

STATEMENT OF HANK KRAKOWSKI, CHIEF OPERATING OFFICER, AIR TRAFFIC ORGANIZATION, FEDERAL AVIATION ADMINISTRATION, BEFORE THE SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION, SUBCOMMITTEE ON AVIATION OPERATIONS, SAFETY, AND SECURITY, ON AIR TRAFFIC CONTROL MODERNIZATION. MARCH 25, 2009.

Chairman Dorgan, Senator DeMint, Members of the Subcommittee:

Thank you for inviting me here today to discuss the current state of the Federal Aviation Administration's (FAA) efforts on air traffic control modernization. We have recently made some great strides in this area, and I am happy to report that in recognition of that, the Government Accountability Office (GAO) recently removed the FAA's air traffic control modernization program from its High Risk List, its biennial update of federal programs, policies, and operations that are at "high risk" for waste, fraud, abuse, and mismanagement or in need of broad-based transformation.

The GAO added FAA air traffic control modernization to the High Risk List in 1995 due to cost overruns, schedule delays, and performance shortfalls in the FAA attempts to modernize its air traffic control system. However, the GAO has found that the FAA is making progress in "addressing most of the root cause of its past problems." The GAO concluded that the FAA's efforts "have yielded results, including deploying new systems across the country and incurring fewer cost overruns."

As positive as this news is, we are not resting on our laurels. As you know, at the heart of the FAA's modernization is the Next Generation

Air Transportation System (NextGen). NextGen is a wide-ranging transformation of the entire national air transportation system to meet future demand and support the economic viability of the system while reducing delays, improving safety, and protecting the environment. NextGen will change the way the system operates – reducing congestion, noise, and emissions, expanding capacity and improving the passenger experience. NextGen is a complex, multilayered, evolutionary process of developing and implementing new technologies and procedures. NextGen is **not** a single piece of equipment or a program or a system that will instantaneously transform the air transportation system. NextGen is an evolutionary process, and existing systems must be sustained as we transition. NextGen builds on legacy systems to increase capability in today's National Airspace System (NAS), adds new performance-based procedures and routes, and ultimately delivers programs that transform the NAS. NextGen takes advantage of new technology that is similarly being used to transform our personal lives and the way we do business, such as GPS, analog-to-digital, and network to network data sharing.

NextGen goals will be realized through the development of aviation-specific applications for existing, widely-used technologies. They will also be realized through the fostering of technological innovation in areas such as weather forecasting, data networking, and digital communications. Hand in hand with state-of-the-art technology will be new airport infrastructure and new procedures, including the shift

of certain decision-making tools and accompanying responsibility from the ground to the cockpit.

As it is implemented, NextGen will gradually allow aircraft to safely fly more closely together on more direct routes, reducing delays, and providing benefits for the environment and the economy through reductions in carbon emissions, fuel consumption, and noise.

Defining NextGen: The Need

Although it is extremely safe, and staffed by a capable, dedicated workforce, our current air traffic control system is not scalable or flexible enough to keep up with future demand. Our future preeminence as a nation in air transportation is not assured. In addition to improving efficiency and creating additional capacity, NextGen is needed to provide corresponding enhancements to safety and environmental performance. It will bring to air transportation the same twenty-first century processes that give operations in other industries greater reliability, flexibility, and predictability.

Even in the face of falling demand and reduced capacity, we've seen congestion continue in our busiest airspace and airports. In February 2008, there were 1,171,721 operations, while in February 2009, there were 1,040,150 operations. That's a reduction of over 11 percent. Still, while traffic is down overall, our congested airspace in New York/New Jersey/Philadelphia has seen only about a 5.5% reduction in traffic from last year to this year.

We know that we must be poised to handle future demand that will surely return as the nation's economy improves. In fact, the aviation sector will be an important factor in the nation's economic recovery. The FAA estimates that in 2006, civil aviation accounted for 11 million jobs and represented 5.6% of the Gross Domestic Product; and, according to the FAA's calculations using U.S. International Trade Commission's reported trade data statistics, at \$61 billion, aerospace products and parts contributed more to the positive balance of trade than any other sector - \$32 billion more than the next highest contributor.

NextGen must also help manage the constraints on the air transportation system from the environmental impacts of aircraft noise and emissions and concerns about energy usage. Increased efficiency with NextGen operations will lead to reduced fuel consumption resulting in lower carbon emissions. NextGen investments in engine and airframe design and alternative fuels will produce the changes needed to reduce the environmental impact of aviation.

NextGen will also increase the safety of an already exceedingly safe system. NextGen further enables FAA's transition from traditional forensic investigations of accidents and incidents to a prognostic approach to improving safety. NextGen promotes the open exchange of pertinent safety information to continuously improve aviation safety.

Benefits of NextGen

NextGen is reaping the benefits originated under the Operational Evolution Plan (OEP). Communities, airports, and the FAA continue to work together to build new runways, which provide significant capacity and operational improvements. In Fiscal Year 2009, four runway projects have been commissioned. On November 20th, three major new runways opened: at Seattle-Tacoma, Washington Dulles, and Chicago O'Hare International Airports. The Seattle runway is expected to cut local delays in half by increasing capacity in bad weather by 60 percent, while the new runway at Dulles will provide capacity for an additional 100,000 annual operations. The new Chicago runway, which added capacity for an additional 52,300 annual operations, is a part of the greater O'Hare Modernization Program (OMP) that will reconfigure the airport's intersecting runways into a more modern, parallel layout. The OMP will substantially reduce delays in all weather conditions and increase capacity at the airfield, allowing O'Hare to meet the region's aviation needs well into the future. On February 12, a runway extension at Philadelphia was completed, helping reduce delays at the airport. Looking forward for the next three years, new runways will open at Charlotte and Chicago O'Hare. Eleven other runway projects are in the planning or environmental stage at OEP airports through 2018.

While airfield improvements offer significant capacity increases, they alone are not enough to address current problems at certain airports, or the growth in demand we expect in the future. New technology and procedures can help us gain extra use from existing runways.

Today, capacity for closely spaced parallel runway operations (CSPO) is dramatically reduced in poor visibility conditions. We are working on capabilities that allow for continued use of those runways in low visibility conditions by providing precise path assignments that provide safe separation between aircraft assigned on parallel paths, restoring capacity and reducing delays throughout the system. In November 2008, we published a national order that allows us to safely reduce separation between aircraft approaching parallel runways at Boston, Cleveland, Philadelphia, St. Louis and Seattle. In good visibility Seattle's pair of parallel runways, together, could handle roughly 60 operations per hour; poor visibility conditions cut that rate in half. Even in poor visibility, the new order now safely allows a rate of about 52 operations per hour, a significant improvement for the airport and its users. We are beginning to see similar benefits in Boston.

This order is a first step in a phased approach for safely increasing the use of CSPOs through a combination of procedural changes and new ground and aircraft equipment. Down the road, new rules for CSPOs could give airports more design flexibility so that they can safely build runways more closely together, increasing their capacity within their existing boundaries, providing better service to their communities without requiring additional land.

Performance-based navigation is another building block for NextGen which we are accelerating with cooperation from industry.

Performance-based routes and procedures result in shorter distances flown, which add up to both fuel and time savings. Fuel savings

equate to reduced emissions, enhancing environmental performance. Safety is increased as air traffic operations become more predictable. Performance-based navigation includes Area Navigation (RNAV) and Required Navigation Procedures (RNP), which allow equipped aircraft to fly more direct and precise paths, reducing flight time and fuel use, as well as localizer performance with vertical guidance (LPV) procedures, which can increase access to airports, especially in low visibility conditions.

Advances in performance-based procedures and routes allow for optimal use of airspace. The FAA maximizes the use of airspace, especially in congested areas, through targeted airspace and procedures enhancements. Continuing work in the New York area includes integration of RNAV procedures, relocation and expansion of airways, airspace reconfiguration, and creation of optimal descent procedures. In the Chicago area, the FAA is adding departure routes and changing procedures to allow for triple arrivals. In southern Nevada, the FAA is optimizing existing airports and airspace. Houston will also see additional departure routes and arrival procedures, along with improved procedures to avoid severe weather.

Operators like Southwest Airlines recognize the value of performance-based navigation. The airline made the business decision early last year to equip its entire fleet for RNAV and RNP procedures. The company envisions building a network of RNP routes for their system. Southwest believes its \$175 million investment can be recouped within the next three to five years

because of the operational efficiencies RNP offers. We are currently working with Southwest on a pilot project to build RNAV/RNP routes between Texas' Dallas Love Field and Houston Hobby airports.

Today, more than three-quarters of commercial aircraft are equipped for RNAV, and almost half of these are equipped for RNP precision procedures. Likewise, more than 20,000 aircraft are equipped for LPVs. This level of equipage provides an excellent opportunity for the aviation community to use what it already has to produce ever-greater benefits. FAA has responded: last year the agency published more than 600 performance-based navigation procedures and routes, versus our goal of almost 400. The FAA plans to keep up this pace each year for the next four years.

Because the realization of NextGen benefits is integrally linked to how quickly the operators equip their aircraft, it is imperative that the FAA work closely with industry on NextGen deployment. As such, the FAA has established a NextGen Implementation Task Force with RTCA, an industry association that serves as a federal advisory committee. The task force will provide recommendations on how to move forward together on implementation. FAA's governing principles for accelerating equipage, published in the January 2009 FAA's NextGen Implementation Plan, provide a starting point for this work. These principles focus on mitigating the risk for early adopters of NextGen avionics, while providing the maximum operational benefits in the airspace where they're most needed. They also focus on international interoperability, and incentivizing the equipage of aircraft

that meet evolving environmental standards. The Task Force will deliver recommendations to the FAA in August 2009.

Our current national airspace system is safer than it has ever been. However, new means are required to ensure this remains the case as we transform the NAS. NextGen will continue that trend in the face of increasing traffic and the introduction of very light jets, unmanned aerial vehicles, and commercial space flights. To continue to minimize risk as we introduce a wave of new systems and procedures over the next decade, the aviation community will continue its move to safety management systems and other aspects of proactive management, where trends are analyzed to uncover problems early on. This allows preventive measures to be put in place before any accidents can occur.

An important part of NAS modernization, the FAA's Aviation Safety and Information Analysis and Sharing program (ASIAS), provides a suite of tools that extract relevant knowledge from large amounts of disparate safety information. The FAA is partnering with NASA and major airlines for ASIAS, which helps FAA and our industry partners to monitor the effectiveness of safety enhancements. In use today, ASIAS will ensure that the operational capabilities that produce capacity, efficiency and environmental benefits are first and foremost inherently safe. ASIAS has already demonstrated the ability to measure the performance of safety solutions to known problems, such as Loss of Control, Controlled Flight Into Terrain, Runway Incursion, Approach, and Landing Accident Reduction. Additionally, ASIAS has demonstrated the ability to detect new safety issues, such

as terrain avoidance warning system alerts (TAWS) at mountainous terrain airports, and to identify solutions that have the potential to virtually eliminate these threats. Between now and fiscal year 2013, the FAA intends to increase the number of databases ASIAs can access; expand ASIAs to include maintenance/air traffic information; increase membership by adding regional air carriers; increase community stakeholders to include general aviation, helicopter and military; and increase the automated search capabilities.

The primary environmental and energy issues that will significantly influence the future capacity and flexibility of the NAS are aircraft noise, air quality, global climate effects, energy availability, and water quality. Aviation accounts for approximately three percent of direct greenhouse gas emissions, and national and international concerns about climate impacts could constrain the industry in the future, if not properly addressed. An environmental management system approach will be used to integrate all environmental and energy considerations into core NextGen business and operational strategies.

In 2009, we are moving forward on a research consortium called Continuous Low Emissions, Energy and Noise (CLEEN), which will allow us to work with industry to accelerate the maturation of technology that will lower energy, emissions and noise. CLEEN also seeks to advance renewable alternative fuels for aviation. These fuels not only improve air quality and reduce life cycle greenhouse emissions, but also enhance energy security and supplies. FAA helped form – and is an active participant in – the Commercial

Aviation Alternative Fuels Initiative, or CAAFI. Alternative fuels will be the “game changer” technology that gets us closer to carbon neutrality. Significant deliverables in the FY09-13 period include demonstrations of clean and quiet aircraft technologies that can be transitioned into new products and used to retrofit existing products, approval of generic renewable fuels for aviation, and models and guidance to improve our ability to quantify environmental costs and benefits and to optimize solutions, including those to address CO2 and non-CO2 aviation climate impacts.

Current Status

FAA is working closely with all aspects of the aviation community to make NextGen a reality sooner rather than later. We are also leveraging the capabilities of our legacy systems to improve operations. We’re partnering with several of the nation’s air carriers for trials and demonstrations; we’re engaging with universities like Embry Riddle. We’re working with pilots, dispatchers, and controllers on NextGen integration and development to achieve balance in the safety and efficiency design of NextGen. The FAA has established an integrated demonstration capability in Florida where, working with a wide range of government, university and industry partners, we are evaluating NextGen technologies. We’re working with airport authorities, manufacturers and with government bodies and industry from around the world. We are collaborating with Joint Planning and Development Office (JPDO) Working Groups, RTCA, and other industry groups to integrate stakeholder requirements into government commitments.

Moreover, this past year, through the efforts of the JPDO, we have seen the contributions to NextGen resulting from cross-department and cross-agency cooperation increase significantly. Through the cross-agency support provided by the JPDO and its Senior Policy Committee, we are collaborating with the Department of Transportation (DOT), the Department of Defense (DoD), the Department of Commerce (Commerce), the Department of Homeland Security (DHS), and the National Aeronautics and Space Administration (NASA). Some of our collaborations have resulted in:

- DoD established a division at JPDO to work on efficient and secure information sharing;
- The Departments of Commerce, Defense and the FAA have collaborated to deliver the first NextGen weather capability in 2013; and
- JPDO conceived and facilitated the formation of Research Transition Teams to further the effective transition of research from NASA to implementation in the FAA.

The FAA officially began its development of NextGen in fiscal year 2007 by identifying and funding two transformational programs – Automatic Dependent Surveillance – Broadcast (ADS-B) and System Wide Information Management (SWIM). ADS-B is a key component of NextGen that will move air traffic control from a system based on radar to one that uses satellite-derived aircraft location data. In addition to improved safety with traffic, weather, and flight information, the system also promises greater efficiency and flexibility

for the national airspace system. 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 air traffic controllers.

ADS-B is surveillance, like radar, but offers more precision and additional services, such as weather and traffic information. ADS-B provides air traffic controllers and pilots with much more accurate information to help keep aircraft safely separated in the sky and on runways. 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.

NextGen transformational programs made significant advances over the past year. ADS-B essential services have been deployed in southern Florida and are being deployed in the Gulf of Mexico, where we have never had radar coverage. In December, FAA achieved its In-Service Decision for ADS-B essential services in southern Florida. Achievement of this major milestone clears the way for national deployment of broadcast services. The National Aeronautics Association recognized ADS-B last year by presenting the ADS-B team with its Collier Trophy. This award is given yearly for "the greatest achievement in aeronautics or astronautics in America with respect to improving the performance, efficiency and safety of air or space vehicles." The Collier award is generally recognized as the epitome of aviation innovation and excellence.

The SWIM program, Data Communications, and NAS Voice Switch achieved major acquisition milestones, and NextGen Network Enabled Weather (NNEW) conducted demonstrations of the integration of weather data into automated decision support tools. This is a necessary step in the realization of improved management of weather in the NAS.

An updated FAA NextGen Implementation Plan was published in January 2009. This edition of the plan focuses on answering five fundamental questions: What does NextGen look like in 2018; what aircraft avionics are needed to support operations in 2018; what benefits will be delivered by 2018; what is the FAA specifically committed to deploy in the near-term that makes the most of existing resources; and what activities are underway to support future capabilities?

While the focus of the FAA's NextGen Implementation Plan is on the mid-term (through 2018), the plan, coupled with the NAS Enterprise Architecture, provides a picture of near-term (2009-2013) deliverables. FAA's near-term NextGen implementation efforts are targeted across three broad areas: airfield development, air traffic operations, and aircraft capabilities. Together, these efforts will increase capacity and operational efficiency, enhance safety, and improve our environmental performance. We are moving forward with a dual-pronged approach: maximizing the use of untapped capabilities in today's aircraft and ground infrastructure, while working aggressively to develop and deploy new systems and procedures that will form a foundation for more transformative capabilities that will be

delivered in the mid-term. We believe this approach allows both government and industry to extract the greatest value from existing investments, while positioning the industry to gain exponential benefits in the mid-term and beyond.

From that first investment of \$109 million in 2007, and supported by sound evaluation and planning, FAA funding for NextGen grew to \$202 million in fiscal year 2008 and \$688 million is anticipated this fiscal year. The Administration's fiscal year 2010 budget includes approximately \$800 million for NextGen. The January 2009 NAS Enterprise Architecture and NextGen Implementation Plan support these funding numbers.

Along those lines, I would like to thank this Committee and the Congress for the additional \$200 million in economic recovery funding that will be used for repairing and upgrading our air traffic facilities and equipment. This will go a long way to improving our buildings and providing our workforce with the tools they need to do their jobs well.

We do have other interim efforts to enhance safety and operations, such as Runway Status Lights (RWSL). The RWSL system integrates airport lighting equipment with approach and surface surveillance systems to provide a visual signal to pilots and vehicle operators indicating that it is unsafe to enter/cross or begin takeoff on a runway. The system is fully automated based on inputs from surface and terminal surveillance systems. Airport surveillance sensor inputs are processed through safety logic that commands in-

pavement lights to illuminate red when there is traffic on or approaching the runway.

The RWSLs will activate either when it is unsafe to enter a runway from a taxiway (referred to as runway entrance lighting or RELs) or when it is unsafe to take off from a runway (called takeoff hold lighting or THLs). For example, if an aircraft is landing or departing, the RELs will illuminate indicating it is unsafe for an aircraft or vehicle to go onto that runway from a taxiway. Another example is if an aircraft starts to cross a runway when there is an aircraft ready for departure on that runway, the THLs will illuminate indicating to the pilot that it is unsafe to continue the departure. Both RELs and THLs will automatically turn off when the system determines it to be safe. RWSLs are red lights only; there are no green lights in RWSLs.

We currently have RWSL systems installed, one at San Diego International Airport, and the other at Dallas/Ft. Worth International Airport. Installation of RWSL systems is underway at Los Angeles International Airport and at Boston Logan International Airport. The FAA is scheduled to install RWSL systems at 18 other airports by 2011. In addition, we are continuing to test additional runway lights: in Boston we are testing Runway Intersection Lighting (RIL) to guard runway intersections; and at Dallas/Ft. Worth, we are testing the enhanced Final Approach Runway Occupancy Signal (eFAROS) to alert landing traffic that a runway is occupied.

Labor Issues

I know that this Committee has always been interested in how FAA has interacted with our labor unions, and I would like to address that briefly. In his confirmation hearing before this Committee, Secretary LaHood made it very clear that resolving labor disputes was one of his top priorities for the FAA, and that he was seeking to fill the FAA Administrator position with someone who had the people skills to resolve our outstanding issues with the National Air Traffic Controllers Association (NATCA). As someone who has sat on both sides of the labor debate, I fully support the Secretary's priority on this.

Our controllers, indeed, our entire workforce, are our most valuable assets in ensuring the safety of the traveling public. As such, we have included controllers in all phases of NextGen so far. Controller input has come from individual controllers who have been invited to participate in NextGen development, though they were not participating as official NATCA representatives. NATCA does have a seat on the NextGen Management Board, the governance structure that we originally put in place as our framework for achieving NextGen. I look forward to moving ahead towards a resolution of our differences. These have been challenging times for us, and I want to commend all the hard work that has occurred on both sides.

Chairman Dorgan, Senator DeMint, Members of the Subcommittee, this concludes my prepared remarks. Thank you again for inviting me here today to discuss FAA's air traffic modernization program. I would be happy to answer any questions that you might have.