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NEXT GENERATION AIR TRANSPORTATION SYSTEM

Status of the Transition to the Future Air Traffic Control System

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Highlights of [GAO-07-784T](#), a testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

The nation's current air traffic control system is reaching its capacity limits as demand for air transportation grows. The Next Generation Air Transportation System (NextGen) represents a new system that will use state-of-the-art technologies and procedures. Transitioning to NextGen will require the Federal Aviation Administration (FAA) to continue to sustain the current air traffic control system while acquiring new systems on schedule and on budget. In 2003, Congress authorized the creation of the Joint Planning and Development Office (JPDO), housed within FAA, to plan NextGen and coordinate the transition. GAO's testimony focuses on the progress FAA is making in implementing businesslike operations that could provide a foundation for managing the transition to NextGen, the status of JPDO's planning and facilitation of NextGen, and some key challenges that FAA and JPDO need to address in moving toward NextGen. This statement is based on GAO's November 2006 report and recent testimonies as well as ongoing work. GAO's November report recommended that FAA study its technical and contract management expertise and that JPDO take actions to institutionalize its collaborative practices. FAA and JPDO said they would consider our recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-07-784T.

To view the full product, click on the link above. For more information, contact Gerald L. Dillingham, Ph.D., at (202) 512-2834 or dillingham@gao.gov.

NEXT GENERATION AIR TRANSPORTATION SYSTEM

Status of the Transition to the Future Air Traffic Control System

What GAO Found

During the last few years, FAA has made significant progress in implementing businesslike operations and procedures for managing and acquiring air traffic control systems. These operations and procedures have improved FAA's management of the current system and should better position the agency to manage the enormously complex transition to NextGen. One outcome of these changes is that FAA has reported exceeding its system acquisition goals for the past 3 fiscal years. However, further work remains to fully address past problems in acquiring systems and institutionalizing changes throughout the agency.

JPDO has continued to make progress in furthering its key planning documents. JPDO has experienced delays in the release of key documents, but currently plans to have initial versions of these documents released by July 2007. JPDO has been working since 2005 to establish a memorandum of understanding between its partner agencies, although as of May 4, 2007, the memorandum had been signed by the Departments of Transportation and Commerce and NASA, but was not yet signed by the Departments of Defense and Homeland Security. JPDO is also working with the Office of Management and Budget to establish mechanisms to identify NextGen-related projects across the partner agencies and consider NextGen as a unified, cross-agency program for funding decisions.

FAA and JPDO continue to face a number of challenges in moving toward NextGen, including questions about FAA's technical and contract management expertise; FAA's ability to maintain a number of existing systems, including monitoring and addressing equipment outages to ensure the safety of these existing systems as it transitions to NextGen; and conducting necessary human factors research. In addition, while JPDO recently estimated that the total federal cost for NextGen infrastructure through 2025 will range between \$15 billion and \$22 billion, questions remain about which entities will fund and conduct the necessary research, development, and demonstration projects that will be key to achieving certain NextGen capabilities. Also, JPDO faces a continuing challenge in ensuring the involvement of all key stakeholders, such as active air traffic controllers and system technicians, in its NextGen planning efforts.

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to testify before you today to discuss the future of air traffic control modernization. The nation's current air traffic control system is reaching its capacity limits as demand for air transportation continues to grow each year. The Next Generation Air Transportation System (NextGen) represents a transformation to a new system that will use satellite-based technologies and state-of-the-art procedures to handle the increasing volume of air traffic, while further improving safety and security. Transitioning to NextGen, however, will require the Federal Aviation Administration (FAA) to continue to operate and sustain the current air traffic control system while simultaneously acquiring and deploying the new NextGen systems on budget and on schedule.

In December 2000, President Clinton signed an executive order, and Congress passed supporting legislation that, together, provided FAA with the authority to create the performance-based¹ Air Traffic Organization (ATO) to administer and improve FAA's management of its current air traffic control modernization efforts. In 2003, Congress authorized the creation of the Joint Planning and Development Office (JPDO), housed within FAA, to plan for and coordinate a transition to NextGen—envisioned as a move from largely ground-based radars to precision satellite-based navigation and including digital, networked communications; an integrated weather system; layered, adaptive security; and more. In addition to FAA, JPDO operates in conjunction with multiple federal partner agencies and with the private sector to collaboratively conceptualize and plan the NextGen system.²

The reauthorization of FAA provides an opportunity to examine how the agency is managing the transformation to NextGen. My testimony today focuses on the following questions: (1) What progress is FAA making in implementing initiatives that could provide a solid foundation for managing the transition to NextGen? (2) What is the status of JPDO's

¹Performance-based organizations are discrete units, led by a chief operating officer, that commit to clear objectives, specific measurable goals, customer service standards, and targets for improved performance.

²JPDO's partner agencies include the Departments of Transportation, Commerce, Defense, and Homeland Security; FAA; the National Aeronautics and Space Administration (NASA); and the White House Office of Science and Technology Policy.

planning and facilitation of the transition to NextGen? and (3) What are some key challenges that FAA and JPDO need to address in moving toward NextGen? My statement is based on our November 2006 report³ and recent testimonies⁴ as well as on-going work. We conducted this work in accordance with generally accepted government auditing standards.

In summary:

- During the last few years, FAA has made significant progress in implementing businesslike operations and procedures for acquiring and managing air traffic control systems which have improved FAA's management of the current system and should better position the agency to manage the enormously complex transition to NextGen. However, further work remains to fully address past problems in acquiring systems and to institutionalize changes throughout the agency. By creating the Air Traffic Organization and appointing a chief operating officer, FAA established a new management structure and adopted more leading practices of private sector businesses to address the cost, schedule, and performance shortfalls that have plagued air traffic control acquisitions. One outcome of these changes is that for the past 3 fiscal years, FAA has reported exceeding its system acquisition goals. For fiscal year 2006, FAA reported that its critical acquisitions were 100 percent on budget and over 97 percent on schedule. FAA has also improved its management of the air traffic control system through increased efforts to achieve cost savings by outsourcing and consolidating facilities. Currently, FAA is seeking savings through outsourcing its planned nationwide deployment of a critical NextGen surveillance technology. To help sustain progress in managing acquisitions and address remaining program risks, FAA is working with the Office of Management and Budget (OMB) to develop goals and milestones for FAA to meet in further reducing acquisition risks. Despite FAA's progress, however, the FAA administrator's term ends in September 2007 and the chief operating officer left in February 2007, after serving 3 years. Thus, FAA will have lost two of its significant agents for change by

³GAO, *Next Generation Air Transportation System: Progress and Challenges Associated with the Transformation of the National Airspace System*, [GAO-07-25](#) (Washington, D.C.: Nov. 13, 2006).

⁴GAO, *Federal Aviation Administration: Key Issues in Ensuring the Efficient Development and Safe Operation of the Next Generation Air Transportation System*, [GAO-07-636T](#) (Washington, D.C.: Mar. 22, 2007) and 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).

the end of September. FAA's new leaders will need to demonstrate the same commitment to improvement as the outgoing leaders.

- JPDO has made progress in furthering its key planning documents, but continues to face challenges in institutionalizing its collaborative practices. JPDO is developing several key documents—a Concept of Operations, an Enterprise Architecture, and an Integrated Work Plan—that together form the foundation of NextGen planning. JPDO has missed earlier milestones regarding the release of its Concept of Operations and Enterprise Architecture. JPDO currently plans to release initial versions of all three documents by July 2007. As we noted in November 2006, JPDO is fundamentally a planning and coordinating body that lacks authority over the key human and technological resources of its partner agencies. Thus, institutionalizing the collaborative process between these partner agencies will continue to be critical to JPDO's success. However, JPDO still does not have in place a formal, long-term agreement among its partner agencies on their roles and responsibilities in planning and facilitating the transition to NextGen. JPDO has been working since 2005 to establish a memorandum of understanding between the partner agencies, although as of May 4, 2007, the memorandum had been signed by the Departments of Transportation and Commerce and NASA; the Departments of Defense and Homeland Security had not yet signed.⁵ It will also be important for institutionalizing collaboration to incorporate NextGen goals and activities into the partner agencies' key planning documents, as FAA is currently doing with its Operational Evolution Partnership—FAA's new implementation plan for NextGen. JPDO is also working with OMB to establish mechanisms to identify NextGen-related projects across the partner agencies and consider NextGen as a unified, cross-agency program for funding decisions.
- FAA and JPDO continue to face a number of challenges in moving toward NextGen, including determining whether the organizations have the adequate and appropriate technical and contract management expertise, managing and sustaining the current system, identifying who will conduct necessary research and development activities, obtaining stable leadership, conducting needed human factors research, and ensuring the involvement of all key stakeholders. In November 2006, we recommended that FAA examine its strengths and weaknesses with regard to the technical and contract management expertise that will be required to define, implement, and integrate the numerous complex programs

⁵According to JPDO, it is not appropriate for the Office of Science and Technology Policy, as a White House agency, to sign the MOU.

inherent in the transition to NextGen. In response to our recommendation, FAA is working with the National Academy of Public Administration to explore these issues. JPDO recently estimated that the total federal cost for NextGen infrastructure through 2025 will range between \$15 billion and \$22 billion. However, questions remain over which entities will fund and conduct some of the necessary research, development, and demonstration projects that will be key to achieving certain NextGen capabilities. According to officials at FAA and JPDO, they are currently studying these issues and trying to assess how much research and development FAA can assume. Of critical importance in the area of NextGen research is human factors research given the fundamental changes that NextGen envisions in the roles of air traffic controllers and pilots due to automation and changes in surveillance technologies and communications. JPDO has suffered from a lack of stable leadership and is now functioning under its third director. This issue is exacerbated by JPDO's senior policy committee, which has met only four times and has not met at all as a formal body since November 2005. Finally, JPDO faces a continuing challenge in ensuring the involvement of all key stakeholders, such as active air traffic controllers and technicians. Our work on past air traffic control modernization projects has shown that a lack of stakeholder or expert involvement early and throughout a project can lead to costly increases and delays.

In November 2006, we recommended that the Secretary of Transportation direct FAA to undertake a formal exploration of the agency's strengths and weaknesses with regard to the technical expertise and contract management expertise that will be required to define, implement, and integrate the numerous complex programs and systems inherent in the transition to NextGen. We recommended that the Secretary direct JPDO to take actions to institutionalize the partner agencies' collaboration in supporting NextGen, including action on a memorandum of understanding among the partner agencies, actions to finalize procedures to leverage partner agency resources, and actions to develop procedures for dispute resolution. We also recommended that the Secretary direct JPDO to determine whether key stakeholders and expertise are not currently represented in JPDO planning efforts. FAA and JPDO officials neither agreed nor disagreed with our recommendations, but said they would consider them.

**Improved,
Businesslike
Operations Should
Better Position FAA
to Implement and
Manage NextGen, but
Further Work
Remains**

During the last few years, FAA has made significant progress in implementing businesslike processes and procedures for managing and acquiring air traffic control systems. This contrasts with the previous decade's air traffic control modernization program which was characterized by chronic cost and schedule difficulties with systems acquisitions. The implementation of these businesslike operations has improved FAA's management of the current system and should better position the agency to manage the enormously complex transition to NextGen. However, further work remains to fully address past problems and institutionalize these changes throughout the agency, especially given the changing leadership within both FAA and ATO.

**Progress Has Been Made
but Further Work Remains
to Institutionalize Recent
Improvements in
Management and
Acquisition Processes**

A successful transition to NextGen will depend, to a great extent, on FAA's ability to manage the acquisition and integration of multiple NextGen systems. In recent years, FAA has made significant progress toward improving its management of acquisitions. However, FAA's air traffic control modernization program remains on our list of high risk programs because of its history of systemic management and acquisition problems that contributed to cost growth, schedule slippages, and performance shortfalls and the relative recentness of the turnaround in the program's performance. The realization of NextGen goals could be severely compromised if FAA's improved program management and outcomes are not institutionalized and carried over into the implementation of NextGen, which is an even more complex and ambitious undertaking than past modernization efforts.

By creating ATO and appointing a chief operating officer (COO) to head ATO, FAA established a new management structure and adopted more leading practices of private sector businesses to address the cost, schedule, and performance shortfalls that have plagued air traffic control acquisitions. ATO has worked to create a flatter organization, with fewer management layers, and has reported reducing executive staffing by 20 percent and total management by 16 percent. In addition, FAA uses a performance management system to hold managers responsible for the

success of ATO. More specifically, to better manage its acquisitions and address problems we have identified,⁶ FAA has

- undertaken human capital initiatives to improve its acquisition workforce culture and build towards a results-oriented, high-performing organization;
- developed and applied a process improvement model to assess the maturity of its software and systems capabilities resulting in, among other things, enhanced productivity and greater ability to predict schedules and resources; and
- reported that it has established a policy and guidance on using earned value management (EVM) in its acquisition management system and that 19 of its major programs are currently using EVM.⁷

One outcome of the implementation of the changes in program management and operations is that for the past three fiscal years, FAA has reported exceeding system acquisition goals. FAA's goals for fiscal year 2006 were to have 85 percent of critical acquisition programs within 10 percent of budget, as reflected in its capital investment plan, and to have 85 percent of critical acquisition programs on schedule. For fiscal year 2006, FAA reported that its critical acquisitions were 100 percent on budget and over 97 percent on schedule.

FAA Has Reported Cost Savings through Outsourcing and Facility Consolidations

FAA has also improved its management of its air traffic control program through increased efforts to achieve cost savings by outsourcing and consolidating facilities. For example, FAA is outsourcing flight service stations and estimates a \$2.2 billion savings over 12 years. Similarly, FAA is seeking savings through outsourcing its planned nationwide deployment of Automatic Dependent Surveillance-Broadcast (ADS-B), a critical NextGen surveillance technology. FAA is planning to implement ADS-B

⁶GAO, *Federal Aviation Administration: Stronger Architecture Program Needed to Guide Systems Modernization Efforts*, [GAO-05-266](#) (Washington, D.C.: Apr. 29, 2005); *Air Traffic Control: System Management Capabilities Improved, but More can be Done to Institutionalize Improvements*, [GAO-04-901](#) (Washington, D.C.: Aug. 20, 2004); and *Information Technology: FAA Has Many Investment Management Capabilities in Place, but More Oversight of Operational Systems is Needed*, [GAO-04-822](#) (Washington, D.C.: Aug. 20, 2004).

⁷EVM is a project management technique that combines measurements of technical performance, schedule performance, and cost performance with the intent of providing an early warning of problems while there is time for corrective action.

through a performance-based contract in which FAA will pay “subscription” charges for the ADS-B services and the vendor will be responsible for building and maintaining the infrastructure. (FAA also reports that the ADS-B rollout will allow the agency to remove 50 percent of its current secondary radars, saving money in the program’s baseline. The remaining radars will serve as a back-up system to ADS-B.) As for consolidating facilities, FAA is currently restructuring ATO’s administrative service areas from nine offices to three offices, which FAA estimates will save up to \$460 million over 10 years.

We previously reported that FAA should pursue further cost control options, such as exploring additional opportunities for contracting out services and consolidating facilities. However, we recognize that FAA faces challenges with consolidating facilities, an action that can be politically sensitive. In recognition of this sensitivity, the administration’s reauthorization proposal presents an initiative in which the Secretary of Transportation would be authorized to establish an independent, five-member Commission, known as the Realignment and Consolidation of Aviation Facilities and Services Commission, to independently analyze FAA’s recommendations to realign facilities or services. The Commission would then send its own recommendations to the President and Congress. In the past, we noted the importance of potential cost savings through facility consolidations; however, any such consolidations must be handled through a process that solicits and considers stakeholder input throughout and fully considers the safety implications of both proposed facility closures and consolidations.

Mitigating Remaining Risks and Institutionalization of Improvements Will Continue to Be a Challenge for FAA

Sustaining the acquisition progress achieved to date and addressing the remaining program risks remains a challenge for FAA. FAA’s air traffic control modernization program has been on GAO’s high-risk list since 1995. In recent years the agency has made measurable improvements in its acquisition processes. GAO acknowledged those improvements in its 2007 high risk report.⁸ In 2005, FAA submitted a plan to OMB for reducing the risks of cost overruns, schedule slippages, and performance shortfalls with goals and milestones for FAA to meet in further reducing acquisition risks. FAA expects to complete the risk mitigation plan by the end of calendar year 2008.

⁸GAO, *High Risk Series: An Update*, [GAO-07-310](#) (Washington, D.C.: January 2007).

Additionally, we have an ongoing study that is examining FAA's performance and reporting on its critical acquisitions, including applicable performance measures. We are exploring FAA's use of the most recently approved cost and schedule baselines, which may have changed significantly since the start of an acquisition, to measure and report on program performance. Rebaselining acquisitions is an accepted practice and there can be valid reasons for doing so, such as when changes in a program's requirements fundamentally alter the acquisition and make the originally approved schedule unrealistic. Because rebaselining resets the cost and schedule variances to zero, however, we want to verify that FAA's practice is not masking acquisition performance problems and is providing full disclosure to the Congress. We expect to issue a report on these issues later this year.

Institutionalizing Changes Within FAA Will Require Continued Strong Leadership

It will be important, as FAA begins to implement NextGen systems, to maintain critical acquisitions on schedule and on budget to meet the goal of transitioning to NextGen by 2025 and to prevent escalation of the costs of NextGen. While FAA has implemented many positive changes to its management and business processes in recent years, it currently faces the loss of key leaders. We reported that the experiences of successful transformations and change management initiatives in large public and private organizations suggest that it can take 5 to 7 years or more until such initiatives are fully implemented and cultures are transformed in a sustainable manner.⁹ Such changes require focused, full-time attention from senior leadership and a dedicated team. However, FAA will have lost two of its significant agents for change—the FAA administrator and the COO—by the end of September 2007. The administrator's term ends in September 2007; the COO left in February 2007, after serving 3 years. For the financial, management, and acquisition improvements to further permeate the agency, and thus provide a firm foundation upon which to implement NextGen, FAA's new leaders will need to demonstrate the same commitment to improvement as the outgoing leaders. Because this is a critical time for FAA, the agency needs to move expeditiously to find a new COO for ATO. A COO who could commit to the current statutory 5-year term also would be useful in providing stable leadership at ATO as foundational NextGen systems begin to be implemented.

⁹GAO, *National Airspace System: Transformation will Require Cultural Change, Balanced Funding Priorities, and Use of All Available Management Tools*, GAO-06-154 (Washington, D.C.: Oct. 14, 2005).

JPDO Has Made Progress in Planning NextGen, but Continues to Face Challenges with Its Organization

JPDO has continued to make progress in furthering its key planning documents, but still faces challenges in institutionalizing its collaborative practices.

JPDO Has Made Progress Toward Releasing Key Planning Documents, although Further Work Remains

JPDO's authorizing legislation requires the office to create a multi-agency research and development plan for the transition to NextGen. To comply, JPDO is developing several key documents that together form the foundation of NextGen planning. These documents include a NextGen Concept of Operations, a NextGen Enterprise Architecture, and an Integrated Work Plan.

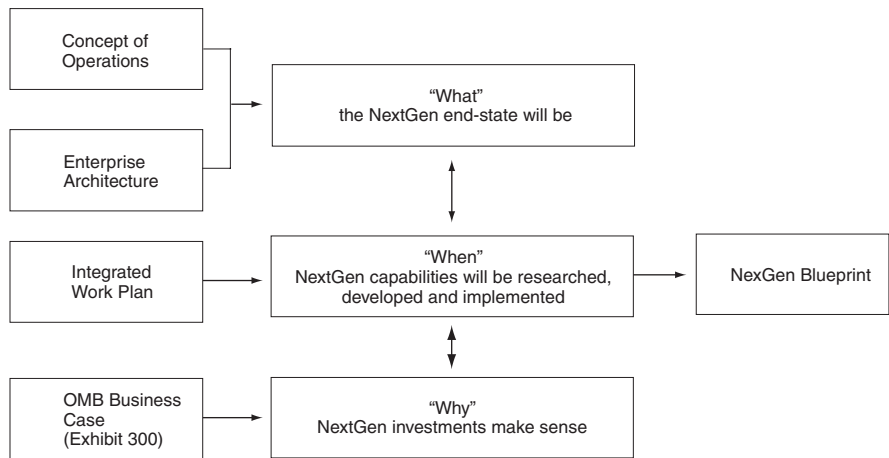
The Concept of Operations is the most fundamental of JPDO's key planning documents, as the other key documents flow from it. Although an earlier version was delayed so that stakeholder comments could be addressed, Version 1.2 of the Concept of Operations is currently posted on JPDO's Website for review and comment by the aviation community. This 226-page document provides written descriptions of how the NextGen system is envisioned to operate in 2025 and beyond, including highlighting key research and policy issues that will need to be addressed.¹⁰ For example, some key policy issues are associated with automating the air traffic control system, including the need for a backup plan in case automation fails, the responsibilities and liabilities of different stakeholders during an automation failure, and the level of monitoring needed by pilots when automation is ensuring safe separation between aircraft. Over the next few months, JPDO plans to address the public comments it receives and issue a revised version of the Concept of Operations.

¹⁰Following an introductory section, the Concept of Operations has eight sections covering air traffic management operations, airport operations and infrastructure services, net-centric infrastructure services, shared situational awareness services, security services, environmental management framework, safety management services, and performance management services.

In addition to the Concept of Operations, JPDO is working on an Enterprise Architecture for NextGen—that is, a technical description of the NextGen system, akin to blueprints for a building. The Enterprise Architecture is meant to provide a common tool for planning and understanding the complex, interrelated systems that will make up NextGen. According to JPDO officials, the Enterprise Architecture will provide the means for coordinating among the partner agencies and private sector manufacturers, aligning relevant research and development activities, and integrating equipment. JPDO plans to issue an early version of its Enterprise Architecture next month, although three previous release dates—March 2006, June 2006, and September 2006—were not met. According to JPDO officials, until the Enterprise Architecture is released, precise cost estimates cannot be developed and the partner agencies' research plans cannot be coordinated.

Finally, JPDO is developing an Integrated Work Plan that will describe the capabilities needed to transition to NextGen from the current system and provide the research, policy and regulation, and acquisition timelines necessary to achieve NextGen by 2025. The Integrated Work Plan is akin to a project plan and will be critical for fiscal year 2009 partner agency budget and program planning. According to a JPDO official, the office intends to issue its initial draft of the Integrated Work Plan in July 2007.

Figure 1: Key NextGen Planning Documents



Source: JPDO.

We have discussed JPDO’s planning documents with JPDO officials and examined both an earlier version of JPDO’s Concept of Operations¹¹ and the current version that is out for public comment.¹² As we previously testified, JPDO is focusing on the right types of key documents for the foundation of NextGen planning.¹³ As for the Concept of Operations, the current version is improved from the prior version due to additional detail. Nonetheless, we believe that it still does not include key elements such as scenarios illustrating NextGen operations, a summary of NextGen’s operational impact on users and other stakeholders, and an analysis of the benefits, alternatives, and trade-offs that were considered for NextGen. In addition, it lacks an overall description that ties together the eight key areas that the document covers. As noted earlier, JPDO does plan to release another version of the Concept of Operations later this year.

In fact, JPDO plans further versions of all of its key planning documents. We see the development of all three of JPDO’s key documents as part of an

¹¹Concept of Operations for the Next Generation Air Transportation System, version 0.2, July 24, 2006.

¹²We reviewed JPDO’s current Concept of Operations for the Next Generation Air Transportation System, version 1.2, dated February 28, 2007, by comparing it with the IEEE Standard 1362-1998 for concept of operations documents.

¹³[GAO-07-693T](#).

iterative and evolutionary process. Thus, it is unlikely that any of these documents will ever be truly “finalized,” but rather will continue to evolve throughout the implementation of NextGen to reflect, for example, the development of new technologies or problems uncovered during research and development of planned technologies.

Finally, while each of the three key documents has a specific purpose, the scope and technical sophistication of these documents makes it difficult for some stakeholders to understand the basics of the NextGen planning effort. To address this issue, JPDO is currently drafting what the office refers to as a “blueprint” for NextGen, meant to be a short, high-level, non-technical presentation of NextGen goals and capabilities. We believe that such a document could help some stakeholders develop a better understanding of NextGen and the planning effort to date.

Institutionalizing the Collaborative Process Will Continue to be Critical to JPDO’s Facilitating NextGen

In our November 2006 report, we noted that JPDO is fundamentally a planning and coordinating body that lacks authority over the key human and technological resources of its partner agencies. Consequently, institutionalizing the collaborative process with its partner agencies will be critical to JPDO’s ability to facilitate the implementation of NextGen. JPDO, however, has not established some practices significant to institutionalizing its collaborative process. For example, at a fundamental level, JPDO does not have formal, long-term agreements among its partner agencies on their roles and responsibilities in creating NextGen. There is no mechanism that assures that the partner agencies’ commitment will continue over the 20-year timeframe of NextGen or that ensures accountability to JPDO. According to JPDO officials, they are working to establish a memorandum of understanding (MOU), signed by the Secretary or other high-ranking official from each partner agency, which will broadly define the partner agencies’ roles and responsibilities. JPDO first informed us of the development of this MOU in August 2005; in November 2006 we recommended that JPDO finalize the MOU and present it to JPDO’s senior policy committee for its consideration and action. Nonetheless, according to a JPDO official, as of May 4, 2007, the MOU has been signed by the Departments of Transportation and Commerce and NASA, but remains unsigned by the Departments of Defense and Homeland Security.

Another key method for institutionalizing the collaborative effort is incorporating NextGen goals and activities into the partner agencies’ key planning documents. For example, we noted in November 2006 that NASA and FAA had incorporated NextGen goals into their strategic plans. These types of efforts will be critical to JPDO’s ability to leverage its partner

agency resources for continued JPDO planning efforts. Even more importantly, these efforts will be critical to helping ensure that partner agencies—given competing missions and resource demands—dedicate the resources necessary to support the implementation of NextGen research efforts or system acquisitions.

Recognizing that JPDO does not have authority over partner agency resources, FAA and JPDO have initiated several efforts to institutionalize NextGen. First, JPDO is working with FAA to refocus one of FAA's key planning documents on the implementation of NextGen—an effort that also appears to be improving the collaboration and coordination between JPDO and ATO. FAA has expanded and revamped its Operational Evolution Plan (OEP)—renamed the Operational Evolution Partnership—to become FAA's implementation plan for NextGen.¹⁴ The OEP is being expanded to apply to all of FAA and is intended to become a comprehensive description of how the agency will implement NextGen, including the required technologies, procedures, and resources. (Figure 2 shows the new OEP framework.) An ATO official told us that the new OEP is to be consistent with JPDO's key planning documents and its budget guidance to the partner agencies. According to FAA, the new OEP will allow it to demonstrate appropriate budget control and linkage to NextGen plans and help ensure that FAA's research and development is relevant to NextGen's requirements. According to FAA documents, the agency plans to publish a new OEP in June 2007.

¹⁴Prior to expansion of the OEP, the document centered around plans for increasing capacity and efficiency at 35 major airports.

Figure 2: New OEP Framework



Source: JPDO.

Note: The concentric rings indicate the nature of initiative development from the outer ring (NextGen strategic initiatives), in which new programs and concepts are analyzed and demonstrated; to the second ring, where decisions are made regarding safety, operating policy, performance standards, and certification requirements; to the third ring (technical development), where concepts are prototyped and investment analysis decisions are made. The progression through the rings is not necessarily linear, and a program may be in more than one ring at a time. Data communications, for example, is in the technical development ring and also in the middle ring as policy and rulemaking is considered. The core is divided into three sections, which indicate the FAA offices that implement the final NextGen program.

In addition, to further align FAA's efforts with JPDO's plans for NextGen, FAA has created a NextGen review board to oversee the OEP. This review board is co-chaired by JPDO's director and ATO's vice president of operations planning services. Initiatives, such as concept demonstrations

or research, proposed for inclusion in the OEP now need to go through the review board for approval. These efforts are assessed for relation to NextGen requirements, concept maturity, and risk. An ATO official told us that the new OEP process should also help identify some smaller programs that might be inconsistent with NextGen and which could be discontinued. Additionally, as a further step towards integrating ATO and JPDO, the administration's reauthorization proposal calls for the JPDO director to be a voting member of FAA's joint resources council and ATO's executive council.

While progress is being made in incorporating NextGen initiatives into FAA's strategic and planning documents, more remains to be done with FAA and the other JPDO partner agencies. For example, one critical activity that remains in this area will be synchronizing the NextGen enterprise architecture—once JPDO releases and further refines it—with the partner agencies' enterprise architectures. Doing so should help align agencies' current work with NextGen while simultaneously identifying gaps between agency plans and NextGen plans. Also, while FAA is making significant progress toward creating an implementation plan for NextGen with its OEP, the other partner agencies are less far along or have not begun such efforts. JPDO's lack of authority over partner agency resources will be minimized as a challenge if the partner agencies commit to NextGen goals and initiatives at a structural level. By further incorporation of NextGen efforts into strategic planning documents, the partner agencies will better institutionalize their commitments to JPDO and the NextGen initiative.

Finally, JPDO has made progress in establishing mechanisms for leveraging partner agency resources—another important practice for institutionalizing JPDO's collaborative effort. As we noted in our November 2006 report, JPDO is working with OMB to develop a process that would allow OMB to identify NextGen-related projects across the partner agencies and consider NextGen as a unified, cross-agency program. We recommended that JPDO develop written procedures that formalize agreements with OMB regarding the leveraging of partner agency resources and the identification of NextGen-related programs within agency budgets. We recently met with OMB officials who said that they felt there has been significant progress with JPDO over the last year. JPDO is now working on an OMB Exhibit 300 form for NextGen that will allow JPDO to present OMB a joint business case for the NextGen-related

efforts within the partner agencies and will be used as input to funding decisions for NextGen research and acquisitions across the agencies.¹⁵ This Exhibit 300 will be due to OMB in September 2007 to inform decisions about the partner agencies' 2009 budget submissions.

Ultimately, the success of JPDO will have to be measured in the efforts of its partner agencies to implement policies and procedures, conduct research, and acquire systems that support NextGen. For example, JPDO is currently working to establish a joint weather office involving FAA and the Departments of Defense and Commerce. The goal of this joint office is to eliminate redundancies in weather research and leverage the resources of these partner agencies to implement a joint weather product by 2012, according to a senior JPDO official. Similarly, JPDO has secured a commitment from the Departments of Defense and Homeland Security and FAA to jointly fund the developmental testing of scenarios for network enabled operations.

With regard to implementation of NextGen technologies, JPDO can point to its success in collaborating with FAA to fund and speed FAA's rollout of two systems considered cornerstone technologies for NextGen: ADS-B and System Wide Information Management (SWIM). ADS-B will replace many existing radars with less costly ground-based transceivers. SWIM will provide an initial network centric capability to all the users of the air transportation system. This means that the FAA and the Departments of Homeland Security and Defense will eventually share a common, real-time, secure picture of aviation operations across the airspace system. Identifying such NextGen programs across the partner agencies and establishing implementation plans for them in JPDO's Integrated Work Plan will be critical going forward to creating performance metrics for JPDO.

¹⁵Section 300 of OMB Circular No. A-11, Preparation, Submission, and Execution of the Budget (Nov. 2, 2005), sets forth requirements for federal agencies for planning, budgeting, acquiring, and managing information technology capital assets.

FAA and JPDO Continue to Face a Number of Challenges in Moving Toward NextGen

FAA and JPDO continue to face a number of challenges as they move toward the implementation of NextGen systems and procedures, including assessing FAA's technical and contract management expertise, sustaining the current air traffic control system, identifying which entities will handle necessary research and development, addressing JPDO's leadership challenges, conducting human factors research, and ensuring the involvement of all key stakeholders.

FAA Needs to Explore Whether It Has the Technical and Contract Management Expertise Necessary to Implement NextGen

In the past, a lack of expertise contributed to weaknesses in FAA's management of air traffic control modernization efforts, and industry experts with whom we spoke questioned whether FAA will have the technical expertise needed to implement NextGen. In addition to technical expertise, FAA will need contract management expertise to oversee the systems acquisitions and integration involved in NextGen.

Recognizing the complexity of the NextGen implementation effort and the possibility that FAA may not have the in-house expertise to manage it without assistance, we have identified potential approaches for supplementing FAA's capabilities. One of these approaches is for FAA to contract with a lead systems integrator (LSI). Generally, an LSI is a prime contractor that would help to ensure that the discrete systems used in NextGen will operate together and whose responsibilities may include designing system solutions, developing requirements, and selecting major system and subsystem contractors. The government has used LSIs before for programs that require the integration of multiple complex systems. Our research indicates that although LSIs have certain advantages, such as the knowledge, understanding, skills, and ability to integrate functions across various systems, their use also entails certain risks.¹⁶ For example, because an LSI may have significantly more responsibility than a prime contractor usually does, careful oversight is necessary to ensure that the government's interests are protected and that conflicts of interest are avoided. Providing the oversight that is needed, however, can be compromised when government expertise is lacking. Consequently, selecting, assigning responsibilities to, and managing an LSI could pose significant challenges for JPDO and FAA.

¹⁶GAO, *Defense Acquisitions: Future Combat System Risks Underscore the Importance of Oversight*, GAO-07-672T (Washington, D.C.: Mar. 27, 2007).

Another approach that we have identified involves obtaining technical advice from federally funded research and development corporations to help the agency oversee and manage prime contractors. These nonprofit corporations are chartered to provide long-term technical advice to government agencies in accordance with various statutory and regulatory rules to ensure independence and prevent conflicts of interest.

In November 2006, we recommended that FAA examine its strengths and weaknesses with regard to the technical expertise and contract management expertise that will be required to define, implement, and integrate the numerous complex programs inherent in the transition to NextGen.¹⁷ In response to our recommendation, FAA has contracted with the National Academy of Public Administration (NAPA) to determine the needed skill mix and the number of those skilled persons, such as technical personnel and program managers, that would be necessary to implement the new OEP and to compare those requirements with current FAA staff resources. According to FAA, the next step in this process would be to contract with NAPA or another organization for advice on how best to fill any skills gaps and how to proceed with management and oversight of the implementation of NextGen. We believe this is a reasonable approach that should help FAA begin to address this challenge.

Although FAA Is Now Focusing on NextGen, It Must Continue to Manage and Sustain the Current System

While FAA works to acquire and deploy NextGen technologies, it will be equally important that FAA maintain many existing systems and, for those systems that FAA determines should be phased out, that the agency do so using a risk-based approach. The adequacy of FAA's maintenance of existing systems was raised following a power outage and equipment failures in Southern California that caused hundreds of flight delays during the summer of 2006. Investigations by FAA and the Department of Transportation Inspector General into these incidents identified a number of underlying issues, including the age and condition of equipment. Nationwide, the number of scheduled¹⁸ and unscheduled outages of air traffic control equipment and ancillary support systems has been increasing. Increases in the number of unscheduled outages indicate that systems are failing more frequently. It will be critical for FAA to monitor and address equipment outages to ensure the safety and efficiency of the

¹⁷GAO-07-25.

¹⁸Scheduled outages occur for scheduled maintenance.

legacy systems, since they will be the core of the national airspace system for a number of years and, in some cases, will become part of NextGen.

FAA and JPDO Have Begun to Release Early Cost Estimates for NextGen, but Questions Remain Over Who Will Conduct Necessary Research and Development

In our November report, we noted that JPDO had not yet developed a comprehensive estimate of the costs of NextGen. Since then, in its recently released 2006 Progress Report,¹⁹ JPDO reported some estimated costs for NextGen, including specifics on some early NextGen programs. JPDO believes the total federal cost for NextGen infrastructure through 2025 will range between \$15 billion and \$22 billion. JPDO also reported that a preliminary estimate of the corresponding cost to system users, who will have to equip with the advanced avionics that are necessary to realize the full benefits of some NextGen technologies, produced a range of \$14 billion to \$20 billion. JPDO noted that this range for avionics costs reflects uncertainty about equipage costs for individual aircraft, the number of very light jets that will operate in high-performance airspace, and the amount of out-of-service time required for installation.

FAA, in its capital investment plan for fiscal years 2008-2012, includes estimated expenditures for 11 line items that are considered NextGen capital programs.²⁰ The total 5-year estimated expenditures for these programs is \$4.3 billion. In fiscal year 2008, only 6 of the line items are funded for a total of roughly \$174 million; funding for the remaining 5 programs would begin with the fiscal year 2009 budget. According to FAA, in addition to capital spending for NextGen, the agency will spend an estimated \$300 million on NextGen-related research and development from fiscal years 2008 through 2012. The administration's budget for fiscal year 2008 for FAA includes a total of \$17.8 million to support the activities of JPDO.

¹⁹JPDO, *Making the NextGen Vision a Reality: 2006 Progress Report to the Next Generation Air Transportation System Integrated Plan* (Washington, D.C.; Mar. 14, 2007).

²⁰FAA has six capital investment programs that it considers transformational NextGen programs slated to receive funding in fiscal year 2008: ADS-B nationwide implementation, System Wide Information Management (SWIM), NextGen Data Communications, NextGen Network Enabled Weather, National Airspace System Voice Switch, and NextGen Technology Demonstration. In addition, five other programs are slated to begin funding in 2009: NextGen System Development, NextGen High Altitude Trajectory Based Operations, NextGen High Density Airports, NextGen Networked Facilities, and NextGen Cross-Cutting Infrastructure.

While FAA and JPDO have begun to release estimates for FAA's NextGen investment portfolio, questions remain over which entities will fund and conduct some of the necessary research, development, and demonstration projects that will be key to achieving certain NextGen capabilities. In the past, a significant portion of aeronautics research and development, including intermediate technology development, has been performed by NASA. To its credit, NASA plans to focus its research on the needs of NextGen. However, NASA is also moving toward a focus on fundamental research and away from developmental work and demonstration projects, which could negatively impact NextGen if these efforts are not assumed by others.

In addition, JPDO will need to conduct modeling for NextGen and may look to its partner agencies to provide modeling capabilities and support. For example, NASA's NAS-wide modeling platform, the Airspace Concepts Evaluation System (ACES),²¹ permits JPDO to, among other things, evaluate alternative research ideas and assess the performance of competing vendors. According to a JPDO official, this capability, which is critical to NextGen research, is eroding as JPDO's investment simulation requirements are expanding. As part of its fundamental research mission, NASA intends to upgrade to ACES-X (a more sophisticated representation of the national airspace system), but not for another two years. Until then, JPDO's investment modeling capability will be constrained unless the office or another partner agency can assume the modeling work. For example, the Department of Defense has detailed aircraft models and the Department of Homeland Security has detailed models of airport terminals that are relevant for JPDO's simulations. This is an issue that needs to be addressed in the short-term.

JPDO faces the challenge of determining the nature and scope of the research and technology development necessary to begin the transition to NextGen, as well as identifying the entities that can conduct that research and development. According to officials at FAA and JPDO, they are currently studying these issues and trying to assess how much research and development FAA can assume. An FAA official recently testified that the agency proposes to increase its research and development funding by

²¹ACES provides a detailed flight simulation environment and an open framework to integrate the results of other simulations. This allows JPDO to test concepts well before they have to be demonstrated with real hardware and people. This platform provides a basis for evaluating the timing of many agencies' current budget requests and is a method for comparing competitive ideas.

\$280 million over the next 5 years. However, a draft report by an advisory committee to FAA stated that FAA would need at least \$100 million annually in increased funding to assume NASA's research and development work, and establishing the necessary infrastructure within FAA could delay the implementation of NextGen by 5 years.²² JPDO's Integrated Work Plan will permit NASA and the other partner agencies to assess the research and development needs of NextGen, determine funding, and conduct the necessary initiatives. The Integrated Work Plan is critical for the timely completion of research and testing of proposed NextGen systems and keeping NextGen on schedule.

JPDO's Lack of Stable Leadership and the Authority to Enforce Accountability Threaten the Credibility of Organization

While basic organizational structure of JPDO has been in place for several years (see app. 1), it has suffered from a lack of stable leadership. As JPDO begins its fourth year in operation, it is functioning under its third director and operated for much of 2006 under the stewardship of an acting director. The current director of JPDO has held the position since August 2006. The Next Generation Air Transportation System Institute (the Institute), created to facilitate the participation of nonfederal stakeholders in the NextGen effort, noted in its recent annual report that JPDO's leadership turnover had made it a challenge for JPDO to move out more aggressively on many goals and objectives, as the office waited on a full-time director. The Institute also stated that JPDO's leadership turnover had limited the ability of the Institute's executive committee²³ to forge a stronger relationship with JPDO leadership and work jointly on strategic issues and challenges. These fundamental leadership issues are exacerbated by the lack of meetings of JPDO's senior policy committee. Although JPDO has been functioning for just over 3 years, the senior policy committee has met only four times, and has not met at all as a formal body since November 2005.

²²Research, Engineering and Development Advisory Committee, *Draft Report on Financing the Next Generation Air Transportation System* (Washington, D.C.; April 2006).

²³The Institute's executive committee is a subset of the Institute's governing body, the Institute Management Council. The Institute Management Council members represent commercial airline operations, commercial pilots, air traffic control technology, air traffic controllers, airport operators, business aircraft operations, federal advisory committees, universities, and non-profit research organizations, small aircraft general aviation, helicopter operations, manufacturers of air vehicles and airborne/space-borne and ground based equipment, and regional commercial airline operations. The JPDO director is an ex-officio member and there are two at-large members.

In addition to the lack of stable leadership, JPDO's management lacks the authority to hold much of JPDO's staff accountable for their performance. As we noted in November 2006, JPDO has staffed the various levels of its organization with employees from its partner agencies and this practice helps to leverage partner agency human resources. However, a drawback of such staffing is a lack of real or perceived accountability to JPDO. According to JPDO officials, the JPDO workforce consists largely of part-time partner agency personnel who have been detailed to JPDO and part-time private sector volunteers. Only a few permanently-assigned FAA staff have their performance appraised by JPDO management, although the director does provide input to the performance appraisals of some of the managers detailed to JPDO from partner agencies. We have noted in previous studies that improved performance has been linked to accountability.²⁴

Similarly, although the organizational structure of the Institute has been in place for 2 years, the Institute is currently led by an acting director while a search is being conducted for the Institute's third executive director. Some Institute Management Council (IMC) members with whom we spoke believed that this turnover might be indicative of problems with the structure of the Institute and a need for greater clarity in roles and responsibilities. For example, these IMC members noted that there were stresses placed on the Institute's executive director resulting from the need to meet the competing demands of the IMC, the IMC executive committee, and JPDO management. Other IMC members attributed the stresses on the executive director to the lack of clarity in the Institute's role. These members noted that while the Institute is clearly charged with selecting private sector participants for JPDO's work groups, the Institute's role of conducting research for the JPDO could be viewed as overlapping with other advisory organizations such as RTCA.²⁵ Two IMC members believed that the Institute's award of only two research contracts in two years illustrates that the Institute is not yet functioning as intended. Some IMC members also pointed out that a formal mechanism for

²⁴GAO, *Air Traffic Control Modernization: Status of the Current Program and Planning for the Next Generation Air Transportation System*, [GAO-06-653T](#) (Washington, D.C.: June 21, 2006)

²⁵Organized in 1935 and once called the Radio Technical Commission for Aeronautics, RTCA is today known by its acronym. RTCA is a private, not-for-profit corporation that develops consensus-based performance standards for ATC systems. RTCA serves as a federal advisory committee, and its recommendations are the basis for a number of FAA's policy, program, and regulatory decisions.

providing industry input to JPDO on NextGen concepts and issues has not yet been fully established, even though this is one of the missions of the Institute. Although the Institute is currently seeking a new executive director, some IMC members felt that the IMC would do better to first try and gain a better understanding of the factors that have led to the turnover in the executive director position.

Human Factors Research Is Critical to Some Fundamental NextGen Capabilities

Among the central assumptions of the NextGen system is a concept of operations that envisions an increased reliance on automation, which dramatically changes the roles and responsibilities of both the air traffic controllers and the pilots. In such an automated environment some of the controller's responsibilities will shift from air traffic control to air traffic management and pilots will take on a greater share of the responsibility for maintaining safe separation and other tasks currently performed by controllers. These changes in roles and responsibilities raise significant human factors issues for the safety and efficiency of the national airspace system.

Although JPDO has begun to model how shifts in air traffic controllers' workloads would affect their performance, it has not yet begun to model the effect of how this shift in workload to pilots would affect pilot performance. According to a JPDO official, modeling the effect of changes in pilot workload has not yet begun because JPDO has not yet identified a suitable model to incorporate into its suite of modeling tools. According to a JPDO official, the evolving roles of pilots and controllers is the NextGen initiative's most important human factors issue, but will be difficult to research because data on pilot behavior are not readily available for use in creating models. In addition to the study of changing roles, JPDO has not yet studied the training implications of various systems or solutions proposed for NextGen. For example, JPDO officials said they will need to study the extent to which new air traffic controllers will have to be trained to operate both the old and the new equipment as the concept of operations and enterprise architecture mature.

JPDO Faces A Continuing Challenge in Ensuring the Involvement of All Key Stakeholders

Some stakeholders, such as current air traffic controllers and technicians, will play critical roles in NextGen, and their involvement in planning for and deploying the new technology will be important to the success of NextGen. In November 2006, we reported that active air traffic controllers were not involved in the NextGen planning effort and recommended that JPDO determine whether any other key stakeholders and expertise were not represented on its integrated product teams, divisions, or elsewhere

within the office. Since then, the head of the controllers' union has taken a seat on the IMC. However, no active controllers are yet participating at the more detailed group planning level. Also, aviation technicians do not participate in NextGen efforts. Input from current air traffic controllers who have recent experience controlling aircraft and current technicians who will maintain NextGen equipment is important when considering human factors and safety issues. Our work on past air traffic control modernization projects has shown that a lack of stakeholder or expert involvement early and throughout a project can lead to costly increases and delays.

In addition, we found that some private sector stakeholders have expressed concerns that participation in the Institute might either preclude bidding on future NextGen acquisitions or pose organizational conflicts of interest. FAA's acquisition process, generally, precludes bids from organizations that have participated in, materially influenced, or had prior knowledge of the requirements for an acquisition. The Institute was aware of this concern and attempted to address it through an amendment to its governing document that strengthened the language protecting participants from organizational conflicts of interest for participation in the NextGen initiative. However, while the amendment language currently operates to protect stakeholders, the language has never been tested or challenged. Thus, it is unclear at this time whether any stakeholder participation is being chilled by conflict of interest concerns.

Mr. Chairman, this concludes my statement. I would be pleased to respond to any questions from you or other Members of the Subcommittee.

GAO Contacts and Staff Acknowledgment

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Appendix I: JPDO's Organizational Structure Facilitates Collaboration, but Continues to Evolve

In November 2006, we reported that the Joint Planning and Development Office's (JPDO) organizational structure incorporated some of the practices that we have found to be effective for federal interagency collaborations—an important point given how critical such collaboration is to the success of JPDO's mission. For example, the JPDO partner agencies have worked together to develop key strategies for the Next Generation Air Transportation System (NextGen) and JPDO has leveraged its partner agency resources by staffing various levels of its organization with partner agency employees. Also, our work has shown that involving stakeholders can, among other things, increase their support for a collaborative effort.

Vision 100 includes requirements for JPDO to coordinate and consult with its partner agencies, private sector experts, and the public. JPDO's approach has been to establish an organizational structure that involves federal and nonfederal stakeholders throughout the organization. This structure includes a federal interagency senior policy committee. JPDO's senior policy committee is headed by the Secretary of Transportation (as required in Vision 100) and includes senior-level officials from JPDO's partner agencies. The JPDO board is an adjunct to the senior policy committee and is composed of at least one senior representative from each of the partner agencies.

The Next Generation Air Transportation System Institute (the Institute) was created by an agreement between the National Center for Advanced Technologies¹ and the Federal Aviation Administration to meet Vision 100's requirement that JPDO coordinate and consult with the public. The Institute incorporates the expertise and views of stakeholders from private industry, state and local governments, and academia. In addition, the Institute arranges for the participation of nonfederal stakeholders in JPDO's planning efforts, reviews and selects private sector organizations to conduct research studies needed by JPDO, and holds public meetings to obtain the views of the aviation community. The Institute held its first public meeting in March 2006 and plans to hold another public meeting in May 2007. The Institute is directed by an Institute Management Council (IMC), which consists of top officials and representatives from the aviation community. The IMC oversees the policy, recommendations, and products of the Institute and provides a means for advancing consensus

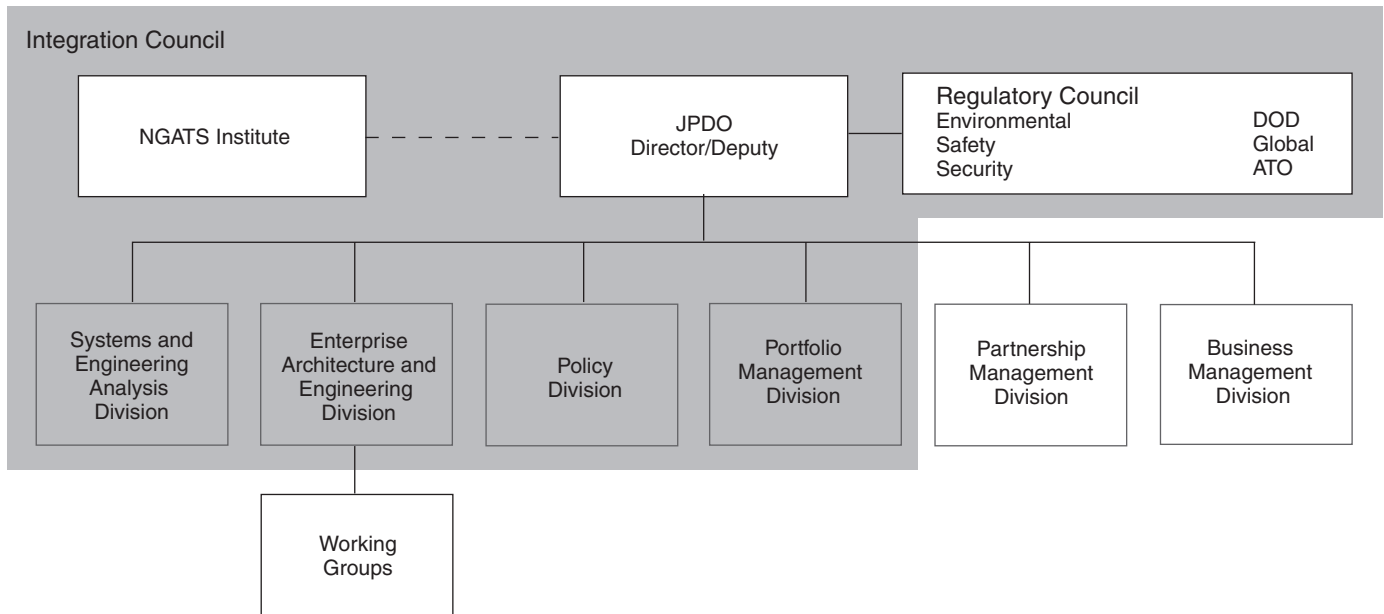
¹The National Center for Advanced Technologies is a nonprofit unit established by the Aerospace Industries Association.

positions on critical NextGen issues. An executive committee, consisting of the IMC's two co-chairs and three members selected by them, conducts business on behalf of the IMC. The Institute is managed on a day-to-day basis by an executive director, who reports to the IMC and the executive committee, and works closely with JPDO management.

Recently, JPDO announced they are in the process of implementing several structural and operational changes to improve the efficiency of the organization (see fig. 3). JPDO's structure used to include eight integrated product teams (IPT), which was where the federal and nonfederal experts came together to plan for and coordinate the development of capabilities for NextGen. The eight IPTs were linked to eight key strategies that JPDO developed early on for guiding its NextGen planning work. The IPTs were headed by representatives of JPDO's partner agencies and include more than 200 nonfederal stakeholders from over 100 organizations.

JPDO recently converted each IPT into a "working group" with the same participants as the former IPT, but with each working group led by a joint government and industry steering committee. These steering committees will oversee the creation of small, ad hoc subgroups that will be tasked with short-term projects exploring specific issues and delivering discrete work products. Under this arrangement, working group members will be free of obligations to the group when not engaged in a specific project. According to JPDO officials, they believe the working groups will be more efficient and output- or product-focused than the former IPTs. JPDO officials noted that they are also in the process of staffing a new, ninth working group to address avionics issues.

Figure 3: JPDO New Organizational Chart



Governance

- Senior Policy Committee
- Board of Directors

Advisors

- REDAC Executive Committee
- Institute Management Council

Inter-Agency Coordination

- Joint Architecture and Engineering Board

Source: JPDO.

Note: There are nine working groups covering aircraft, air navigation services, airports, environment, global harmonization, net-centric operations, safety, security, and weather.

We believe that these changes could help address concerns that we have heard from some stakeholders about the productivity of some IPTs and the pace of the planning effort at JPDO. However, it will be important to monitor these changes to ensure that the participation of stakeholders is neither decreased nor adversely affected. Maintaining communications within and among work groups could increase in importance if, as work group members focus on specific projects, they become less involved in the overall collaborative planning effort. The effectiveness of the changes to JPDO’s organizational structure will need to continue to be evaluated over time. Currently, we have on-going study examining the views and

concerns of JPDO's federal and nonfederal stakeholders about the office and its performance. We expect to issue a report on our findings later this year.

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