U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

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March 16, 2009

## SUMMARY OF SUBJECT MATTER

**TO:** Members of the Subcommittee on Aviation

**FROM:** Subcommittee on Aviation Staff

**SUBJECT:** Air Traffic Control Modernization and the Next Generation Air Transportation System: Near-Term Achievable Goals

### PURPOSE OF HEARING

The Subcommittee will meet on Wednesday, March 18, 2009, at 10:00 a.m. in Room 2167 Rayburn House Office Building to receive testimony on ATC Modernization and the Next Generation Air Transportation System: Near-Term Achievable Goals.

### Background

The present-day national airspace system ("NAS") consists of a network of en route[1] airways, much like an interstate highway grid in the sky, interconnected by ground-based navigation facilities that emit directional signals that aircraft use to navigate through geographic points in the airspace. Limits on the transmission distances of these signals prevent aircraft from flying direct routes on long-distance flights and limit the utilization of airspace to predefined routes where aircraft can reliably transition from one navigational signal to the next.

In the terminal environment, near busy airports and metropolitan areas, aircraft follow arrival and departure routes by tracking ground-based navigational signals, much like navigation during the en route phase of flight, or by following the instructions of air traffic controllers, often referred to as receiving radar vectors.

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[1] The FAA uses three types of facilities to control traffic: *Airport towers* direct traffic to the ground before landing and after takeoff within 5 nautical miles of the airport and about 3,000 feet above the airport. *Terminal Radar Approach Control Facilities* (*"TRACONs"*) sequence and separate aircraft in terminal airspace – i.e., as they approach and leave airports, beginning about 5 nautical miles and ending about 50 nautical miles from the airport and generally up to 10,000 feet above the ground. *En route centers* control aircraft in high-altitude en route airspace – i.e., in transit and during approaches to some airports, generally controlling air space that extends above 18,000 feet for commercial aircraft.

Surveillance and separation of aircraft, both en route and in terminal airspace, is largely achieved by utilizing surveillance data through an extensive network of radar sites and air traffic controllers who are directly responsible for ensuring adequate separation between aircraft receiving radar services. Maintaining this separation is achieved through extensive use of voice communications between controllers and pilots over open two-way radio frequencies.

Under the current system, controller workload, radio frequency voice-communication, congestion, and the coverage and accuracy of ground-based navigational signals impose practical limitations on the capacity and throughput of aircraft in the system, particularly in busy terminal areas near major airports and around certain choke-points in the en route airway infrastructure where many flight paths converge.

Currently, the U.S. air transportation system handles about 50,000 flights over a 24-hour period. By 2025, air traffic is projected to increase two- to three-fold, equating to about 100,000 to 150,000 flights every 24 hours. It is widely acknowledged that the current U.S. air transportation system will not be able to meet these air traffic demands. In 2003, Congress created the Joint Planning and Development Office ("JPDO") in *Vision 100 – the Century of Aviation Reauthorization Act* (P.L. 108-176) within the Federal Aviation Administration ("FAA"), and tasked it with developing a Next Generation Air Transportation System ("NextGen") that will meet anticipated traffic demands.

The NextGen plan will consist of new concepts and capabilities for air traffic management and communications, navigations, and surveillance that will involve: transitioning from a ground-based radar system to a more automated, aircraft-centered, satellite-based surveillance system; developing more direct and efficient routes through the airspace; improving aviation weather systems; developing data communications capabilities between aircraft and the ground to reduce controller and pilot workload per aircraft; and creating shared and distributed information technology architectures.

Early industry feedback to initial NextGen planning documents expressed a desire for more detail on near- to mid-term NextGen capabilities, requirements and benefits. Accordingly, the FAA appears to be shifting its attention to the near- to mid-term, and is refining NextGen benchmarks for the next five to eight years while maintaining efforts to develop the end-state architecture.

## I. The FAA's Current Air Traffic Control ("ATC") Modernization Effort

In 1981, the FAA initiated an ambitious effort to modernize the ATC system. According to the Government Accountability Office ("GAO"), the FAA initially estimated ATC Modernization would cost $12 billion and could be completed over 10 years. This ATC Modernization involved acquiring a vast network of radar, navigation, communications, and information-processing systems, as well as new air traffic control facilities. However, key projects within this ATC Modernization experienced significant cost overruns, schedule delays, and performance shortfalls that affected FAA's ability to deliver systems as promised.

In 1995, the GAO placed the FAA's ATC Modernization program on its "High-Risk List" because of the program's estimated $36 billion cost, its complexity, its criticality to FAA's mission of ensuring safe and efficient air travel, and its problem-plagued past. However, in January 2009, the GAO removed the FAA's ATC Modernization program from its "High-Risk List." The GAO

notes that since the creation of the FAA's Air Traffic Organization ("ATO") in 2004, the FAA has shown significant improvement in its management of ATC Modernization and that many more acquisition programs are being completed within the original cost and time estimates than prior to the ATO's existence. The GAO has cited several steps that the ATO has taken to improve the management of its ATC acquisitions, including:

- Establishing a portfolio approach to managing investments. This approach allows the ATO to evaluate the relative merits of spending funds to develop new systems, enhance current systems, or continue operating and maintaining existing systems.

- Applying a business case approach to each project, which includes an analysis of assumptions, constraints, and alternatives to the project, and for each alternative, the full life cycle cost, benefit, schedule, risk, and economics.

- Establishing annual acquisition performance goals to improve oversight and accountability over acquisition processes.

Yet, it is worth noting that the GAO draws a distinction between ATC Modernization and NextGen. Whereas the FAA's ATC Modernization program focused primarily on the acquisition of ATC systems within the FAA's ATO, NextGen is a far more expansive "transformation" of the air transportation system that includes not only the acquisition of new systems, but also the integration of "legacy systems" (i.e., current ATC Modernization programs) with those new systems, along with the development of policies and procedures that will require cooperative relations between multiple government agencies and nonfederal aviation stakeholders. As such, the GAO has stated that NextGen is a high risk effort because of its dollar cost and complexity, but it is not currently on GAO's "High-Risk List" because NextGen has only recently begun to move from the planning stage to implementation.

The Department of Transportation Inspector General's ("DOT IG") office has also noted the ATO's ability to better control cost growth and schedule slips on major ATC Modernization programs. In April 2008, the DOT IG reported on 18 major FAA acquisitions valued at $17.5 billion. When comparing revised baselines,[2] only 2 of the 18 projects the DOT IG reviewed have experienced additional cost growth totaling $53 million and cumulative delays of 5 years since the DOT IG last reported in 2005. However, from program inception, six ATC Modernization programs have experienced cumulative cost growth of nearly $4.7 billion and schedule delays ranging from 1 to 12 years. Like the GAO, the DOT IG has described NextGen as a high-risk effort.

But it is worth noting that the DOT IG has attributed much of the ATO's ability to control growth and schedule slips to its "incremental approach" to ATC acquisitions, which at times has involved cancelling or deferring key decisions about ATC Modernization programs that may need to

[2]"Baselining" refers to movement from research and development to deployment of a system. The FAA's Joint Resources Council ("JRC") - the FAA's senior decision making body for major acquisitions) makes a formal decision to invest in a technology and approves cost, schedule and/or performance targets. Rebaselining readjusts the cost and schedule milestones for a program, effectively resetting cost and schedule variances to zero. The FAA uses the current baseline schedule and costs for its performance measurement rather than the baseline set at an acquisition's inception.

be revived or reevaluated as part of the NextGen effort. The DOT IG has testified that while the ATO's incremental approach reduced risk in the near term, it has left several programs with no clear end-state, low visibility into their ultimate cost, and in certain instances, it has left the FAA in a difficult position to begin introducing NextGen.

Approximately 30 existing capital programs will serve as "platforms" for NextGen. According to the DOT IG, over the next 2 years the FAA must make more than 23 critical decisions about ongoing programs that will have a direct bearing on the FAA's ability to meet NextGen mid- and long-term goals and capability requirements, including:

- **Terminal Modernization:** The FAA plans to make an initial investment decision on how to modernize displays and computers that controllers use to manage traffic in the vicinity of airports. This will be particularly important for busy and complex facilities like New York, Chicago, and Atlanta. The FAA's final investment decision leading to a contract award is expected in late 2010.

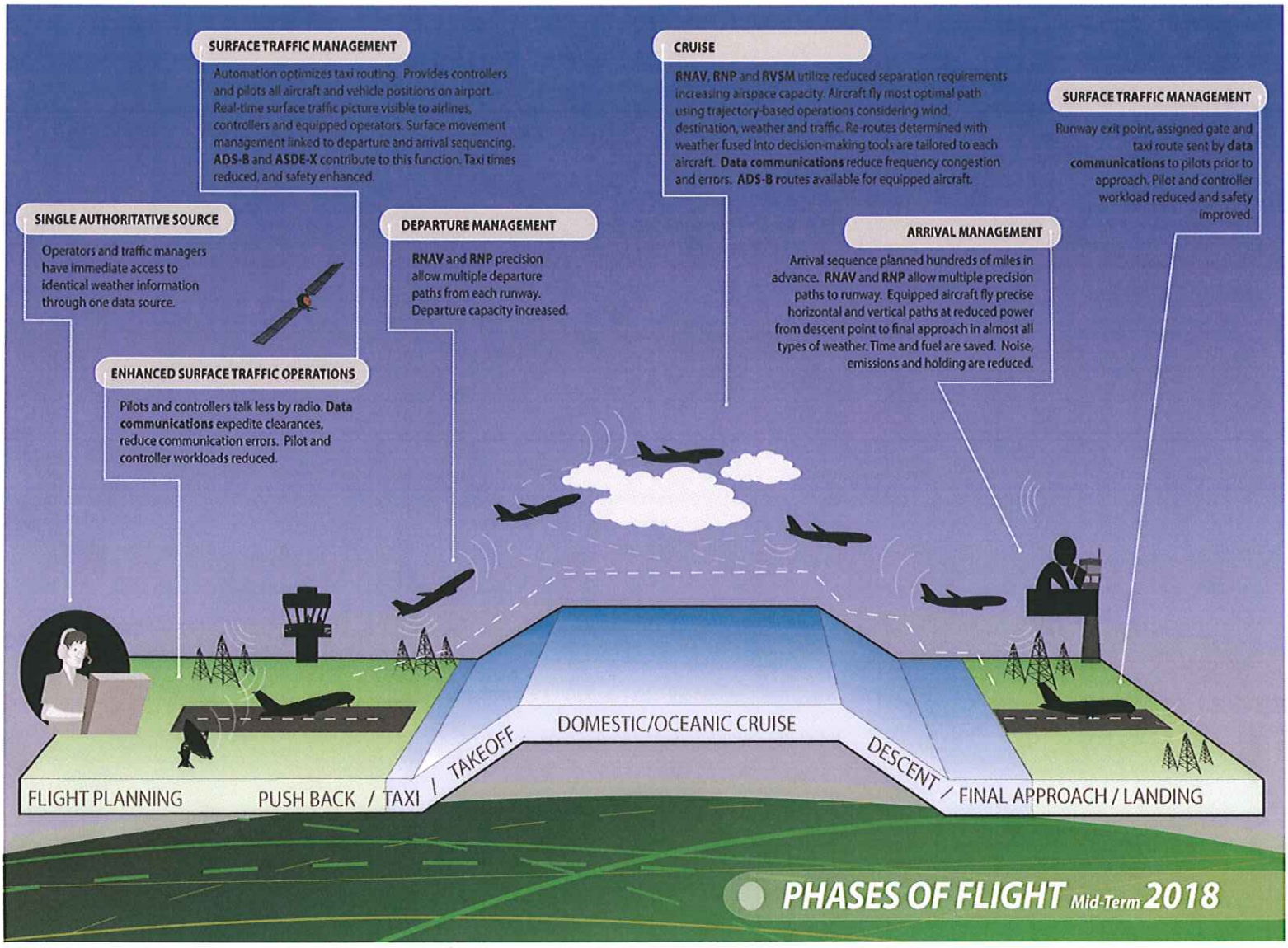
- **Surface and Tower Automation:** The FAA is pursuing ways to improve the management of aircraft on the airport surface. The Airport Surface Detection Equipment - X ("ASDE-X") system was originally considered as a safety system, but is now viewed as a way to enhance efficiency and capacity. In 2009 and 2010, the FAA will decide how to incorporate ASDE-X data (the location of aircraft on runways and taxiways) into other systems that are planned for airport towers as well as systems owned and operated by airlines and airports. The FAA is demonstrating this capability at John F. Kennedy International airport, but costs for a wider deployment are uncertain.

- **Traffic Flow Management:** The FAA relies on traffic flow management to manage air traffic system-wide and reduce the impacts of bad weather. This includes efforts to link the FAA's Command Center with airlines, which are known as "collaborative air traffic management." This fall, FAA plans to decide what additional capabilities will be incorporated into the system.

## II. NextGen in the Near-Term

### A. Transformational Programs

Between fiscal year ("FY") 2009 and 2013, the FAA plans to spend $5.3 billion on NextGen capital and research, engineering and development programs. In addition to several NextGen technology demonstration projects, the FAA is focused on implementing five core NextGen "transformational" capital programs:




Source: FAA

- **Automatic Dependent Surveillance – Broadcast ("ADS-B")**: ADS-B is the FAA's flagship program to transition to satellite-based surveillance. Equipped aircraft receive Global Positioning System ("GPS") signals and use them to transmit the aircraft's precise position (along with identification and other information) to automation systems, air traffic controllers and other pilots with properly equipped aircraft. In 2007, the FAA awarded a performance-based service contract for ADS-B services to a consortium led by ITT Corporation and published a notice of proposed rulemaking that would require aircraft operating in certain classes of airspace to equip with "ADS-B Out"[3] avionics by 2020.[4] The FAA plans to complete the installation of ADS-B ground stations and deploy ADS-B

[3] "ADS-B Out" refers to the broadcast of information by equipped aircraft out to other aircraft equipped to receive the data and ADS-B ground stations. "ADS-B In" refers to a properly equipped aircraft's ability to receive another aircraft's "ADS-B Out" information, as well as traffic information transmitted from the ground. In other words, "ADS-B In" enables aircraft to "see" other aircraft on flight deck displays.

[4] Last month, Europe's regulatory body, the European Commission, issued a Eurocontrol notice of proposed rulemaking ("ENPRM") mandating "ADS-B Out" after Feb. 5, 2015.

services NAS-wide by 2013. The FAA plans to spend approximately $1.2 billion on ADS-B between FY 2009 and FY 2013.

- **System Wide Information Management ("SWIM"):** SWIM is an information technology platform that will provide common situational awareness between the FAA, other agencies, and NAS operators regarding weather, traffic flows, and other information to support strategic decision making. The FAA has described SWIM as "an internet-like network, making information accessible, secure and usable in real time for all stakeholders…" The FAA plans to spend $164 million on SWIM between FY 2009 and FY 2013.

- **NextGen Networked Enabled Weather ("NNEW"):** According to the FAA, approximately 70 percent of annual NAS delays are attributed to weather. The FAA believes that NNEW will help it cut weather-related delays at least in half. FAA officials state that the weather dissemination system today is inefficient to operate and maintain, and information gathered by one system is not easily shared with other systems.

  If SWIM will function as an internet-like network for NAS operators, the FAA, and other agencies, then NNEW will manage the weather information content of that network. In other words, NNEW will integrate weather information from multiple weather sources and package that information for dissemination on the SWIM network to meet the specific needs of individual NAS operators. The FAA plans to spend $110 million on NNEW between FY 2009 and FY 2013.

- **Data Communications:** Data communications will provide an email-like means for two-way exchange between controllers and flight crews for air traffic control clearances, instructions, advisories, flight crew requests and reports. This platform is expected to alleviate air-to-ground voice frequency congestion and reduce communications errors. The FAA estimates that with 70 percent of aircraft data-link equipped, exchanging routine controller-pilot messages and clearances via data will enable controllers to safely handle approximately 30 percent more traffic. Data communications benefits will depend on aircraft equipage with avionics, and the FAA and industry are currently working to define data communications avionics requirements. The FAA plans to spend $892 million on data communications between FY 2009 and FY 2013.

- **NAS Voice Switch ("NVS"):** In the NAS, the voice communication architecture consists of ground telecommunication lines that connect facilities, radios that allow for conversations with aircraft providing the air-to-ground connection, and voice switches that direct the controller's voice either across the ground lines to other facilities, or across the ground lines to the radios for talking to aircraft. The connections between the voice switches and the radios and between voice switches in adjacent facilities are all "hard-wired" and cannot be changed easily.

  The existing FAA voice switches are aging, and a number are over 20 years old and in need of replacement. However, a simple replacement of the existing switches will not meet the future NextGen requirements. In the future, controllers in one facility will need to talk with aircraft that can only be reached today by another facility. Therefore, the NVS must be able to let controllers utilize a wide array of radio and communications equipment to talk to

airplanes outside their current facility's area of control. In FY 2009, the FAA will publish initial requirements and a draft functional architecture. The FAA expects to award a contract by 2011. The FAA plans to spend $200 million on NVS between FY 2009 and FY 2013.

In addition, FAA officials have testified that NextGen funding requirements for government development and deployment costs the first 10 years range from $8 billion to $10 billion, and that preliminary estimates suggest that the investments necessary to achieve the end state NextGen system infrastructure range from $15 billion to $22 billion in FAA funding. However, the DOT IG has reported that there are still considerable unknowns, and costs will depend on, among other things, performance requirements for new automation, weather initiatives, and the extent to which FAA intends to consolidate facilities.[5]

## B. Area Navigation ("RNAV") and Required Navigation Performance ("RNP")

In addition to legacy ATC Modernization platforms and the five core NextGen transformational programs, both the FAA and system operators hold high expectations for RNAV and RNP procedures to provide near- to mid-term benefits. Most major carriers are already using these procedures today. RNAV/RNP relies on aircraft avionics[6] for improved route precision: RNAV allows aircraft to fly any desired flight path without the limitations imposed by ground-based navigation systems; and RNP is RNAV with the addition of an onboard monitoring and alerting capability for pilots that takes advantage of an aircraft's onboard navigation capability to fly more precise flight and efficient paths into and out of airports. These procedures can potentially reduce fuel burn, noise and carbon emissions, boost controller productivity and increase capacity.

As of February 2009, the FAA has published a total of over 535 RNAV/RNP procedures. For FY 2008, the FAA published 78 RNAV procedures and 63 RNP procedures. Typically, the FAA initiates development efforts on 75 to 100 RNAV and RNP sites at a time, which enables it to publish a minimum of 50 RNAV and 50 RNP procedures each year.

The FAA and industry are engaged in establishing new, more aggressive goals for RNAV/RNP procedure development. Plans are being developed to better connect RNAV/RNP procedures in a systematic way for NextGen. This vision is focused on developing procedures that deconflict and optimize arrival and departure interactions in terminal airspace and that connect city pairs for seamless, end-to-end RNAV/RNP operations.

While RNAV/RNP procedures hold potential for near-term benefits, the FAA may face significant challenges going forward. For example, current RNAV/RNP routes are largely overlays of existing routes and have not required extensive environmental reviews. To maximize benefits of RNAV/RNP, the FAA will need to look at future airspace changes and environmental impacts of moving routes and procedures outside of existing ground tracks. However, these new routes may require more extensive environmental reviews, which could take up to 8 years.

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[5] These estimates do not include avionics equipage costs incurred by airspace operators.

[6] Data provided by MITRE – Center for Advanced Aviation System Development ("MITRE") indicates that aircraft already equipped for some level of RNAV/RNP capability represent over 80 percent of all instrument flight rule ("IFR") operations at the nation's top 34 airports. Proponents of accelerating RNAV/RNP deployment point to the high rate of RNAV/RNP equipage as a reason why RNAV/RNP deployment could provide very near-term benefits.

Moreover, controller training has, to date, been minimal because the controllers are already familiar with the existing routes. However, new and more sophisticated routes likely will require additional controller training. According to the FAA, the RNAV/RNP computer-based instruction is undergoing extensive revision to ensure controller training is up to date and certification requirements are met.

To help speed the introduction of RNAV/RNP procedures, the FAA signed agreements with two private vendors (Naverus and Jeppesen) to develop and implement these procedures; the Bush Administration proposed giving greater authority for developing and implementing new procedures to third-party private vendors. However, in February 2008, the president of the union representing technicians and specialists who certify and maintain FAA equipment and procedures expressed doubts about the FAA's ability to adequately regulate, supervise or review the work of third-party design initiatives. H.R. 915, the *FAA Reauthorization Act of 2009*, requires the DOT IG to assess the FAA's reliance on third-parties for development of new procedures and determine the FAA's ability to provide oversight.

## C. Airspace Redesign

The FAA's airspace redesign efforts will also play a critical near-term role in enhancing capacity, reducing delays, transitioning to more flexible routing and ultimately saving money for airlines and airspace operators in fuel costs. The critical importance of airspace redesign efforts is underscored by the fact that they are highlighted in FAA strategic plans, including the Flight Plan 2009-2013 and the NextGen Implementation Plan.

However, since 2005, the airspace redesign program has experienced significant funding reductions, from $15.3 million to $8.6 million—a 40-percent decrease. The DOT IG has expressed concern that these budget cuts could steer the program off track. For FY 2007, the FAA approved seven airspace redesign projects as national programs. However, only three projects received substantial funding due to budget shortfalls (New York/New Jersey/Philadelphia Metropolitan Airspace Redesign,[7] Chicago Airspace, and Houston Area Air Traffic System). H.R. 915 authorizes funding to mitigate the impact of these budget cuts.

## D. NextGen Mid-Term Planning

Early industry feedback to initial NextGen planning documents expressed a desire for more detail on near- to mid-term NextGen capabilities, requirements, and benefits. For example, industry stakeholders have urged the FAA to develop an interim planning document that provides sufficient detail on commitments needed to deliver real operational benefits in the mid-term that would help the industry justify and plan for the investments it needs to make in aircraft equipage. Accordingly, the FAA appears to be shifting its attention to the near- to mid-term and is refining NextGen benchmarks for the next five to eight years. In January, the FAA published: 1) a Mid-Term Architecture, which is a general blueprint for NextGen through 2018; and 2) a new release of its

[7] With regard to the New York/New Jersey/Philadelphia Metropolitan Airspace Redesign, after 9 years of evaluation and a cost of over $53 million, the FAA announced that it would implement a new airspace structure for the five major airports and several regional airports serving the New York/New Jersey/Philadelphia metropolitan area in September 2007. The redesign is currently the subject of 13 different lawsuits. While litigation is ongoing, the FAA is continuing to implement the redesign.

NextGen Implementation Plan that provides a concise framework of NextGen capabilities, requirements, and benefits from now through 2018.

In addition, the FAA has commissioned the RTCA[8] to establish the NextGen Mid-Term Implementation Task Force ("Task Force") to review mid-term NextGen priorities and provide a final report is August 2009. The Task Force report will recommend a prioritized list of desired operational capabilities (including specific technologies, procedures, pilot and controller training, policies, etc. needed to achieve those capabilities) to be fully deployed by 2018, along with strategies for closing the business case on these recommended capabilities. To develop this prioritized list, the Task Force will attempt to forge a consensus among the aviation stakeholders, and its final recommendations will include the commitments required from both the FAA and NAS operators to achieve the full benefits of these new operational capabilities. The Task Force will also likely recommend a formal mechanism for jointly tracking the progress of FAA and operator commitments.

Moreover, because the entire airspace system is highly interdependent, delays at one airport may lead to delays rippling across the system throughout the day. Therefore the Task Force is also expected to address where NextGen might be deployed first to achieve the greatest benefit:

> A review of mid-term NextGen priorities should give FAA a clear idea of what the system operators want most, says FAA Chief Operating Officer Hank Krakowski in a message to employees. The agency expects to hear proposals like addressing the major "pain points" in the system, such as New York, Chicago and Atlanta before focusing on NextGen solutions across the country. . . RTCA has been tasked with finding out what the operator community wants and will report back this summer.[9]

## E. Aircraft Equipage

NextGen planning documents call for operators to equip with a range of new avionics including ADS-B, data communications and RNAV/RNP. In 2007, MITRE, working with FAA/JPDO, developed a preliminary estimate of the NextGen avionics costs, which concluded that the most probable range of total avionics costs to civil operators is $14 billion to $20 billion.[10] The FAA/JPDO estimated that the equipage costs for general aviation operators will range from $7,000 - $30,000 per aircraft, whereas equipage costs for commercial operators will range from $32,000 - $670,000 per aircraft, depending on the type and age of the aircraft, and desired level of capability.

Traditionally, the FAA mandates the equipage of aircraft and provides several years for operators to comply. For a variety of reasons, some operators do not equip until the deadline for equipping is near: electronic equipment tends to decrease in price over time; airlines want to ensure

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[8] RTCA, Inc. is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance, and air traffic management system issues. RTCA functions as a Federal Advisory Committee and includes roughly 335 government, industry and academic organizations from the United States and around the world. Members represent all facets of the aviation community, including government organizations, airlines, airspace users and airport associations, labor unions, aviation service and equipment suppliers.

[9] *Aviation Daily, Intelligence*, March 2, 2009.

[10] According to MITRE, ongoing work continues to validate these estimates. However, some avionics manufactures suggest that costs for equipage could decrease once technical standards are finalized and production begins, but to what extent remains unclear.

that standards and technology are mature to avoid double-equipping; and the time value of money suggests delaying investments until economic, operational or safety benefits are compelling.

The FAA has proposed an option to incentivize early equipage, referred to as "best-equipped, best-served." Under this option, the FAA would offer those aircraft operators who choose to equip their aircraft as soon as possible with various operational benefits, such as preferred airspace, routings, or runway access. While operators that equip early would reap the greatest benefits, lesser equipped aircraft must still be safely and appropriately accommodated. The FAA has asked the NextGen Mid-Term Implementation Task Force to provide recommendations on the best means to implement "best-equipped, best served" principles in a way that accommodates all types of operators with varying levels of equipage, while maximizing overall system performance and enhancing safety.

A coalition of industry stakeholders argued that $4 billion should have been included in the *American Recovery and Reinvestment Act of 2009* (the "Recovery Act")(P.L. 111-5) to equip aircraft and accelerate NextGen efforts, including $2 billion specifically for ADS-B. As stakeholders pointed out, there is a precedent for helping airspace operators equip specifically with ADS-B avionics. The FAA purchased ADS-B avionics for operators in Alaska as part of the Capstone initiative.[11] This provided a base of properly equipped aircraft and allowed the FAA to examine the costs and benefits of the new technology.

Congress did not provide funding for aircraft equipage in the Recovery Act, but incentivizing operators to equip will remain an important issue in the debate about how to move forward with NextGen. Stakeholders have suggested that incentives could take a number of forms, including: purchasing equipment for operators, an investment tax credit, an adjustment to current excise taxes for equipped aircraft, or research and development tax credits specifically for avionics manufacturers.

## III. Organizational Structure and Workforce Issues

### A. Organizational Structure

Pursuant to Vision 100, the JPDO was created within the FAA to leverage the expertise and resources of the Departments of Transportation, Defense, Commerce, and Homeland Security, as well as the National Aeronautics and Space Administration and the White House Office of Science and Technology Policy to develop the NextGen plan. The JPDO organizational structure includes:

- A Director who works with the JPDO's government and industry partners to strategically integrate their respective activities, commitments and contributions.

- A NextGen Institute ("Institute") to provide a structure for direct industry involvement in NextGen. Members of the Institute include over 300 stakeholders from private industry, state and local governments, and academia. The Institute's governing body is the Institute

[11] The Capstone Project was a joint industry and FAA research and development effort to improve aviation safety and efficiency in Alaska. Under Capstone, FAA provided avionics equipment for aircraft and the supporting ground infrastructure. The Capstone Project operated from 1999 to 2006, and its success in Alaska laid the groundwork for the nationwide deployment of ADS-B.

Management Council and is composed of 15 top officials and representatives from the aviation community.

- While the JPDO has its own staff of approximately 18 full-time employees, it relies heavily on the contributions of nine workgroups. These include workgroups on: Aircraft, Aircraft Equipage, Airports, Environment, Global Harmonization, Safety, Security, Net-Centric Operations, and Weather. These teams are made up of representatives from industry and government and each team has an industry co-chair and a government co-chair.

In 2007, the GAO reported that the JPDO's placement within FAA and its dual reporting to both the FAA Administrator and the ATO's Chief Operating Officer ("COO") hindered its ability to interact on equal footing with ATO and other federal agencies. In addition, industry stakeholders expressed concerns that the dual reporting structure would subordinate the JPDO's long-term planning mission to the COO day-to-day operational priorities. Therefore, the GAO suggested that the JPDO should have some independence from the ATO and recommended that the JPDO Director report directly to the FAA Administrator. To increase the authority and visibility of the JPDO, H.R. 915 elevates the Director of the JPDO to the status of Associate Administrator for NextGen within the FAA, reporting directly to the FAA Administrator.

Nevertheless, in May 2008, the FAA announced a reorganization of its NextGen management structure and named a Senior Vice President for NextGen and Operations Planning who reports to the COO. As part of this reorganization, JPDO is now housed within the new NextGen and Operations Planning Office and reports through the Senior Vice President for NextGen and Operations Planning only to ATO's COO. Under this new structure, JPDO will focus on long-term planning and cross-agency cooperation. Other offices within the NextGen and Operations Planning Office will carry out other aspects of implementing and planning for NextGen. Now that JPDO is no longer a separate, independent office within the FAA and no longer reports directly to the FAA Administrator, its organizational position within the FAA has declined.

In addition, Vision 100 created a Senior Policy Committee ("SPC") that provides advice to the Secretary of Transportation on national goals and strategic objectives for NextGen to meet future U.S. air transportation needs. SPC members, heads of partnering departments and agencies, provide policy guidance for the JPDO's integrated work plan,[12] identify resource needs, and make recommendations for funding for planning, research and development activities within their organizations.

In November 2008, President Bush issued Executive Order 13479, which affirms Executive Branch support for the policy regarding NextGen as set forth in Vision 100. It outlines functions of the Secretary of Transportation and the SPC, strengthening their role and increasing their accountability. Specifically, the Order calls for quarterly SPC meetings, thus increasing SPC visibility into NextGen issues; provides a Department-level support staff to assist the Secretary and SPC in the conduct of their duties; and adds an advisory committee to provide private-sector advice to the SPC on aviation-related subjects and related performance measures.

## B. Workforce Issues

[12] The Integrated Work Plan describes the capabilities needed to transition to NextGen from the current system and provides the interagency research, policy, regulation, and acquisition timelines necessary to achieve NextGen by 2025.

To manage the implementation of NextGen, the FAA will need staff with technical skills, such as systems engineering and contract management expertise. Because of the scope and complexity of the NextGen effort, the GAO has noted that the FAA may not currently have the in-house expertise to manage the transition to NextGen without assistance.

In response to recommendations from both the GAO and the DOT IG, the FAA contracted with the National Academy of Public Administration ("NAPA") to determine the mix of skills needed by the acquisition workforce to implement NextGen, and to identify strategies for obtaining the necessary workforce competencies. In September 2008, NAPA issued a report that identified 26 competencies - including software development, systems engineering, research and development, strategic planning, financial budget analysis, and contract administration – where the FAA currently lacks both the capacity and capabilities to execute NextGen implementation. The FAA plans to fill between 300 and 400 NextGen positions over the next two years to address some of its skill mix requirements.

With regard to the operational workforce, both the DOT IG and the GAO have noted that the FAA's efforts to replace its retiring air traffic controllers appear to be on track. However, the pace of hiring and training has changed some of FAA's training procedures. More often than in the past, the FAA sends developmental controllers[13] directly to busy facilities to begin their on-the-job training ("OJT"):

> The FAA is hiring thousands of air traffic controllers to stay ahead of the spike in retirements, but this is raising concerns about an increasingly inexperienced workforce. Trainees now comprise a quarter of the U.S. controller staff – up to half at some facilities – and this ratio is set to rise further. . . Veteran controllers are being replaced by recruits who need further on-the-job training before becoming fully certified. "We do have concerns – not over the total size of the workforce, but over the skill level and training level" of new controllers, says U.S. Transportation Dept. Inspector General Calvin Scovel.[14]

The GAO has stated that the FAA must carefully manage the flow of developmental controllers to each facility so that their numbers do not overwhelm the facility's capacity to train them. Furthermore, with fewer fully certified controllers and greater OJT training demands, controllers may work more overtime hours. The DOT IG has cautioned that as attrition increases, the FAA must also continue addressing controller human factor issues such as fatigue and attention. According to DOT IG, human factors training is critical since almost 90 percent of controller operational errors (when a controller allows two aircraft to get too close together either on the runway or in the air) are due to human factors issues rather than procedural or equipment deficiencies. Moreover, as new NextGen technologies are introduced, the FAA must provide

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[13] A developmental controller is an air traffic controller in training at an FAA field facility who has not attained the Certified Professional Controller (CPC) level. After controllers complete classroom and simulation training they begin OJT, which is conducted by CPC who observes and instructs trainee controllers individually as they work the control position. Controllers in training achieve certification on each position as they move through the various stages. After they have certified on all positions within their assigned area, they are commissioned as a CPC at that facility.

[14] Adrian Schofield, Rookie Ratio: FAA's Controllers Hiring Drive Puts More Trainees in Towers, *Aviation Week*, Feb. 23, 2009.

technical training for all of its controllers on the new equipment necessary for NextGen while maintaining skills on existing equipment.

The GAO has reported that the lack of stakeholder or expert involvement early and throughout the development and implementation of ATC modernization projects has been a key factor leading to cost overruns and delays. More specifically, the GAO has stated that input from current air traffic controllers with recent experience controlling aircraft, who will be responsible for managing traffic in the NextGen environment, and from current technicians, who will maintain NextGen equipment, is important when considering human factors and safety issues.

In September 2008, the GAO reported that active air traffic controllers largely were not involved in the NextGen planning effort. Since then, GAO notes that some progress has been made. However, according to the GAO, the technicians' union does not generally participate in NextGen efforts, although it has a liaison working on ADS-B and is seeking to participate in the NextGen Mid-Term Implementation Task Force. H.R. 915 requires the FAA to establish a process for including and collaborating with qualified employees selected by each impacted exclusive collective bargaining representative in the planning, development, and deployment of air traffic control modernization projects, including NextGen.

## AGENDA

### Subcommittee on Aviation

### Hearing

**Wednesday, March 18, 2009**
**10:00 a.m.**
**2167 Rayburn House Office Building**

**ATC Modernization and NextGen: Near-Term Achievable Goals**

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WITNESSES

PANEL I

**Ms. Victoria Cox**
Senior Vice President for NextGen and
Operations Planning Services
Air Traffic Organization
Federal Aviation Administration

**Dr. Karlin Toner**
Director, Staff to the Secretary and
Senior Policy Committee for NextGen Coordination
U.S. Department of Transportation

**Dr. Gerald Dillingham**
Director, Physical Infrastructure Issues
U.S. Government Accountability Office

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

**Dr. Agam N. Sinha, Sr.**
Senior Vice President and General Manager
The MITRE Corporation

**Mr. Robert M. Tobias**
Panel Member – NextGen Study
National Academy of Public Administration and
Director, Public Sector Executive Education
American University

**PANEL II**

**Ms. Marion C. Blakey**
President and Chief Executive Officer
Aerospace Industries Association of America, Inc.

**Mr. Peter Bunce**
President and CEO
General Aviation Manufacturers Association

**Mr. James C. May**
President and CEO
Air Transport Association

**Captain Rory Kay**
Executive Air Safety Chairman
and United Airlines Pilot
Air Line Pilots Association, International

**Mr. Patrick Forrey**
President
National Air Traffic Controllers Association

**Mr. Tom Brantley**
President
Professional Aviation Safety Specialists, AFL-CIO