STATEMENT OF CHARLES LEADER, DIRECTOR, JOINT PLANNING AND DEVELOPMENT OFFICE, BEFORE THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY, SUBCOMMITTEE ON SPACE AND AERONAUTICS ON JPDO AND THE NEXT GENERATION AIR TRANPORTATION SYSTEM: STATUS AND ISSUES, MARCH 29, 2007

Good morning, Chairman Udall, Congressman Calvert, and Members of the Subcommittee. I am Charles Leader, Director of the multi-agency Joint Planning and Development Office (JPDO). I am honored to be here this morning to testify about the JPDO, 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.

Moving to NextGen is inextricably linked to changes in the FAA's financing system. We need to establish the financing of current and future operations based on actual costs and investment requirements that will realize tangible benefits and increasing efficiency. The NextGen Financing Act of 2007, as proposed by the Administration, provides the necessary reforms to our financing, and puts us on the path towards fully implementing the NextGen system.

And implementing that system is imperative. Our nation's air transportation system has become a victim of its own success. 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.

The warning signs are everywhere. Flight delays and cancellations have reached unacceptable levels. Other issues, ranging from environmental concerns to the complexities of homeland security are placing additional stresses on the system. If we fail to address these issues, we will suffocate the great engine of economic growth that is civil aviation. A MITRE study done for FAA concludes that the current system cannot handle the projected traffic demands expected by 2015 – absent modernization, the consequences will be serious.

NextGen is about a long-term transformation of our air transportation system. It focuses on leveraging new technologies, such as satellite-based navigation, surveillance and network-centric systems. 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. That's where the work of the Joint Planning Development Office has come in to develop, the Concept of Operations, the Enterprise Architecture, and the Integrated Work Plan. These documents provide us with that picture of where we want to go and the plans for how to achieve it.

The Concept of Operations is a description of the transformed state of NextGen, much like what an architect's blueprints offers a builder. Then, 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 next level of 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. Finally, the Integrated Work Plan is the equivalent of the general contractor's work plan. It specifies the timing and interdependencies of the multi-agency research, demonstrations, and development required to achieve the NexGen system vision.

This set of documents will define the NextGen system and 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.

Let me emphasize, however, that we are not waiting for 2025 to implement technologies to promote safer, more efficient operations, and increase capacity in an environmentally sound manner. 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. FAA proposes to spend $173 million on these programs in FY08.

These technologies are essential to begin the transition from today's air traffic management system to the NextGen system of 2025. Perhaps the most significant of these transformational technologies 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, and it has contributed to the recent reduction of GA accidents in Alaska by more than 40 percent for ADS-B equipped aircraft. One of the first uses of ADS-B technology outside of Alaska will be in the Gulf of Mexico. The FAA has 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 looking at 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 an appropriate proposed timeline for a future NPRM.

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. SWIM will provide high quality, timely data to many users and applications. By reducing the number and types of interfaces and systems, SWIM will reduce unnecessary redundancy of information and better facilitate multi-agency information-sharing. When implemented, 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.

The heart of the NextGen advanced airspace management concepts lies -- like much of our society -- in the ability to communicate large amounts of complex information in a fast, efficient, and robust manner. In the current system, all air traffic communications with airborne aircraft is by voice communications -- in other words you pick up the "phone" to talk to someone else on another "phone." NextGen transformation cannot be realized through today's voice-only communications, especially if you want to manage tens of thousands of aircraft flights on optimal trajectory-based routes. 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. [FAA ATO-P Future Enroute Work Station Study, Preliminary Results, 2006]

The NextGen Network Enabled Weather will serve as the backbone of the NextGen weather support services, and provide a common weather picture to all NAS users. Approximately 70 percent of annual national airspace system delays are attributed to weather. The goal of this investment is to cut weather-related delays by at least 50 percent. The weather problem is about total weather information management, and not just the state of the scientific art in weather forecasting. The weather dissemination system today is inefficient to operate and maintain, and information gathered by one

system is not easily shared with other systems. We must integrate predictive weather information with decision support tools and provide uniform real-time access to key common weather parameters, and common situational awareness. The benefits will be improved utilization of air space across all flight domains, and reduced flight delays.

The NAS Voice Switch will provide the foundation for all air-to-ground and ground-to-ground voice communications in the air traffic control environment. The switches today are very 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. A crucial part of this activity is demonstrations of new technologies and capabilities. In late April, we will demonstrate the use of continuous descent approaches with time metering. We are requesting funding for additional activities related to defining operational concepts and technologies 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 using procedures for increasing capacity at busy airports. This 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.

Another vital consideration in the development of the NexGen system is successfully managing aviation's environmental impacts. We have set out an aggressive vision that grew out of a report to Congress that was requested under Vision 100. Two years ago we delivered "Aviation and the Environment- A National Vision." Developed through the Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) Center of Excellence, it brought near 40 stakeholders together: airlines, manufacturers, community groups, airports, universities, research establishments, and other government agencies to develop a common vision. The participants agreed that the US aviation system should ensure significant impacts from noise and local emissions continue to decline, identify appropriate metrics to deal with greenhouse gas emissions, improve the

relationship between airports and communities that surround them, and ensure the US remains a global leader in aviation environmental matters- even as we grow the system two to three fold.

A preliminary JPDO analysis has shown that long before we run into limits from technology, we run into constraints to capacity from noise and emissions impacts. In fact, we potentially lose tens of billions of dollars in foregone aviation activity. That's why the NexGen reauthorization is so important. It offers a number of programs that are essential if we are to meet the environmental objectives- and so foster capacity expansion and benefits it brings to the American public. These include: demonstrating the use of new environmentally-friendly procedures; underwriting the implementation of such procedures at airports; targeting research of environmental issues at the airport level; accelerating the maturing of new noise and emission reduction technologies for use in aircraft; and exploring the use of alternative fuels to enhance supply security and environmental performance.

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.

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. Out-year funding estimates over the first ten years range from $8 billion to $10 billion. Preliminary estimates suggest that the investments necessary to achieve the end state NextGen system range from $15 billion to $22 billion in funding. We are working to continuously refine these estimates, particularly with our users as we implement new cost-based financing mechanisms, as proposed in the Next Generation Air Transportation System Financing Reform Act of 2007, the FAA's reauthorization proposal.

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. 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. The further opening of US and European markets in the recently-agreed "Open Skies" agreement reinforces this need. 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. We hope to take the first steps under this agreement later this summer to lay out a roadmap of flight trials to test a number of procedures and technology that will reduce noise and emissions.

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.

Our overarching goal in the NextGen initiative is to develop a 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, environment and efficiency. Research will continue to help us find the right balance between a centralized satellite and ground system and a totally distributed system, where aircraft "self-manage" their flight with full knowledge of their environment.

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