



Testimony

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

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**NEXT GENERATION AIR
TRANSPORTATION
SYSTEM**

**Challenges with Partner
Agency and FAA
Coordination Continue, and
Efforts to Integrate Near-,
Mid-, and Long-term
Activities Are Ongoing**

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Highlights of [GAO-10-649T](#), a testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

To prepare for future air traffic growth, the Federal Aviation Administration (FAA), including its Joint Planning and Development Office (JPDO) and Air Traffic Organization, is planning and implementing the Next Generation Air Transportation System (NextGen) in partnership with other federal agencies, such as the Departments of Commerce, Defense, and Homeland Security, and the aviation industry. NextGen will transform the current radar-based air traffic control system into a satellite-based system. As FAA begins implementing near- and midterm NextGen capabilities, a key challenge will be the extent to which FAA is able to integrate near- and midterm improvements (those between 2012 and 2018) with long-term plans (beyond 2018).

Furthermore, coordination among federal partner agencies and among various lines of business within FAA is important to ensure that NextGen implementation efforts are aligned.

GAO's testimony focuses on (1) current mechanisms for and challenges to coordination among FAA and its partner agencies in implementing NextGen, (2) challenges and ongoing efforts to improve coordination across offices within FAA, and (3) issues related to integrating near- and midterm implementation plans with long-term NextGen plans. This statement is based on past and ongoing GAO work, and interviews GAO conducted with senior agency officials at FAA, JPDO and its partner agencies, and selected industry stakeholders.

View [GAO-10-649T](#) or [key components](#). For more information, contact Gerald Dillingham at (202) 512-2834 or dillinghamg@gao.gov.

NEXT GENERATION AIR TRANSPORTATION SYSTEM

Challenges with Partner Agency and FAA Coordination Continue, and Efforts to Integrate Near-, Mid-, and Long-term Activities Are Ongoing

What GAO Found

Several mechanisms to facilitate coordination on NextGen activities among partner agencies and across FAA exist, but challenges to this coordination remain. One interagency coordination mechanism is the Senior Policy Committee, which is the high-level coordinating body across all of the partner agencies. In addition, JPDO is tasked with facilitating day-to-day interagency coordination, and has several mechanisms, including working groups and research transition teams, to accomplish this. GAO has previously reported that a lack of stable leadership and ambiguity surrounding JPDO's organizational position and ongoing role have contributed to the uneven performance of its coordination mechanisms. Recent changes in both the leadership and organizational position of JPDO could improve coordination across partner agencies. Stakeholders and partner agencies identified several other challenges to improving interagency coordination and collaboration, including (1) limited funding and staffing to dedicate to NextGen activities, (2) competing mission priorities, and (3) undefined near-term roles and responsibilities of some partner agencies.

FAA also faces challenges coordinating the implementation of NextGen across multiple FAA offices. GAO has previously reported that shifting from an organization focused on system acquisition to one focused on integration and coordination will be an ongoing challenge for FAA. Recent organizational changes that solidify the FAA Deputy Administrator as the key executive in charge of NextGen may help address these challenges. Moreover, FAA has made progress in improving coordination of efforts within FAA, by coordinating some office functions and moving toward a portfolio approach for implementation. However, as all these changes have recently occurred, it is too early to measure their success.

Integration of midterm implementation plans with the long-term plans and vision for NextGen is currently an ongoing effort within FAA. FAA officials and several stakeholders described FAA's near- and midterm efforts—such as implementing satellite-based surveillance of aircraft—as necessary stepping-stones to the long-term plans and vision of NextGen—such as aircraft operators receiving satellite surveillance information in the cockpit and using it to self-separate from surrounding aircraft. Early success in implementing NextGen capabilities will help build confidence among aircraft operators that FAA can and will provide the operational improvements necessary for operators to realize benefits from their equipment investments. However, some stakeholders expressed concern that near- and midterm implementation efforts are not integrated well enough with the long-term vision. Stakeholders identified key policy decisions that will affect the vision of the NextGen system over the long term and in turn determine whether programs, technologies, and capabilities implemented today will be the stepping-stones to future, more advanced capabilities. Key decisions include such issues as the installation of aircraft equipment, expediting environmental reviews, and the extent to which additional airport capacity will be needed.

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to testify before you today on interagency coordination and the integration of current implementation activities and long-term planning efforts to transform the current air traffic control system to the Next Generation Air Transportation System (NextGen).¹ NextGen is an enormously complex undertaking that requires new integrated systems, procedures, aircraft performance capabilities, and supporting infrastructure to create an air transportation system that uses satellite-based surveillance and navigation and network-centric operations. NextGen is intended to improve the efficiency and capacity of the air transportation system so that it can accommodate anticipated future growth. By 2025, air traffic is projected to increase up to three times the current level. Today's U.S. air transportation system will not be able to meet these air traffic demands, and improvements to the national airspace system are needed to mitigate the potential increase in flight delays that are likely to occur as air traffic grows and the potential decrease in economic productivity resulting from more delay and congestion in the system.

The Federal Aviation Administration (FAA) is the lead implementer for NextGen. Recently, FAA has emphasized improvements that can be implemented in the near and midterm, which FAA defines as between 2010 and 2018. Recognizing the importance of near- and midterm solutions, FAA requested that RTCA Inc.² create a NextGen Midterm Implementation Task Force (the Task Force), composed of industry stakeholders, to reach consensus within the aviation community on the operational improvements that can be implemented between 2009 and 2018. The Task Force provided recommendations to FAA in September 2009, and FAA provided responses to all of the Task Force recommendations in its 2010 NextGen Implementation Plan, and is continuing to work with industry through RTCA on addressing the recommendations as implementation

¹ This work is part of a review and monitoring effort that we are undertaking for the House Transportation and Infrastructure Committee; House Science and Technology Committee; and Senate Commerce, Science, and Transportation Committee. The work includes a number of planned reviews related to the ongoing implementation of NextGen.

² RTCA Inc. is a private, not-for-profit corporation that develops consensus-based recommendations on communications, navigation, surveillance, and air traffic management system issues.

continues.³ The FAA's Air Traffic Organization (ATO) is responsible for implementing near- and midterm NextGen improvements identified in the 2010 NextGen Implementation Plan in conjunction with other FAA lines of business. The Joint Planning and Development Office (JPDO) within FAA is responsible for long-term planning and coordination with federal partner agencies.⁴ According to the Task Force and other stakeholders, as FAA begins implementing near- and midterm capabilities, a key challenge will be integrating those improvements with long-term plans and ensuring that work is under way now to realize capabilities envisioned in the future. Furthermore, coordination among federal partner agencies, as well as coordination among the various offices within FAA with responsibility for NextGen and among industry stakeholders, is important to ensure that implementation efforts within FAA are aligned and that the research and development and other NextGen activities carried out by partners and stakeholders are aligned with FAA's near-, mid-, and long-term plans.

My testimony this afternoon addresses (1) current mechanisms for and challenges to coordination among FAA and its partner agencies in implementing NextGen over the near, mid-, and long terms; (2) challenges and ongoing efforts to improve coordination among offices within FAA; and (3) issues related to integrating near- and midterm implementation plans with long-term NextGen plans. My statement is based on our prior NextGen-related reports and testimonies, which are listed at the end of this statement. My statement is also based on ongoing work that includes our analysis of documents provided by FAA, JPDO, and its partner agencies, including key implementation documents such as the NextGen Implementation Plan and JPDO's Integrated Work Plan; interviews we conducted with senior agency officials at FAA, JPDO, and partner agencies; and interviews with industry stakeholders, including officials of the National Air Traffic Controller Association, RTCA, MITRE

³ Our previous work has highlighted several challenges that FAA faces in responding to Task Force recommendations. See GAO, *Next Generation Air Transportation System: FAA Faces Challenges in Responding to Task Force Recommendations*, [GAO-10-188T](#) (Washington, D.C.: Oct. 28, 2009).

⁴ NextGen was designed as an interagency effort in order to leverage various agencies' expertise and funding to advance NextGen while avoiding duplication. In addition to FAA, federal partner agencies include the Departments of Commerce (particularly its National Oceanic and Atmospheric Administration [NOAA]), Defense (DOD), Homeland Security (DHS), and Transportation (DOT); the National Aeronautics and Space Administration (NASA); and the White House Office of Science and Technology Policy (OSTP).

Corporation,⁵ the Aerospace Industries Association, and Boeing. We provided a draft of this statement to FAA and RTCA for comment and received technical comments from both organizations, which we incorporated as appropriate. We conducted our work in accordance with generally accepted government auditing standards. Additional information on the scope and methodology of our previous NextGen-related reports and testimonies is available in each product.

FAA Has Established Several Mechanisms to Facilitate Coordination on NextGen Activities among Partner Agencies, but Several Challenges Exist

Several Mechanisms Are in Place to Facilitate Coordination

Several mechanisms to facilitate coordination among FAA and partner agencies – including interagency committees, advisory boards, and working groups – are in place. First, the Senior Policy Committee, as the interagency governing body for NextGen, is meant to facilitate coordination and planning on NextGen across federal agencies. Chaired by the Secretary of Transportation, the Senior Policy Committee includes senior representatives from the NextGen partner agencies. Among its key activities, this committee works to provide policy guidance, resolve major policy issues, and identify and align resource needs. FAA and other partner agency officials indicated that the Senior Policy Committee has met infrequently. The Senior Policy Committee held their first full committee meeting under the new Administration in September 2009. According to the JPDO Director, JPDO is working closely with the Senior

⁵ MITRE is a not-for-profit organization chartered to work in the public interest. MITRE manages four Federally Funded Research and Development Centers, including one for FAA. MITRE has its own independent research and development program that explores new technologies and new uses of technologies to solve problems in the near term and in the future.

Policy Committee to establish a process for the committee to operate more effectively by providing it with the ability to review interagency dependencies such as FAA's reliance on NASA research, develop a NextGen road map, and establish a set of high-level milestones—which it currently does not have—as well as conduct oversight of NextGen progress.

In addition to the Senior Policy Committee, several other interagency coordination mechanisms are in place to facilitate coordination among FAA and partner agencies, many of which are within JPDO. These include the JPDO Board and the JPDO Division Directors Group, each of which is composed of representatives from other federal agencies and FAA. The JPDO Board functions as an adjunct to the Senior Policy Committee and includes representatives from each of the partner agencies. Representatives on the JPDO Board work on actionable outcomes related to NextGen. The Division Directors are responsible for the planning and managing of NextGen. JPDO also has organized nine working groups composed of representatives from federal agencies and industry stakeholders to specialize in developing NextGen's key capabilities, along with recommendations and action plans to be integrated into NextGen planning. Continued industry participation in JPDO Working Groups – which is provided pro-bono – is a challenge given the current business climate and companies' participation in numerous aviation forums.

FAA and NASA also participate on four JPDO research transition teams that have been established to ensure that research and development needed for NextGen implementation is identified, conducted, and effectively transitioned to the implementing agency. In previous work, we discussed the formation of these teams, but as they had just been established, noted that their potential effectiveness was unclear.⁶ In that work we also identified key challenges in coordinating research, including gaps in funding for needed research and prioritization of research needs. According to the former Director of JPDO and NASA officials, the teams have been useful vehicles for identifying research needs and potential gaps; however, some teams are further along in terms of their involvement among the agencies and their deliverables than others. Although other agencies do not currently participate on these research transition teams,

⁶ GAO, *Next Generation Air Transportation System: Status of Systems Acquisition and the Transition to the Next Generation Air Transportation System*, [GAO-08-1078](#) (Washington, D.C. Sept. 11, 2008).

NASA agency officials reported that the structure could provide a model for future coordination across agencies.

Other arenas where interagency coordination can take place also exist. For example, the NextGen Management Board, which will be chaired by FAA's newly appointed Deputy Administrator and has representatives from all key FAA lines of business, addresses interagency collaboration on key issues such as maintaining the integrity of information shared through NextGen systems. A liaison from DOD sits on the NextGen Management Board.

Several Challenges Impede Cross-Agency Coordination

Our past work identified several leadership and organizational challenges in ensuring coordination across partner agencies.⁷ First, we have reported that while JPDO has been in place for several years, the office has experienced a high leadership turnover rate.⁸ In 2010, a new JPDO Director was appointed, the office's fourth Director in its 7 years of existence. The lack of stable leadership has made it a challenge for JPDO to move forward on many goals and objectives. Second, in March of 2009, we reported that changes to JPDO's organizational position placing it within ATO could be an impediment to partner agency coordination, as it created ambiguity about JPDO's role and it lowered JPDO's status in the eyes of stakeholders.⁹ Moreover, the creation of a staff to support the Senior Policy Committee resulting from a November 2008 Executive Order caused further confusion regarding roles and responsibilities relative to federal partner agencies.¹⁰ Third, with the ATO focused on implementing capabilities through the midterm, JPDO's role was shifted to a focus on the long term beyond 2018. According to stakeholders and partner agency officials we interviewed for this work, given JPDO's long-term focus, it has largely not been involved in ATO's current near- and midterm activities,

⁷ See [GAO-08-1078](#); *Next Generation Air Transportation System: Status of Key Issues Associated with the Transition to NextGen*, [GAO-08-1154T](#) (Washington, D.C.: Sept. 11, 2008); and *Next Generation Air Transportation System: Status of Transformation and Issues Associated with Midterm Implementation of Capabilities*, [GAO-09-479T](#) (Washington D.C.: Mar. 18, 2009).

⁸ GAO, *Joint Planning and Development Office: Progress and Key Issues in Planning the Transition to the Next Generation Air Transportation System*, [GAO-07-693T](#) (Washington, D.C.: Mar. 29, 2007).

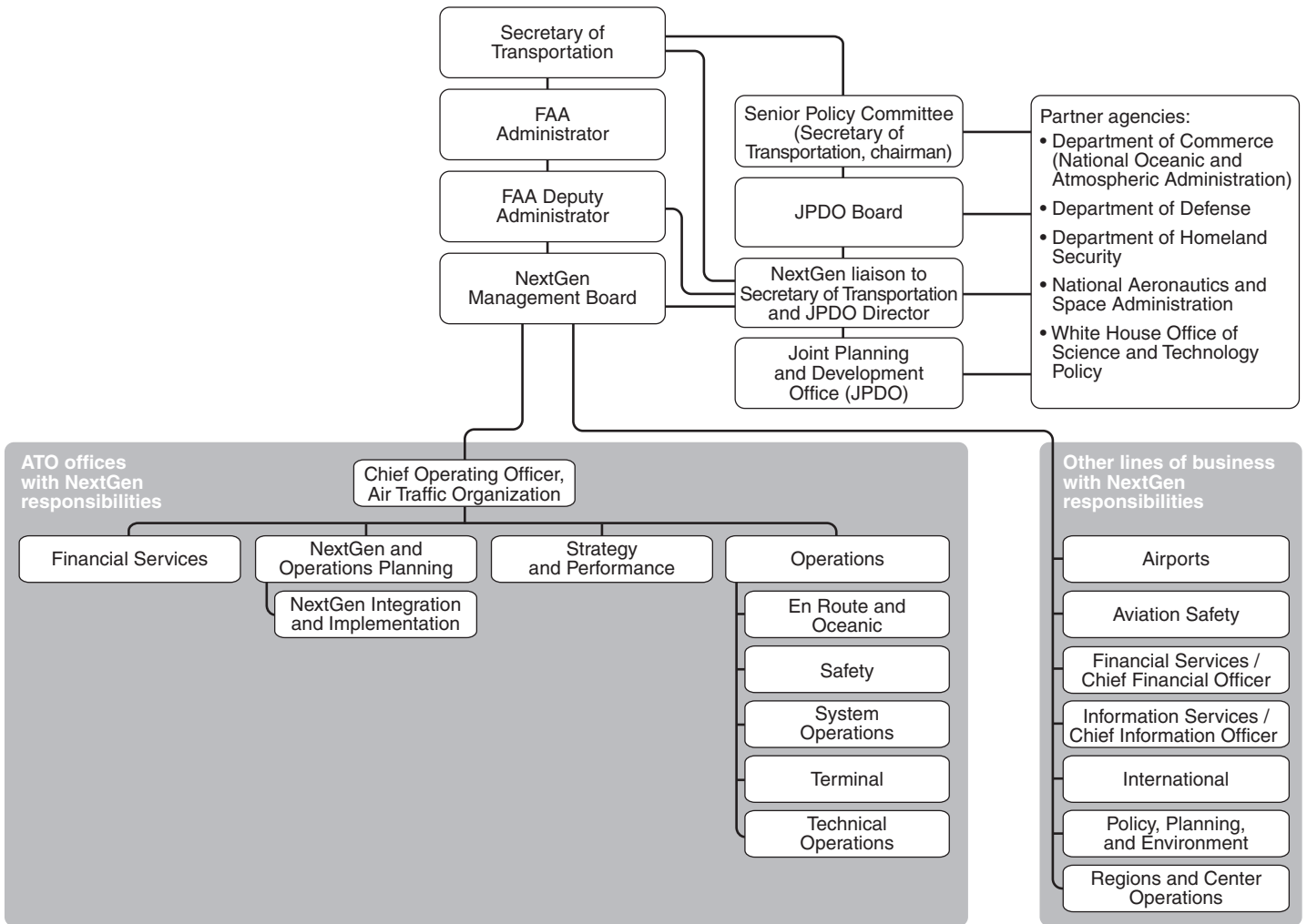
⁹ [GAO-09-479T](#).

¹⁰ Transformation of the National Air Transportation System, Exec. Order No. 13479 (2008).

despite being placed organizationally within ATO. As a result, participation by the partner agencies in those activities is also limited. Agency officials stated that it is important for JPDO to be involved in near- and midterm activities as well as long-term planning to ensure that effective interagency coordination on NextGen is in place.

Recent changes in the leadership and organizational position of JPDO are likely to change the nature of the relationship among JPDO, FAA, and its partner agencies and hold promise for increased coordination. JPDO has been elevated from its previous position within ATO and is now situated within FAA and outside of ATO, as illustrated in figure 1.

Figure 1: NextGen Management and Governance Structure



Sources: FAA and JPDO.

The JPDO Director now reports directly to the Deputy FAA Administrator—who serves as the head of the NextGen Management Board—as well as serving as the Senior Advisor to the Secretary of Transportation. JPDO is also more closely aligned and is in a position to have a more active role with the Senior Policy Committee. This new structure removes the reporting relationship between JPDO and the Chief Operating Officer of ATO, and gives JPDO more visibility within the organization and with federal partners and other stakeholders. With these organizational moves, JPDO is expected to become a better conduit for monitoring cross-agency budgets and facilitating cross-agency

collaborations and long-term research planning. Moreover, many of the key mechanisms for agency coordination, such as research transition teams, are within JPDO, and are likely to be affected by the move. According to the new Director of JPDO, a key step in improving the coordination with partner agencies will be to determine what value they see in the work produced by JPDO. As these changes have just recently occurred, it remains to be seen if the changes will result in better coordination across the partner agencies.

In addition to these leadership and structural issues, stakeholders and representatives of the partner agencies identified other broad challenges that affect the extent to which some partner agencies have coordinated with others. These challenges include (1) limited funding and staffing to dedicate to NextGen activities, (2) competing mission priorities, and (3) undefined near-term roles and responsibilities of some partner agencies.

- **Limited funding and staffing to dedicate to NextGen activities.** Industry stakeholders and agency officials we spoke to stated that some partner agencies' ability to coordinate with other agencies was affected by the levels of funding and staff that could be dedicated to NextGen activities. Officials at some partner agencies we spoke with stated that partner agencies allocated little or no budgetary funding specifically for NextGen activities and because of competing priorities for funds, they were limited in the resources they could dedicate to NextGen planning and coordination efforts. With respect to future investments, according to JPDO and DOT data, in fiscal year 2011, among NextGen partner agencies, three—FAA, NASA, and the Department of Commerce's NOAA—requested some funding for NextGen activities. DOD and DHS did not request funding in their budgets specifically for NextGen activities. OSTP is working with the Office of Management and Budget to improve agency alignment and identification of NextGen-related budgets.
- **Differences in agency mission.** Differences among agencies' mission priorities, particularly DHS's and DOD's, also pose a challenge to coordination efforts. DHS's diverse set of mission priorities, ranging from aviation security to border protection, affects its level of involvement in NextGen activities. For example, events such as the 2009 Christmas Day terrorism attempt can shift DHS priorities quickly and move the agency away from focusing on issues such as NextGen, which are not as critical at that particular time. Agency officials also stated that although different departments within DHS are involved in related NextGen activities, such as security issues, the fact that NextGen implementation is not a formalized mission in DHS can affect DHS's level of participation in NextGen activities. Industry stakeholders told us that there are potential

consequences if DHS is not involved in long-term NextGen planning, including potentially marginalizing DHS's NextGen areas, such as aviation security. Industry stakeholders reported that FAA could more effectively engage partner agencies in long-term planning by aligning implementation activities to agency mission priorities and by obtaining agency buy-in for actions required to transform the national airspace system.

- **Undefined near-term roles and responsibilities of partner agencies.** Some stakeholders and agency officials told us that FAA could do more to clearly define each partner agency's role in key planning documents that guide NextGen implementation efforts, particularly in the near term. Our work has shown that coordinating agencies should work together to define and agree on their respective roles and responsibilities, including how the coordination effort will be led.¹¹ We reported in 2008 that a key intended purpose of these planning documents, according to JPDO officials, is to provide the means for coordinating among the partner agencies and to identify each agency's role in implementing NextGen capabilities, but that stakeholders said that the planning documents did not provide guidance for their organizational decision making.¹² Some stakeholders and agency officials we spoke to more recently told us that the NextGen Implementation Plan, which identifies near- and midterm implementation efforts, still does not specify how partner agencies will be involved or what outcomes are required from them. Another industry stakeholder explained that if partner agencies do not see their roles reflected in key planning documents, projects which depend on inter-agency coordination will not be fully integrated across all partner agencies. One area in particular where coordination is important is related to how FAA, DOD, and DHS information networks will share information in the future to allow for a shared awareness of the national airspace. Information sharing across agencies is necessary for such things as advanced capabilities related to optimizing the use of certain airspace by the diverse set of users under the auspices of these agencies (e.g. military aircraft, commercial aircraft, general aviation, unmanned aerial vehicles, etc.). Protocols and requirements for inter-agency information sharing have yet to be determined. Limited agency participation in near-term coordination efforts, including establishing protocols on information sharing across agencies, could hamper coordination over the long term.

¹¹ GAO, *Results Oriented Government: Practices That Can Help Enhance and Sustain Collaboration among Federal Agencies*, [GAO-06-15](#) (Washington, D.C.: Oct. 21, 2005)

¹² [GAO-08-1078](#).

Both the House and Senate FAA reauthorization bills include provisions for improving coordination among partner agencies that could address, in part, some of the challenges identified by industry stakeholders and agency officials.¹³ Some of the related provisions in the bills call for, among other things, revised memorandums of understanding with partner agencies that describe the respective responsibilities of each agency, including budgetary commitments.

It Is Too Early to Determine Whether FAA Steps to Improve Coordination for NextGen among FAA Offices Will Be Effective

Stakeholders we spoke to cited challenges with coordinating the implementation of NextGen capabilities across FAA lines of business. With multiple FAA lines of business responsible for various NextGen activities, including offices within ATO and outside ATO, coordination and integration is vital since delays in actions required from several offices could prevent or delay full realization of NextGen benefits. Shifting from an organization and culture focused on system acquisition to one focused on integration and coordination will be an ongoing challenge for FAA.¹⁴

Recent organizational changes may help address these issues, but it is too early to measure the success of these efforts. As previously discussed and as shown in figure 1, changes that move JPDO out of the ATO and create a direct reporting relationship to the FAA Deputy Administrator solidify the FAA Deputy Administrator as the key executive in charge of NextGen. The FAA Deputy Administrator has authority over the different lines of business that must work together to implement NextGen and, as chairman of the NextGen Management Board, has the authority to force timely resolution of emerging NextGen implementation issues. Both the House and Senate reauthorization bills include provisions to designate a single official in charge of NextGen. The House bill proposes designating the Director of JPDO as the Associate Administrator for the Next Generation Air Transportation System,¹⁵ while the Senate bill proposes creating a Chief NextGen Officer who would oversee all NextGen programs and JPDO.¹⁶ Because the Deputy Administrator position has not yet been confirmed, it is too early to tell how effective these organizational

¹³ H.R. 915, 111th Cong. § 202 (a)(3) and S. 1451, 111th Cong. § 309.

¹⁴ See [GAO-10-188T](#) for more discussion of challenges related to culture change within FAA.

¹⁵ H.R. 915, 111th Cong. § 202.

¹⁶ S. 1451, 111th Cong. § 302.

relationships will be in addressing concerns from industry and the Congress regarding who is in charge of NextGen and whether that official has sufficient authority and accountability to ensure effective implementation.¹⁷

Other efforts in FAA to coordinate offices and manage NextGen through a portfolio approach are also under way, and it is also too early to tell how effective these efforts will be. According to FAA, the Office of Aviation Safety has already made several changes to improve coordination of NextGen-related projects in response to a Task Force recommendation to identify and solve the operational approval and certification issues that may impede adoption and acceleration of NextGen capabilities. For example, one of the most recent changes included creating new Flight Standards Service offices in each region focused on NextGen.¹⁸ In addition, the Aircraft Certification Service¹⁹ created a new team of experts from different offices to coordinate NextGen approvals.²⁰ FAA has also organized NextGen into various portfolios of capabilities called solution sets—each focusing on a series of related operational improvements that together will bring about the midterm system. One example of a solution set is “Flexible Terminal and Airports”, which includes within it operational improvements such as mitigating wake turbulence for departures and improving runway safety situational awareness for controllers. Within each of these solutions sets exist numerous capital acquisitions and programs, projects, and processes to be implemented by offices across FAA. For example, in the Flexible Terminal and Airports solution set described above, the operational improvements require acquisition and deployment of ground infrastructure, the development of new flight procedures and new protocols for controllers, and numerous other activities. FAA has designated a position of solution set coordinator for each solution set to coordinate and manage the implementation across the agency. However, some solution set coordinator positions have yet to be filled, and it is not yet clear whether coordinators will have sufficient

¹⁷ See [GAO-08-1078](#) and [GAO-08-1154T](#) for a discussion of industry concerns.

¹⁸ The Flight Standards Service office establishes standards for certification and oversight of airmen, air operators, air agencies, and designees.

¹⁹ The Aircraft Certification Service office is responsible for, among other things, administering safety standards governing the design and production of civil aeronautical products.

²⁰ Because these changes have just occurred, it is not yet clear whether they will be sufficient to address the problems cited by the Task Force.

authority over activities across FAA, or that suitable oversight mechanisms exist in order to ensure timely implementation of all activities necessary for an operational improvement. As a result, these issues could slow the implementation of NextGen.

Integration of Near- and Midterm Implementation Plans with Long-term Plans Is Ongoing

FAA officials and several stakeholders we interviewed described FAA's near- and midterm efforts as necessary stepping-stones to the long-term plans and vision for NextGen. Early success in implementing key NextGen capabilities desired by aircraft operators will help build confidence among operators that FAA can and will provide the operational improvements necessary for operators to realize benefits from their equipment investments.

From a planning perspective, integration of near- and midterm implementation plans with the long-term plans and vision for NextGen is currently an ongoing effort within the FAA. As previously mentioned, near- and midterm implementation is guided by the 2010 NextGen Implementation Plan, which feeds into FAA's Enterprise Architecture for the national airspace system.²¹ Supporting the NextGen Implementation plan are two more detailed plans - Segment A, which defines detailed activities through 2015, to be completed later this quarter, which will then be followed by Segment B, which defines NextGen through 2018. These plans will identify in great detail the specific actions that must take place in order to implement the identified capabilities. The long-term vision and initial planning for NextGen took place within JPDO and resulted in the overall Concept of Operations, the NextGen Enterprise Architecture, and an accompanying Integrated Work Plan (IWP).²² The IWP sought to identify all of the envisioned NextGen capabilities through the long term and also lays out the enabling activities believed necessary to achieve those capabilities (e.g., necessary research and development, policy

²¹ Enterprise architecture provides the structure to relate organizational mission, vision, and goals to business processes and the technical infrastructure required to execute them.

²² The Concept of Operations describes how the NextGen system is envisioned to operate over the long term (defined as 2025 and beyond) and identifies key research and policy issues. The Enterprise Architecture is a technical description of the NextGen system, akin to blueprints for a building: It is meant to provide a common tool for planning and understanding the complex, interrelated systems that will make up NextGen. JPDO's Integrated Work Plan is akin to a project plan and is meant to describe the capabilities needed to transition to NextGen from the current system and provide the research, policy, regulation, and acquisition timelines for all partner agencies necessary to achieve NextGen over the long term.

development, and so forth). Currently, according to a senior FAA official, the operational improvements identified in the 2010 NextGen Implementation Plan and FAA's Enterprise Architecture have been aligned with the operational improvements identified in the NextGen Enterprise Architecture and the IWP. However, the enabling activities necessary to achieve those capabilities have yet to be fully aligned. Various ATO offices and JPDO are currently developing agreements that will set forth how the offices will work together to fully align all of the enabling activities across the various planning documents. The effort to align the rest of the enabling activities is expected to be completed in late fiscal year 2010, according to a senior FAA official.

Some stakeholders expressed concern that near- and midterm programs and capabilities are not connected well enough to the long-term vision and identified several key policy decisions that will affect the vision of the NextGen system and thus will determine whether programs, technologies, and capabilities implemented today will be the stepping-stones to future, more advanced capabilities. Three of these decisions that will have a major impact on the direction of near- and midterm implementation efforts as well as the long-term vision involve issues such as the scope and timing of installing necessary equipment on aircraft, expediting environmental reviews, and the extent to which additional airport capacity will be needed.²³

- **Equipping aircraft.** FAA has yet to develop a strategy for the timing, cost, and scope of equipping the nation's aircraft fleet. In particular, FAA must focus on delivering near-term operational benefits by completing activities, such as procedure development, airspace redesign, performance standard development, and separation standard reduction, that lay the foundation for NextGen. Doing so will help provide incentives for users, especially commercial airlines, to invest in equipment for their aircraft. Two key decisions that must be considered are whether all aircraft need to be equipped at all locations and when equipping with various technologies should occur. FAA must align aircraft equipping rules and incentives in a way that minimizes the costs and maximizes the overall benefits of NextGen. We have previously reported that, in some cases, the federal government may deem financial or other incentives desirable to speed the

²³ Other major policy decisions were also identified by stakeholders and include issues such as future facility realignment plans, the level of automation that will be required and the degree of self-separation necessary in the future, and developing an information-sharing architecture across partner agencies.

deployment of new equipment and that appropriate incentives will depend on the technology and the potential for an adequate and timely return on public and private investment.²⁴

- **Environmental approach.** FAA has yet to make decisions regarding how environmental reviews can be expedited and what strategies might be needed to meet national environmental targets. We previously reported that differing levels of review must be completed depending on the extent FAA deems its actions to have significant environmental impact, and that the more extensive the analysis required, the longer the process can take, which can thus affect implementation of NextGen capabilities.²⁵ A key question in this regard is how to appropriately and expeditiously review actions that may increase noise in some areas but also reduce emissions and reduce noise levels overall. Further, a balance will need to be struck between needs for increased capacity, which means more aircraft will be flying and releasing emissions, and potential environmental targets in the future. A key issue here is that although NextGen will increase the efficiency per flight (fuel burn, distance traveled, and emissions), because there are expected to be more total flights, greenhouse gas emissions in total may rise.
- **Airport capacity.** A national policy regarding airport capacity in key metropolitan areas will need to be determined. Even with current planned airport expansion, FAA expects capacity shortfalls in many of the nation's busiest airports.²⁶ NextGen alone is not likely to sufficiently expand the safety and capacity of the national airspace system. Decisions regarding using existing capacity more efficiently include certifying and approving standards for the use of closely spaced parallel runways—which will be a major driver of the amount of land needed to expand airport capacity and will determine capacity in some metropolitan areas—and developing policies that address situations when demand exceeds capacity at airports or in specific airspace (e.g., pricing, administrative rules, service priorities, and so forth). Furthermore, planning infrastructure projects to increase capacity, such as building additional runways, can take as long as a decade

²⁴ See [GAO-10-188T](#) for more discussion on providing financial and other incentives.

²⁵ See [GAO-10-188T](#) for more discussion of FAA efforts to expedite environmental reviews.

²⁶ [GAO-08-1154T](#).

or more,²⁷ and will require substantial planning and safety and cost analyses.²⁸

JPDO and MITRE are currently conducting modeling work to examine benefits, costs, and risks associated with alternative assumptions regarding various future scenarios. This work will provide important information to stakeholders and decision makers regarding the validation of the benefits of NextGen capabilities, as well as the extent to which further capacity in the system may be required, and is still in the preliminary stages.

Mr. Chairman, this concludes my statement. I would be pleased to answer any questions that you or members of the subcommittee may have at this time.

GAO Contacts and Staff Acknowledgments

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²⁷ For example, planning and construction of a Boston Logan runway took over 30 years.

²⁸ [GAO-09-479T](#).

Related GAO Products

Next Generation Air Transportation System: FAA Faces Challenges in Responding to Task Force Recommendations. [GAO-10-188T](#). Washington, D.C.: October 28, 2009.

Responses to Questions for the Record: March 18, 2009, Hearing on ATC Modernization: Near-Term Achievable Goals. [GAO-09-718R](#). Washington, D.C.: May 20, 2009.

Next Generation Air Transportation System: Status of Transformation and Issues Associated with Midterm Implementation of Capabilities. [GAO-09-479T](#). Washington D.C.: March 18, 2009.

Responses to Questions for the Record: February 11, 2009, Hearing on the FAA Reauthorization Act of 2009. [GAO-09-467R](#). Washington, D.C.: March 10, 2009.

Next Generation Air Transportation System: Status of Systems Acquisition and the Transition to the Next Generation Air Transportation System. [GAO-08-1078](#). Washington, D.C.: September 11, 2008.

Next Generation Air Transportation System: Status of Key Issues Associated with the Transition to NextGen. [GAO-08-1154T](#). Washington, D.C.: September 11, 2008.

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