JOINT STATEMENT OF ROBERT STURGELL, DEPUTY ADMINISTRATOR, FEDERAL AVIATION ADMINISTRATION, AND CHARLES LEADER, DIRECTOR, JOINT PLANNING AND DEVELOPMENT OFFICE, BEFORE THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION ON THE FUTURE OF AIR TRAFFIC CONTROL MODERNIZATION

May 9, 2007

Good morning Chairman Costello, Congressman Petri, and Members of the Subcommittee. I am Robert Sturgell, Deputy Administrator of the Federal Aviation Administration, and interim Chief Operating Officer for the Air Traffic Organization. With me is Charles Leader, Director of the multi-agency Joint Planning and Development Office (JPDO). We thank you for the opportunity to testify today about modernization of FAA's Air Traffic Control System (ATC), and the work we are doing to develop and deploy the Next Generation Air Transportation System (NextGen) while providing operational and safety enhancements that deliver benefits to our customers today.

Reforming FAA's financing system will better enable the modernization of the FAA's Air Traffic Control System and transformation to NextGen. Congress mandated in Vision 100 the establishment of the Air Traffic Organization (ATO). Since the establishment of the ATO in 2003, we have required air traffic leadership to establish metrics for performance. These metrics are also reflected in our budget preparation and execution, and are based on the cost of doing business. We need to continue these practices as we establish the financing of our current and future operations- based on actual costs and investment requirements that will translate to tangible benefits and increasing efficiency for our nation's air transportation system. The NextGen Financing Act of 2007, as proposed by the Administration, provides the necessary reforms to our

financing to allow for a reliable funding stream as we continue on the path towards the implementation of the NextGen system.

And implementing that system is imperative. Our nation's air transportation system has become a victim of its own success. Administrator Blakey and the FAA have taken many steps to delay this gridlock. Since FY 2000, 13 new runways have opened, and we've worked with operators—through forums like Growth Without Gridlock—to find ways to squeeze extra capacity from our system. In addition, we've kept our modernization projects on schedule—2006 is the third straight year that we produced good results. As we reported in our Flight Plan, in FY 2006, 100 percent of our critical acquisitions were within 10 percent of budget and 97.4 percent were on schedule.

To get to the future, we need to prepare now. The actions of today are necessary for us to continue on a progressive path of solutions to address the current and future demands of the aviation industry and the flying public.

We have created the most effective, efficient and safest system in the world. But we now face a serious and impending problem: today's system is at capacity. While the industry downturn following the attacks of September 11 temporarily slowed the growth in the aviation industry that began in the late 1990's, demand is growing rapidly. And we have to change if we a going to be ready to meet it.

Flight delays have increased each of the last three fiscal years, and cancellations remain at an unacceptable level. Other issues, ranging from environmental concerns to the complexities of homeland security are placing additional stresses on the system. A MITRE study done for FAA concludes that the current system cannot handle the projected traffic demands expected by 2015 – absent modernization.

NextGen is a steady, deliberate, and highly collaborative undertaking, aimed at the long-term transformation of our air transportation system. It focuses on leveraging new technologies, such as satellite-based navigation, surveillance and network-centric systems. The FAA is not waiting for 2025 to implement technologies to promote safer, more efficient operations, and increase capacity. We are moving forward now with technologies and procedures which have two purposes; one, to improve efficiency, increase capacity and reduce congestion in the present system; and, two, to provide the foundation to build upon for further improvements in NextGen. The FAA is currently expanding the use of procedures like Area Navigation (RNAV) and Required Navigation Performance (RNP), which collectively result in improved safety, access, capacity, predictability, and operational efficiency, as well as reduced environmental impacts.

RNAV operations remove the requirement for a direct link between aircraft navigation and a ground-based navigational aid, thereby allowing aircraft better access and permitting flexibility of point-to-point operations. By using more precise routes for take-offs and landings, RNAV enables reductions in fuel burn and emissions and increases in capacity. FAA is expanding the implementation of RNAV procedures to additional

airports. The FAA has authorized 128 RNAV procedures at 38 airports for FY2005 and FY2006. We will publish at least 50 additional procedures in FY2007.

An example of how we better use the airspace is our introduction of Domestic Reduce Vertical Separation Minimums (DRVSM) in 2005. We reduced separation minimums from 2000 feet to 1000 feet, effectively doubling the high altitude airspace, and saving airlines close to $400 million per year in fuel.

Another FAA initiative is implementing Required Navigation Performance (RNP) on a greater scale. RNP is RNAV with the addition of an onboard monitoring and alerting function. This onboard capability enhances the pilot's situational awareness providing greater access to airports in challenging terrain. RNP takes advantage of an airplane's onboard navigation capability to fly a more precise flight path into an airport. It increases access during marginal weather, thereby reducing diversions to alternate airports. RNP reduces the overall noise footprint and aggregate emissions. The FAA has authorized a total of 40 RNP procedures at 18 airports. We plan to publish at least 25 RNP approach procedures in FY2007.

Enabling any far-reaching, systematic and long-term transformation requires a vision of what you want and need to achieve, and plans for how to get there from here. For NextGen, the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan provide us with that picture and the plans for how to achieve it. We will be discussing the Concept of Operations, the Enterprise Architecture, and the Integrated

Work Plan later in this statement. We are setting the stage for the long-term development of an air transportation system that will be scalable to a growing demand and the need for safer and more flexible aviation business models. It is a new approach to the way we view the future of the system, and it demands a new level of collaboration, planning and vision.

The unique structure of the NextGen initiative, setting up an inter-agency office to coordinate the efforts of the federal partners, while also bringing in the private sector as a full partner from the very beginning, will be instrumental in the success of NextGen. Indeed, it is our expectation that this new structure will help us avoid some of the problems that FAA has experienced in previous modernization efforts.

NextGen, while representing a continuum of research, investment and implementation activities, can be broken out into three major phases. Each one represents a key period in NextGen's development. The first phase focuses on the development and implementation of certain key NextGen foundational technologies and capabilities. These initiatives represent our current programs. This phase also includes the essential research and development needed to support the next two phases. The second phase builds upon this foundation to begin critical implementation of NextGen capabilities. This is when many aircraft in the fleet will begin to operate using on-board NextGen tools. This will allow greater expansion of RNP/RNAV procedures, net-enabled weather, advanced data communications, and the development of critical infrastructure for Trajectory-Based Operations. The third phase will be maturation of our core NextGen

capabilities into an operational nationwide system. This will allow aviation services to be managed and operated in a way that achieves the NextGen transformation across the entire air transportation system.

FAA and JPDO are beginning to move from planning to implementation. In fact, the FAA's FY 2008 – 2012 Capital Investment Plan (CIP) includes $4.6 billion in projects and activities that directly support NextGen. The CIP is a 5-year plan that describes the National Airspace System modernization costs aligned with the projects and activities that the Agency intends to accomplish during that time. Several key NextGen technologies and programs have already been identified and are funded in the FAA's FY08 budget request. These technologies and programs are: Automatic Dependent Surveillance-Broadcast (ADS-B); System Wide Information Management (SWIM); NextGen Data Communications; NextGen Network Enabled Weather; NAS Voice Switch; and, NextGen Demonstrations and Infrastructure Development.

These technologies are essential to begin the transition from today's air traffic control system to the NextGen system of 2025. One important transformational technology is Automatic Dependent Surveillance-Broadcast or ADS-B. ADS-B is, quite simply, the future of air traffic control. A key element of the NextGen system, it uses GPS satellite signals to provide air traffic controllers and pilots with much more accurate information on aircraft position that will help keep aircraft safely separated in the sky and on runways. Aircraft transponders receive GPS signals and use them to determine the aircraft's precise position in the sky, which is combined with other data and broadcast out

to other aircraft and controllers. When properly equipped with ADS-B, both pilots and controllers will, for the very first time, see the same real-time displays of air traffic, thereby substantially improving safety.

ADS-B has been successfully demonstrated through the FAA's Capstone program in Alaska, where GA accidents have been reduced by more than 40 percent for ADS-B equipped aircraft. And UPS has been working with us on a demonstration program in Louisville using ADS-B to conduct continuous descent arrivals, where they have been able to reduce noise by 30 percent and emissions by 34 percent as a result. One of the first uses of ADS-B technology outside of Alaska and Louisville will be in the Gulf of Mexico. The FAA signed a Memorandum of Agreement (MOA) with the Helicopter Association International (HAI), helicopter operators, and oil and gas platform owners in the Gulf of Mexico to improve service in the Gulf. Using ADS-B technology, helicopter operators will transmit critical position information to the Houston Center, enabling enhanced Air Traffic Control services in the Gulf.

The FAA is considering a rulemaking that would mandate the avionics necessary for implementing ADS-B in the national airspace system, and is working closely with stakeholders to determine a timeline.

In today's NAS, there are a myriad of systems with custom-designed, developed, and managed connections. The future, however, demands an infrastructure that is capable of flexible growth, and the cost of expanding today's point-to-point system is simply

prohibitive. System Wide Information Management (SWIM) responds to that need. As many major national and international corporations have done with their own technological systems, SWIM will provide for NextGen the infrastructure and services to deliver network-enabled information access across air transportation operations, and high quality, timely data to many users and applications. By reducing the number and types of interfaces and systems, SWIM will better facilitate multi-agency information-sharing, eliminating redundant information and providing information where it is needed. When implemented, the efficiencies provided by SWIM will contribute to expanded system capacity, improved predictability and operational decision-making, and reduced cost of service. In addition, SWIM will improve coordination to allow transition from tactical conflict management to strategic trajectory-based operations. It will also allow for better use of existing capacity en-route. While transparent to the flying public, these are efficiencies that will benefit the consumer and the aviation industry.

The heart of the NextGen advanced airspace management concepts lies within the digital data communications infrastructure of the future. In the current system, all air traffic communications with airborne aircraft is by voice communications. NextGen transformation cannot be realized through today's voice-only communications, especially in the areas of aircraft trajectory-based operations, net-centric and net-enabled information access. Data communications enabled services, such as 4-D trajectories and conformance management, will shift air traffic operations from short-term, minute-by-minute tactical control to more predictable and planned strategic traffic management. Eventually, the majority of communications will be handled by data communications for

appropriately equipped users. It is estimated that with 70 percent of aircraft data-link equipped, exchanging routine controller-pilot messages and clearances via data can enable controllers to safely handle approximately 30 percent more traffic.

Approximately 70 percent of annual national airspace system delays are attributed to weather. The NextGen Network Enabled Weather will serve as the backbone of the NextGen weather support services, and provide a common weather picture across NextGen. The goal of this investment is to cut weather-related delays at least in half by improving the integration and dissemination of aviation weather information. The benefits will be uniform real-time access to key common weather parameters, common situational awareness, improved utilization of air space across all flight domains, and reduced flight delays.

The NAS Voice Switch will provide the foundation for all air/ground and ground/ground voice communications in the air traffic control environment. The switches today are static, and our ability to adjust the airspace for contingencies is limited. Under the current system it is very difficult and time consuming to coordinate and redesign the airspace. In the future, the impacts of bad weather could be responded to in real-time, thereby minimizing its disruptions to air traffic. The new voice switch allows us to replace today's rigid, sector-based airspace design and support a dynamic flow of traffic. Voice communications capabilities and network flexibility provided by the NAS Voice Switch are essential to the FAA's ability to implement new NextGen services that are necessary to increase efficiency and improve performance.

At this early stage of NextGen, it is critical to better define operational concepts and the technologies that will support them. For the first time, FAA is requesting funding for these defining activities in the FY08 budget. This funding will support two demonstrations and a series of infrastructure development activities. The primary purposes of these demonstrations are to refine aspects of the trajectory-based operations concept, while lowering risk by phasing in new technologies. One demonstration will test trajectory-based concepts in the oceanic environment. The ultimate goal is to increase predictability on long-duration international flights and improve fuel efficiency. The other demonstration will accelerate the first integrated test of super density operations. Procedures for increasing capacity at busy airports will be explored. The demonstration should achieve near-term benefits at the test airport, and give us the tools to implement the same procedures at other locations.

It is important to understand that NextGen is a portfolio program. The technologies described above, and those that will be defined over the next several years, are interdependent, creating a series of transformations that will truly modernize today's system. Let me provide a few examples of this.

In the future, trajectory-based operations will enable many pilots and dispatchers to select their own flight paths, rather than follow the existing system of flight paths, that are like a grid of interstate highways in the sky. In the high performance airspace of the future, each airplane will transmit and receive precise information about the time at which it and

others will cross key points along their paths. Pilots and air traffic managers on the ground will have the same precise information, transmitted via data communications. Investments in ADS-B, SWIM and Data Communications are critical to trajectory-based operations.

The NextGen system will enable collaborative air traffic management. The increased scope, volume, and widespread distribution of information that SWIM provides will improve the quality of the decisions by air traffic managers and flight operators to address major demand and capacity imbalances. SWIM and NAS Voice Switch are instrumental in achieving this collaborative air traffic management.

With NextGen the impact of weather is reduced through the use of improved information sharing, new technology to sense and mitigate the impacts of weather, improved weather forecasts, and the integration of weather into automation to improve decision-making. New capabilities in the aircraft and on the ground, coupled with better forecasts and new automation, will minimize airspace limitations and traffic restrictions. Network Enabled Weather and SWIM are vital investments for these improvements.

We recognize that there are many challenges in converting the JPDO's vision of the NextGen system into reality. Because the JPDO is not an implementing or executing agency, the FAA and the other JPDO partner agencies must work closely with the JPDO to develop an implementation schedule for the operational changes required as new technologies are deployed to realize the NextGen vision. The FAA is using the

Operational Evolution Partnership, the new OEP, to guide their transformation to NextGen. In the past the Operational Evolution Plan successfully provided a mid-term strategic roadmap for the FAA that extended ten years into the future. The new OEP will include strategic milestones through 2025. JPDO representatives will participate along with the FAA in OEP development and execution.

FAA will use the OEP to plan, execute and implement NextGen in partnership with private industry. Required operational implementation schedules will be tracked, as well as dates by which initiatives must be funded in order to meet those schedules.

OEP will provide a single entry point for new NextGen initiatives, jointly developed by the JPDO and the FAA, to enter the FAA capital budget portfolio. It ties these initiatives directly to the FAA budget process. Beginning in fiscal year 2008 and continuing in 2009, the FAA worked closely with the JPDO in budget formulation utilizing JPDO budget guidance. For the fiscal year 2009 budget formulation, the FAA is using a Review Board under the auspices of the OEP Associates Group, which includes the Director of JPDO, to review and prioritize NextGen initiatives based on the JPDO Concept of Operations, JPDO roadmaps, and the NAS Enterprise Architecture.

The NAS and NextGen Enterprise Architectures will provide the backbone of this new OEP by specifying roadmaps for system and certification requirements, operational procedures, program phasing, and prototype demonstrations. This Operational Evolution Partnership will be the mechanism by which we hold ourselves accountable to our

owners, customers, and the aviation community for the FAA's progress towards the JPDO vision, while assuring that the JPDO and the FAA are jointly on-track to deliver the NextGen system.

Cost will be a vital factor: we cannot create a NextGen system that is not affordable. Requirements for the first ten years range from $8 billion to $10 billion. Preliminary estimates by FAA, JPDO and the Research, Engineering, and Development Advisory Committee (REDAC) suggest that the investments necessary to achieve the end state NextGen system range from $15 billion to $22 billion in FAA funding. We are working with our users to continuously refine these estimates.

MITRE, working with FAA, has developed a preliminary estimate of the NextGen avionics costs. It concludes that a wide range of costs are possible, depending on the bundling of avionics and the alignment of equipage schedules. MITRE concluded that the most probable range of total avionics costs to system users is $14 billion to $20 billion. This range 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 time out of service required for equipage installation.

The importance of developing this system of the future is also quite clear to policymakers in Europe, where a comparable effort known as Single European Sky Air Traffic Management Research (SESAR) is well underway. This presents both a challenge and an opportunity to the United States. Creating a modernized, global system that provides

interoperability could serve as a tremendous boost to the aerospace industry, fueling new efficiencies while creating jobs and delivering substantial consumer benefits. Alternatively, we could also see a patchwork of duplicative systems and technologies develop, which would place additional cost burdens on an industry already struggling to make ends meet.

Last year, Administrator Blakey signed a Memorandum of Understanding with her European counterpart that formalizes cooperation between the NextGen initiative and the SESAR program. The FAA and the EC are identifying opportunities and establishing timelines to implement, where appropriate, common, interoperable, performance-based air traffic management systems and technologies. This coordination will address policy issues and facilitate global agreement within international standards organizations such as ICAO, RTCA and Eurocontrol, and contribute greatly to the success of this critical initiative.

Our European counterparts have released a preliminary cost estimate for SESAR. SESAR is conceived as a system that, while smaller in scope and size, has similar air traffic management goals as NextGen. They consider different system scenarios and a range of total costs of $25 billion to $37 billion in US dollars through the year 2020. SESAR, like NextGen, has a lot of work remaining to refine assumptions and better define the system. However, there is an important difference in scope between SESAR and NextGen. While SESAR focuses almost exclusively on air traffic management, NextGen takes what's called a "curb-to-curb" approach, and includes not only air traffic

control, but also airports, airport operations, security and passenger management, and DoD and DHS NAS requirements.

One of the major products for the JPDO, and indeed, one of the critical elements in defining the NextGen initiative itself, is the development of the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan. These documents define each NextGen transformed state and how to evolve to it. They are absolutely essential to the future development of the NextGen system.

The Concept of Operations is a text description of the transformed state of NextGen. This kind of explanation, offered in one document, is critical to developing the specific requirements and capabilities that will be necessary for our national air transportation system in 2025. In a sense, the Concept of Operations is like an architect's blueprints.

However, to adequately lay the groundwork and basic plans for the NextGen system requires another step in the process, developed concurrently with the Concept of Operations, and that's the Enterprise Architecture. The Enterprise Architecture provides the technical details of the transformed NextGen system, much like a builder's plumbing and wiring diagrams, specifying how the house will get its power, water, sewage, cable and internet connections to the rest of the community. The Integrated Work Plan is the equivalent of the general contractor's work plan. It specifies the timing and interdependencies of multi-agency activities required to achieve the NexGen system vision.

These documents, the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan are essential to defining the NextGen system and will guide the future investment and capabilities, both in terms of research and systems development. The JPDO released the NextGen Concept of Operations for public comment on February 28th. It is now available on the JPDO website for review and comment by our stakeholders, and we are anxious to receive their feedback. The NextGen Enterprise Architecture and the Integrated Work Plan should be released within the next few months.

Our overarching goal in the NextGen initiative is to develop a more automated system that will be flexible enough to accommodate a wide range of users -- very light jets and large commercial aircraft, manned and unmanned aircraft, small airports and large, business and vacation travelers alike, while handling a significantly increased number of operations with a commensurate improvement in safety, security and efficiency.

Mr. Chairman, this concludes our testimony. We would be happy to answer any questions the Committee may have.