long-term planning and interagency cooperation while the ATO will focus on more short-term efforts and other implementation issues. However, it is difficult to establish clear demarcation lines because implementing NextGen capabilities depends heavily on modifying existing modernization projects. Both offices will have budget functions, modeling and simulation capabilities, and architecture staffs. Because both offices will help to shape research and development plans, it will be important for FAA to establish clearly defined roles and responsibilities.

- Second, while the ATO's Senior Vice President for NextGen and Operations Planning will manage demonstration projects, other ATO Vice Presidents will manage major modernization projects considered to be essential platforms for NextGen. For example, the Vice President for En Route Services manages multibillion-dollar efforts like ERAM and ADS-B. SWIM, however, will be managed by the Vice President for Technical Operations. Similarly, the Vice President for Terminal Services manages efforts to modernize controller displays and computer equipment located in the vicinity of airports. Also, airports—which play a key role in NextGen—are managed by a different FAA office that is outside the ATO.

  The Senior Vice President for NextGen and Operations Planning stated that she will be responsible for the integration and implementation of all NextGen elements even though most elements will be managed and executed by other ATO service units and lines of business. The NextGen and Operations Planning Office will rely on coordination and a commitment monitoring process. However, FAA has little experience with relying on this approach for managing and executing

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[19] OIG Testimony Number CC-2009-118, "The Status of FAA's Efforts To Develop the Next Generation Air Transportation System," September 11, 2008.

NextGen initiatives. An FAA-commissioned study that examined skill sets for NextGen cautions that while the Senior Vice President for NextGen has overall responsibility for leading the transition to NextGen, the authority delegated to this position is weakened by, among other things, fragmented decision-making that may affect the timeliness and quality of key program decisions.

- Third, the new management structure will be challenged by complex, cross-cutting Government issues. For instance, in our opinion, it will be challenging for an office within the ATO to work out agreements with Department of Defense and Department of Homeland Security on major decisions affecting surveillance and airspace security. FAA must clearly communicate that the change in organizational structure is not a lessening of the Agency's commitment to a multi-agency approach for developing NextGen.

In November 2008, the President issued an executive order to reestablish modernizing the aviation system as a national priority. The order designated the Secretary of Transportation as responsible for implementing NextGen. Specific direction to the Secretary included convening quarterly meetings of the NextGen Senior Policy Committee[20] and establishing within the Department a support staff that would include employees from other departments and agencies to support NextGen.

FAA will likely have to revisit the question of NextGen governance once it has a better understanding of what will be required to develop and implement NextGen. How best to organize FAA is a policy call for Congress. We note that the House Reauthorization proposal (H.R. 915) would establish an Associate Administrator for NextGen who would report directly to the FAA Administrator. We believe such an approach has merit as the cross-cutting nature of the NextGen effort will require close coordination of multibillion-dollar investments from industry and other Federal agencies.

FAA NEEDS TO COMPLETE SEVERAL BUSINESS AND MANAGEMENT ACTIONS TO ADVANCE MID-TERM EFFORTS

We have made numerous recommendations to FAA to help it move forward with NextGen. These include developing an interim architecture, assessing the skill mix with respect to necessary systems integration and contracting, and focusing human factors research to ensure concepts can be safely implemented. At this time, FAA must move beyond planning and advance NextGen.

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[20] The Senior Policy Committee (SPC) was mandated by Congress in Vision 100 – Century of Aviation Reauthorization Act (Pub. L. No. 108-176). The SPC is chaired by the Secretary of Transportation, and membership includes senior representatives of NextGen partner agencies. The SPC is intended to advise the Secretary on policy, national goals, and strategic objectives for the transformation of the Nation's air transportation system.

To do so, FAA needs to take the following business and management actions:

- **Establish priorities and Agency commitments with stakeholders and reflect them in budget requests.** It remains difficult for decision makers to determine what to invest in first from the wide range of operational improvements in NextGen planning documents. Stakeholders have asked for a clear articulation of the timing, location, and assignment of responsibility for NextGen capabilities. This past year, FAA has worked to shape priorities and identify core capabilities. However, the Agency must do more and work with stakeholders to identify the proper sequencing of efforts. Also, stakeholders have asked FAA to clearly state mid-term Agency and operator commitments in its NextGen Implementation Plan. FAA should continually work to provide this Subcommittee with a clear understanding of its NextGen priorities and commitments and reflect them in budgets and plans.

- **Manage mid-term initiatives as portfolios and establish clear lines of responsibility, authority, and accountability for NextGen efforts.** FAA must manage NextGen capabilities as portfolios because several systems, new procedures, and airspace changes funded through different accounts will be required to deliver benefits. FAA is developing various portfolios and understands the need to manage them in an integrated fashion. However, as an FAA study points out, FAA's Acquisition Management System was not designed for managing NextGen investments.[21] Rather, FAA's system focuses on baselines and specific capital programs—not a collection of investments. FAA recognizes that it must modify its system to effectively manage multiple NextGen efforts. FAA could also strengthen its NextGen Implementation Plan by clearly assigning responsibility, authority, and accountability for specific NextGen portfolios.

- **Focus attention on the relief that various NextGen technologies can provide to already congested airports in major metropolitan areas, like New York and Chicago.** An important metric for NextGen is to what extent FAA can improve *airport arrival rates* under various weather conditions. FAA recognizes the importance of this and is shifting resources to this issue. The Agency plans to spend $37.1 million in FY 2009 on Flexible Terminals and Airports and $18.2 million on high-density arrivals and departures. However, FAA's efforts to examine "high-density operations" are in the very early stages, and planning documents and budget requests thus far do not detail how individual NextGen systems can specifically boost airport capacity and reduce delays. Decision makers and stakeholders need to know what elements—ADS-B, new routes, and data link communications for controllers and pilots—are essential to improve capacity at already congested airports.

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[21] "Independent Assessment of FAA Acquisition Management System," April 22, 2008.

- **Acquire the necessary skill mix to effectively manage and execute NextGen.** In response to our February 2007 report, FAA commissioned the National Academy of Public Administration to assess the skill sets needed for NextGen. In its September 2008 report, the Academy identified 26 competencies where FAA lacks both capacity and capabilities to accomplish NextGen implementation.[22] These include experience in large-scale systems acquisition and integration. 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.

- **Develop a realistic plan for implementing ADS-B and realizing the air-to-air benefits of the new technology.** FAA has a contract in place for ADS-B and has published a Notice of Proposed Rulemaking (NPRM) calling for users to equip with *ADS-B Out* in the 2020 timeframe. FAA has received comments from 177 organizations or individuals about the details of the NPRM. While most agree that ADS-B is an important part of the future, some raised concerns about requirements, the cost of equipage, and lack of clear benefits—all legitimate issues that will need to be resolved. To advance ADS-B, FAA must expedite efforts to establish requirements for *ADS-B In* and cockpit displays.

- **Assess "implementation bandwidth" and develop transition benchmarks.** FAA's ability to implement multiple capabilities in a given time period needs to be assessed. There are limits to what can be accomplished given the scope of change envisioned and ongoing efforts. For example, FAA has staggered key NextGen capabilities, such as data link communications, to wait for the completion of ERAM in the 2012 timeframe. Further, FAA and the industry need 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.

In summary, FAA faces a number of critical decisions in the next year. A clear picture of FAA priorities and an executable path for NextGen should emerge sometime this summer when the RTCA task force completes its work. A considerable level of oversight will be required, and we will continue to monitor progress with this important program.

That concludes my statement, Mr. Chairman. I will be happy to answer any questions that you or other Members of the Subcommittee may have.

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[22] 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.

The following pages contain textual versions of the graphs and charts included in this document. These pages were not in the original document but have been added here to accommodate assistive technology.

Federal Aviation Administration: Actions Needed To Achieve Mid-Term NextGen Goals

Section 508 Compliant Presentation

Figure 1. The Federal Aviation Administration's Capital Funding for Fiscal Year 2008 to Fiscal Year 2014

(Note: NextGen funding includes transformational programs—such as ADS-B, SWIM, DataComm—and developmental efforts. Total NextGen funding for fiscal year 2008 to fiscal year 2014 from the capital account is projected to be $7.1 billion. Remaining Facilities and Equipment (F&E) includes funding for existing projects, facilities, and support service contracts.)

- For fiscal year 2008, the NextGen funding enacted is $187,700,000, and the remaining funds enacted for Facilities and Equipment is $2,325,900,000. Total capital funding enacted for fiscal year 2008: $2,513,600,000.

- For fiscal year 2009, the NextGen funding enacted is $637,900,000, and the remaining funds enacted for Facilities and Equipment is $2,104,200,000. Total capital funding enacted for fiscal year 2009: $2,742,100,000.

- For fiscal year 2010, the NextGen funding projection is $703,300,000, and the remaining funds projected for Facilities and Equipment is $2,153,200,000. Total capital funding projection for fiscal year 2010: $2,856,500,000.

- For fiscal year 2011, the NextGen funding projection is $1,062,100,000, and the remaining funds projected for Facilities and Equipment is $2,059,900,000. Total capital funding projection for fiscal year 2011: $3,122,000,000.

- For fiscal year 2012, the NextGen funding projection is $1,269,100,000, and the remaining funds projected for Facilities and Equipment is $2,075,900,000. Total capital funding projection for fiscal year 2012: $3,345,000,000.

- For fiscal year 2013, the NextGen funding projection is $1,562,400,000, and the remaining funds projected for Facilities and Equipment is $1,995,600,000. Total capital funding projection for fiscal year 2013: $3,558,000,000.

- For fiscal year 2014, the NextGen funding projection is $1,646,000,000, and the remaining funds projected for Facilities and Equipment is $1,975,000,000. Total capital funding projection for fiscal year 2014: $3,621,000,000.

Source: Federal Aviation Administration

Table 2.   Average Age of the Federal Aviation Administration's Facilities

- The average age of air traffic control towers is 29 years.

- The average age of terminal radar approach control facilities is 26 years.

- The average age of en route control centers is 43 years.

Source: Federal Aviation Administration