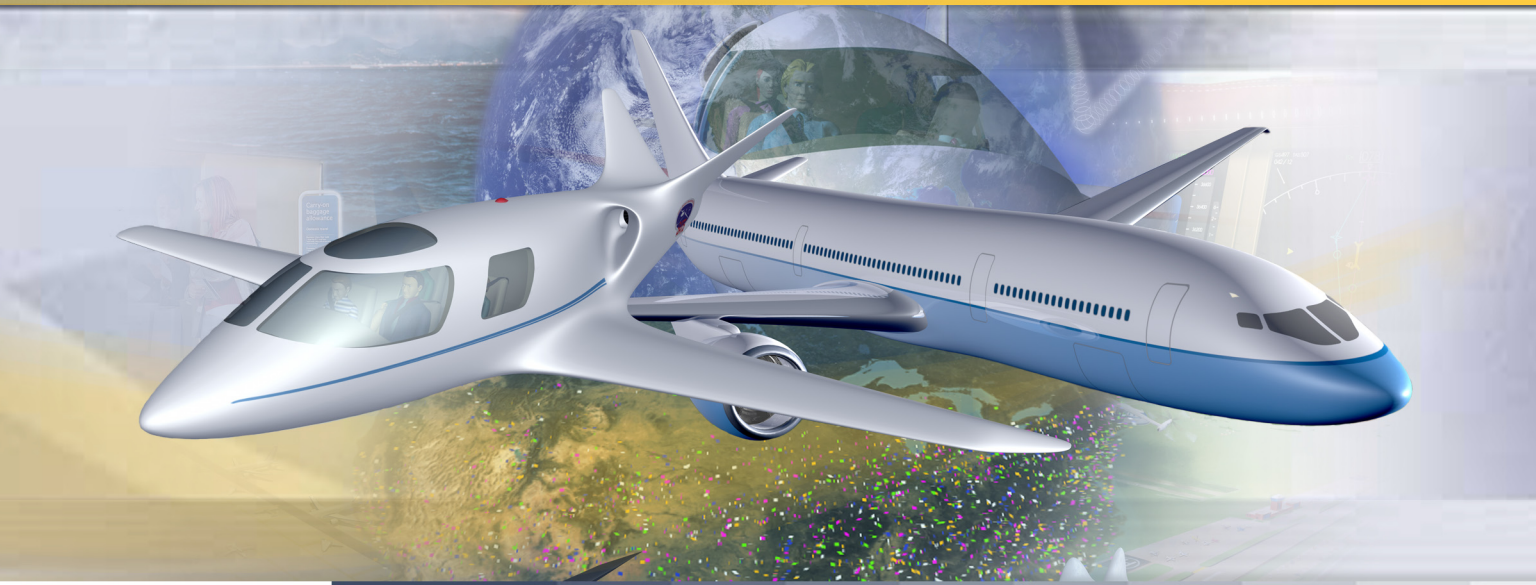
NGATS

Next Generation Air Transportation System



Executive Summary

Introduction and Background

"The changes that are coming are too big, too fundamental for incremental adaptations of the infrastructure … we need to modernize and transform our air transportation system – starting right now."

Department of Transportation Secretary Norman Y. Mineta
Aero Club of Washington Speech
January 27, 2004

Our Nation's air transportation system has become a victim of its own success. We created the most effective, efficient and safest system in the world and like a best selling product, the world couldn't get enough of it.

We now face a looming crisis – demand for air services is on the rise, and could as much as triple over the next two decades. While the industry downturn and the effects of the September 11 attacks temporarily slowed the tremendous growth in air travel that started in the late 1990s, demand is growing again, and in a big way.

The warning signs are everywhere. Flight delays and cancellations reached unacceptable levels last summer at choke-points like O'Hare. For trips less than 500 miles, the curb-to-curb destination speed fell to between 35 and 80 miles an hour. Passengers began turning in their boarding passes for car keys.

Consumers stand to lose $30 billion annually due to people and products not reaching their destinations within time periods we expect today. The Commission on the Future of the United States Aerospace Industry concluded that without improvement, the combined economic cost of delays from 2000-2012 will be an estimated $170 billion.

And since 9/11, we have made a series of security enhancements to our airports and airspace, but typically by layering them on top of an existing system rather than including them in the design from the beginning.

Other issues, ranging from environmental concerns to homeland security are placing additional stresses on the system. For example, the 9/11 Commission reported that once the terrorists had gained control of the aircraft, existing protocols for U.S. airspace defense "were unsuited in every respect for an attack in which hijacked planes were used as weapons." And the challenges keep mounting.

If we fail to address issues such as increased capacity in a deliberate and focused way, we will suffocate the great engine of economic growth we call civil aviation.

First Important Steps Taken

"The Next Generation initiative is the real deal – one of the most important aviation programs the government has undertaken in many years, and is yet a further example of our determination to get out in front of changes before they swamp us."

DOT Undersecretary for Policy Jeffrey N. Shane
Remarks before the American Bar Association Forum on Air & Space Law Annual Meeting and Conference
Montreal, Canada
October 1, 2005

"This plan isn't something that's nice to have. If we don't move forward, we won't be able to catch up. Transformation is a must."

FAA Administrator Marion C. Blakey
U.S. Chamber of Commerce Speech
April 21, 2005

Mandate

In 2003, President Bush and Congress took the first critical and decisive steps towards transformation with the enactment of VISION 100 – Century of Aviation Reauthorization Act (P.L.108-176). It laid out the mandate for the multi-government agency Next Generation Air Transportation System (NGATS or Next Generation System) initiative and proposed a unique public/private partnership managed by the Joint Planning and Development Office (JPDO) to carry it out.

The Next Generation System initiative will transform the way our entire air transportation system works today, through the year 2025 and beyond. The overarching vision is for a system that addresses critical safety and economic needs in civil aviation, such as a two-to-three fold increase in capacity, while fully integrating national defense and homeland security improvements – and in a cost effective manner. Moreover, system transformation not only involves new technology, but also changes in organizational structure, roles, and business practices that are out-of-date and not aligned with customer needs.

But what really distinguishes the NGATS initiative is its inclusive nature. This is not a "government" program where policy and technology are dictated. The Next Generation System is predicated on the belief that government does not have all of the answers and should not be in the business of saying what the marketplace should look like. Rather, as we move forward, we must and will draw on private sector expertise and forge the innovative public/private partnerships that will create the Next Generation System.

Setting an Example for Government Cooperation

From the very beginning, it was also determined that an initiative of this magnitude and complexity could never be successfully com-

pleted by a single department or agency. Transformation cuts across these lines and boundaries. To meet this broad challenge, we formed a coalition made up of the Departments of Transportation, Defense, Homeland Security and Commerce and the FAA, NASA and the White House's Office of Science and Technology Policy. And unlike previous efforts to modernize our system, we brought these agencies together now to ensure that all pieces of the initiative are understood and addressed from the onset.

Overseeing the work of the JPDO is a Senior Policy Committee chaired by the Secretary of Transportation that includes senior representatives from the participating departments and agencies and the Director of the Office of Science and Technology Policy. Among its key responsibilities, the Senior Policy Committee provides policy guidance and review; makes legislative recommendations; and identities and aligns resources that will be necessary to develop and implement the NGATS Integrated Plan.

Indeed, a special feature of the NGATS initiative is the level of participation we are enjoying from the many agencies involved. There is unprecedented engagement and cooperation among these senior government leaders. They are working shoulder-to- shoulder to align programs and plans to the Next Generation System and tackling problems in a very thoughtful and sustained way. And this spirit of cooperation is spilling over to the partnerships we are beginning to form with industry.

As will be discussed later in the Executive Summary, the Senior Policy Committee has now also taken the critical first steps to refocus agency resources towards the Next Generation System. These important cost savings are just the start of this JPDO good government process. Greater gains and more benefits will be realized in the out-years and

Focused on Outcomes

We have determined that the future system must: (1) bolster national security through better knowledge and sharing of risks throughout the system; (2) increase capacity by utilizing the precision that is available to safely reduce aircraft-to-aircraft separation; (3) lower operating costs for both users and the government through more efficient routing of aircraft and the automation of routine tasks; (4) increase productivity through automation and changing roles and responsibilities; (5) require less infrastructure, relying more on aircraft capabilities, which are underutilized today; and (6) facilitate interagency collaboration through information integration and sharing.

thought is already been given to applying the JPDO process across government.

Integrated Plan

The next major milestone occurred in December 2004, when Secretary Mineta and FAA Administrator Marion C. Blakey delivered the NGATS Integrated Plan to Congress; it can be viewed at www.jpdo.aero This first-of-its-kind strategic business plan will guide the way for transforming today's rigid system into one flexible enough to accommodate whatever the future may hold. Administrator Blakey said it best: "This plan isn't something that's nice to have. If we don't move forward, we won't be able to catch up. Transformation is a must."

VISION 100 also directed that an annual Progress Report, including any changes to the Integrated Plan, be submitted to Congress at the time of the President's budget request. This Executive Summary provides a high-level view of that document and we are pleased to report on our progress.

Real Progress to Report in 2005

"The key to JPDO success at this stage is not an infusion of funds but rather how well it leverages research dollars managed by the other agencies, including the National Aeronautics and Space Administration and the Department of Defense."

Kenneth M. Mead
Inspector General, U.S. Department of Transportation
Testimony before the House Aviation Subcommittee
April 14, 2005

Delivery of the Integrated Plan was only the beginning. Now we are laying the foundation for the Next Generation System. We are making progress that can be seen and felt.

Integrated Product Teams

In 2005, we broke down the Integrated Plan into eight more manageable pieces, such as safety, shared situational awareness and an agile air traffic system, and formed an integrated product team (IPT) for each one. These teams of government and private sector technical experts will apply best practices to achieve their particular objectives.

As DOT Under Secretary for Policy Jeffrey N. Shane observed, the IPTs have the very important job of "getting from generalities to specifics, and from objectives to deployment" – in other words, real world improvements. The IPTs will work closely with our many stakeholders to ensure that they have an early window into our thinking and that we take full advantage of their expertise along the way.

The primary responsibility for assembling and leading each IPT belongs to one of the Next Generation System's partner agencies. The JPDO is responsible for approving the IPTs' broad strategies as part of the Integrated Plan and ensuring their plans and schedules are consistent with the overall Roadmap and Enterprise Architecture.

As of February 2006, over 184 industry and private sector participants representing 87 organizations and companies are actively involved in the IPT planning and development work.

"You can see that the Institute has a very difficult job – to ensure that the JPDO has absolutely the best people working on these problems and to do so in a fair and balanced way. I am confident that they can do it."

FAA Administrator Marion C. Blakey
Aerospace Industries Association
Speech, "The Best and Brightest"
February 28, 2005

NGATS Institute

Just as the JPDO process represents a bold departure in the way federal agencies work together to achieve common objectives, President Bush and Congress envisioned a new and revolutionary way for government and the private sector to interact and collaborate to make the 2025 vision a reality.

To this end, the JPDO established in 2005 the NGATS Institute. Hosted by the Aerospace Industries Association, and co-chaired by the Airline Pilots Association and Air Transport Association presidents, it is an alliance among organizations representing major aviation stakeholder communities and allows them to get directly involved on a daily basis in the transformation process. In addition to its co-chairs, the Institute is guided by a board of 15 major aerospace industry and aviation organization leaders.

The Institute's first task is to help populate the eight IPTs. We want to make sure the IPTs have the best and brightest experts industry can offer. We will also benefit from the extensive experience industry stakeholders have gained through other agencies' transformation initiatives.

In addition to recruiting, selecting and assigning private sector experts and technical resources to the IPTs, the Institute is already being called upon to perform specific research in areas identified by the JPDO. So, rather than observing and commenting, the private sector will join with the government as a full partner in the NGATS development process.

For more information on the Institute and the IPTs, please visit www.jpdo.aero and click on the NGATS Institute link.

Global Interoperability

Partnerships extend beyond our borders. In 2005, Undersecretary Shane testified before the U.S. Congress on why a Next Generation global system is so important not only in the United States but throughout the world:

"The importance of developing such a future system is also quite clear to policy-makers in Europe, where a comparable effort is well underway. This presents both a challenge and an opportunity to the United States at this critical time for our nation's aerospace industry. Creating a modernized, global system that provides interoperability could serve as a tremendous boost to the industry, fueling new efficiencies and 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."

"The technologies and operating capabilities you will see demonstrated here today could be the precursor of a whole new kind of air travel. One where people can fly where they want, almost anytime they want in all kinds of weather. This kind of personalized air travel could dramatically change how we live, how we work, and how we play"

NASA Administrator Dr. Michael Griffin
SATS Demonstration
Danville, VA
June 6, 2005

Of great importance to the Next Generation System, the JPDO, FAA and the Commission of the European Communities have been working on a draft of a Memorandum of Understanding that establishes a framework for cooperation. They intend to explore opportunities for working toward commonality of air traffic management systems by implementing compatible technologies in their respective ground and air systems and developing common synchronized timelines for the implementation of the new technology. The key here is ensuring global interoperability where necessary.

Demonstration Projects

This past year, the JPDO and its industry partners have also moved from the drawing board to the field and have begun conducting a number of exciting demonstration projects. For example, in June 2005, JPDO partner agencies NASA and FAA carried out the highly successful Small Aircraft Transportation System, or SATS, demonstration project. It is the first true transformational project.

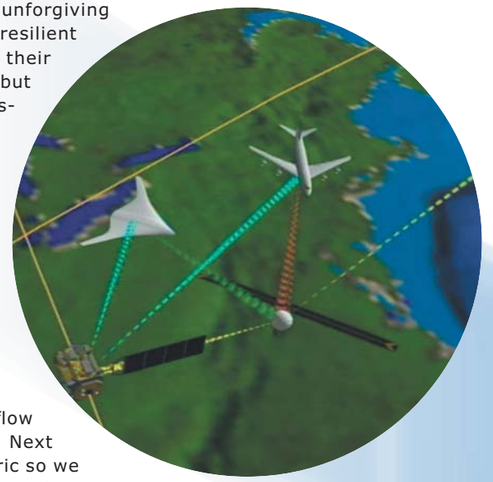
A whole new generation of safe and affordable small aircraft will be able to take advantage of the SATS enabling technology and start delivering service where there was little or none before, thereby taking the pressure off busy airports while conveying economic and quality of life benefits to literally thousands of smaller rural and suburban communities.

Industry, the Department of Defense and other JPDO partners also carried out the first Network Enabled Operations (NEO) demonstration project. With network-centric shared awareness, decision makers can make far more timely decisions across a broad spectrum of responsibilities – safety, security, efficiency, and reliability.

And as Secretary Mineta told the Aero Club of Washington in January 2006, "Having a common operating picture will save precious minutes – perhaps precious lives – when an 'aircraft of interest' or other abnormality is detected."

Operational Vision – It's All About the User

Of great importance in 2005, we brought the 2025 NGATS Operational Vision into much finer definition. (The forthcoming Concept of Operation is drawn from the Operational Vision.) In contrast to today's rigid, brittle and unforgiving system, the Next Generation System will be flexible, scalable, resilient and adaptive. We will take passengers from the airport curb to their airplane in 30 minutes or less with none of today's hassles, but with a lot more security. Remember, the Next Generation System is not about the government; it is all about the user.



The JPDO identified eight "key capabilities" currently missing from today's system but that individually and collectively will play a major role in the Next Generation System. They are: (1) Network-Enabled Information Access; (2) Performance-Based Services; (3) Weather Assimilated Into Decision Making; (4) Layered, Adaptive Security; (5) Broad-Area Precision Navigation; (6) Airport Trajectory-Based Operations; (7) Equivalent-Visual Operations; and (8) Super Density Operations.

The Operational Vision emphasizes end-to-end strategic flow management with minimal individual flight interventions. The Next Generation System will be highly automated and network centric so we get the right information to the right person at the right time keeping our nation safe and the flow of traffic running smoothly. And we will increasingly cut the cord between ground and air as we put more data directly into the cockpit of intelligent aircraft through sensors and satellites.

"And we don't have to wait until 2025 to see changes. By focusing current investments on Next Generation Systems, we are making an operational difference today."

Department of Transportation
Secretary Norman Y. Mineta
"Airport 2025" Remarks
June 28, 2005

The future system has safety and efficiency built right into it. Ultimately, air traffic management services will be tailored and flights will be managed based on individual aircraft and flight crew performance capabilities. We can reward aircraft that have advanced efficiencies and capabilities, such as precision navigation and the ability to land automatically, by allowing them greater operating flexibilities, such as flying in all but the worst of weather.

And through data sharing we will move from the old command-and-control regulations to risk management so we can prevent accidents before they happen. We can increase capacity two to three times while bolstering our enviable safety record. We are clearly on the right track.

Roadmap and Portfolio

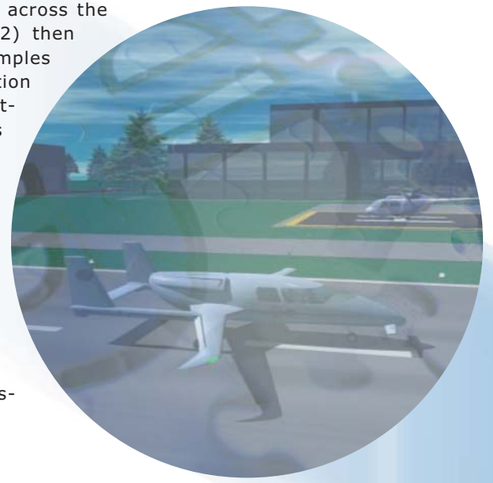
To help us reach the Concept of Operation, the JPDO created the NGATS Capability Roadmap. It sets forth a clear, high-level path, timelines and key transition states and sequences leading to the 2025 system. The 2005 NGATS Roadmap builds on the initial NGATS Roadmap published last year in the Integrated Plan. As the Concept of Operation matures, so does the Roadmap to achieve it. And based on the Roadmap, we developed the first NGATS Portfolio of specific operational improvements and the research, analysis and demonstration projects that lead to them.

Evaluating the Operational Vision

The Next Generation System is designed to address many of the most significant limitations to growth in the current air transportation system. These include runway capabilities and the inherent limitations of ground-based control of en route and terminal area airspace and the vulnerability of the system to bad weather. During 2005, the JPDO analyzed and defined current system performance in enough detail to identify when and where performance limitations restrict desired demand. From this work we were then able to produce an initial assessment that validated the Operating Vision's ability to deliver two to three times today's capacity – another major NGATS milestone.

Interagency Program Review

Based on the roadmap and portfolio, and under the direction and guidance of its Senior Policy Committee, the JPDO conducted its first Interagency Program Review (IPR). The goal was: (1) to perform a structured assessment of aviation research programs/projects across the federal government; and (2) then identify and leverage examples of how interagency collaboration could deliver Next Generation System capabilities in the FY 2007 budget. We plan on conducting further IPRs as we further align and prioritize investments throughout the duration of the initiative.



The six NGATS projects are: (1) accelerate ADS-B (Automatic Dependent Surveillance Broadcast); (2) accelerate Network Enabled Information Access; (3) synchronize weather research and accelerate development; (4) define Required Total System Performance (RTSP) levels of service; (5) initiate dynamic airspace research; and (6) align environmental R&D.

As Secretary Mineta said at the Aero Club two years ago: transformation starts now, not 10 years from now.

Initial Analysis of Costs

In 2005, the JPDO conducted an important initial financial analysis of the air traffic management portions of the Next Generation System, including examining the 2025 Operational Vision to understand the hardware and software that may be required for implementation. The results and assumptions are now being refined as we learn more about costs through the development of the Concept of Operation and Enterprise Architecture – both of which are scheduled for release in the spring/summer 2006.

However, based on the initial analysis, we concluded that our cost profile will be affected by a number of factors, such as the need to reprogram FAA out-year resources to be aligned with NGATS system requirements and the associated technology to enable the timely transformation of our air transportation system. Implementation strategies can also affect costs – and in a very positive way. For example, consolidating facilities can produce real cost savings but will first require a thorough dialogue regarding government's role in the continued management of the entire air traffic management system.

Clearly, more in-depth analysis is needed and in 2006, we will conduct further detailed studies on the costs of implementing the Next Generation System over the next five years. Working with our partner agencies and the NGATS Institute, we will also explore the full-range of government and industry cost drivers. This will allow us to expand our analysis to included expected total NGATS system costs.

"Many have suggested that creating a Next Generation System might be a budget buster and therefore a non starter in these challenging fiscal times. To the contrary, we are using the JPDO process as a way to ensure full participation across agency lines, and between the government and private sector, in ways that simply have not been done in the past. We already have a sizeable amount of resources being spent each year on air transportation research. By better coordinating our actions and tying them to a long-term integrated national plan we can maximize the benefits of those private and public investments."

DOT Undersecretary for Policy
Jeffrey N. Shane
Testimony before the House
Aviation Subcommittee
April 14, 2005

The Road Ahead: 2006

"This is a rare opportunity, and I hope that all of you fully appreciate the magnitude of what we are doing. It may quite frankly have a more far-reaching impact than just about anything that I have been involved with in my more than 30 years of public service."

Department of Transportation Secretary Norman Y. Mineta
"Airport 2025" Remarks
June 28, 2005

In 2006, the JPDO will build on last year's successes and begin the process of generating tangible and cost-effective benefits to users, providers and taxpayers through the six identified NGATS projects and other efforts surrounding the initiative. Clearly, this is a long-term endeavor, but we must sustain the momentum generated in 2005.

Demonstration Projects

In 2006, JPDO will launch a second wave of demonstration projects that will help lay a critical technology foundation for the Next Generation System.

These include the initial phase of ADS-B (Automatic Dependent Surveillance- Broadcast) – a major priority – which will introduce dependent surveillance as a future system tool, and SWIM (System Wide Information Management), which will permit network centric operations in the National Airspace System. In addition, the FAA Joint Resources Council has reached a decision that allows the FAA to begin planning for the full development and implementation of ADS-B. A final decision is scheduled for July 2006.

Also on deck for 2006 are LED airport lighting, which improves visibility and cost-performance of runway and taxiway lighting, and Capstone Phase III, which extends safety benefits from technology, such as WAAS (Wide Area Augmentation System) and air-to-air ADS-B to other parts of the state of Alaska.

Proactive

There are also five major efforts that will create continued momentum into 2006.

First, the JPDO will move from reacting to current agency/departmental plans and programs to providing recommended guidance at the start of each agency's planning cycle. Relevant aviation research programs, plans and dollars must now be aligned to the Next Generation System and meet required deadlines.

Second, private sector participation will begin in earnest through the NGATS Institute. The IPTs will be fully populated with top-notch technical experts, and funded studies have already begun.

Third, all planning will be driven by analysis, enterprise engineering and integration discipline. Indeed, the NGATS Concept of Operation and Roadmap will be integrated into a formal Enterprise Architecture, ensuring that dependencies, gaps, overlaps and costs are fully understood and resolved. The Concept of Operation, Concept of Use and Enterprise Architecture will be released in the spring/summer of 2006 for comment.

Fourth, portfolio management will be formalized with links established to the key research and implementation programs across the NGATS member agencies. We expect to develop a functional and vetted Enterprise Architecture and Portfolio.

Lastly, we will bring an international focus today to ensure seamless global operations in the future.

Summary and Conclusion

The past year was about laying a foundation: building interagency partnerships, aligning programs, creating the NGATS baselines and defining where we can accelerate research that can be implemented in FY2007. We have taken to heart Secretary Mineta's words: transformation starts today – and it has and will continue in 2006.

The year 2006 will see a true national public/private partnership emerge, much greater definition and detail in the NGATS Concept of Operation, Concept of Use, Roadmap, Enterprise Architecture and a thorough understanding of the total portfolio of investments and actions necessary to achieve greater benefits in FY2008 – benefits that will ultimately help take us to the system of the future.

Secretary Mineta recently observed that the Next Generation System initiative may have a more far-reaching impact than anything he has been involved with in his 30 years of public service. Given the Secretary's long and distinguished career, this speaks volumes about what is taking place today. The JPDO is honored to be making progress towards achieving that bold vision he first articulated almost two years ago, and, although much hard work and risk remains, we will work with our many partners in government and the private sector to meet these challenges together. We are confident that we are on the right path and will reach our ultimate goal on behalf of our great nation and the American people.

For more information visit
www.jpdo.aero

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