S. HRG. 109–373

AVIATION CAPACITY AND CONGESTION CHALLENGES—SUMMER 2005 AND FUTURE

HEARING

BEFORE THE

SUBCOMMITTEE ON AVIATION

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

MAY 26, 2005

Printed for the use of the Committee on Commerce, Science, and Transportation

U.S. GOVERNMENT PRINTING OFFICE

27–295 PDF WASHINGTON : 2006

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2250 Mail: Stop SSOP, Washington, DC 20402–0001

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

TED STEVENS, Alaska, *Chairman*

JOHN MCCAIN, Arizona
CONRAD BURNS, Montana
TRENT LOTT, Mississippi
KAY BAILEY HUTCHISON, Texas
OLYMPIA J. SNOWE, Maine
GORDON H. SMITH, Oregon
JOHN ENSIGN, Nevada
GEORGE ALLEN, Virginia
JOHN E. SUNUNU, New Hampshire
JIM DEMINT, South Carolina
DAVID VITTER, Louisiana

DANIEL K. INOUYE, Hawaii, *Co-Chairman*
JOHN D. ROCKEFELLER IV, West Virginia
JOHN F. KERRY, Massachusetts
BYRON L. DORGAN, North Dakota
BARBARA BOXER, California
BILL NELSON, Florida
MARIA CANTWELL, Washington
FRANK R. LAUTENBERG, New Jersey
E. BENJAMIN NELSON, Nebraska
MARK PRYOR, Arkansas

LISA J. SUTHERLAND, *Republican Staff Director*
CHRISTINE DRAGER KURTH, *Republican Deputy Staff Director*
DAVID RUSSELL, *Republican Chief Counsel*
MARGARET L. CUMMISKY, *Democratic Staff Director and Chief Counsel*
SAMUEL E. WHITEHORN, *Democratic Deputy Staff Director and General Counsel*
LILA HARPER HELMS, *Democratic Policy Director*

SUBCOMMITTEE ON AVIATION

CONRAD BURNS, Montana, *Chairman*

TED STEVENS, Alaska
JOHN MCCAIN, Arizona
TRENT LOTT, Mississippi
KAY BAILEY HUTCHISON, Texas
OLYMPIA J. SNOWE, Maine
GORDON H. SMITH, Oregon
JOHN ENSIGN, Nevada
GEORGE ALLEN, Virginia
JOHN E. SUNUNU, New Hampshire
JIM DEMINT, South Carolina

JOHN D. ROCKEFELLER IV, West Virginia, *Ranking*
DANIEL K. INOUYE, Hawaii
BYRON L. DORGAN, North Dakota
BARBARA BOXER, California
MARIA CANTWELL, Washington
FRANK R. LAUTENBERG, New Jersey
BILL NELSON, Florida
E. BENJAMIN NELSON, Nebraska
MARK PRYOR, Arkansas

CONTENTS

	Page
Hearing held on May 26, 2005	1
Statement of Senator Burns	1
Statement of Senator Lott	29
Statement of Senator E. Benjamin Nelson	29
Statement of Senator Pryor	45
Statement of Senator Stevens	2

WITNESSES

Blakey, Hon. Marion C., Administrator, Federal Aviation Administration	2
Prepared statement	6
Dillingham, Gerald L., Ph.D., Director, Physical Infrastructure Issues, Government Accountability Office	30
Prepared statement	32
ElSawy, Amr A., Senior Vice President/General Manager of the Center for Advanced Aviation System Development, MITRE Corporation	40
Prepared statement	42
Mead, Hon. Kenneth M., Inspector General, Department of Transportation	10
Prepared statement	12

APPENDIX

Response to written questions submitted by Hon. Frank R. Lautenberg to:	
Gerald L. Dillingham, Ph.D.	59
Hon. Kenneth M. Mead	59

AVIATION CAPACITY AND CONGESTION CHALLENGES—SUMMER 2005 AND FUTURE

THURSDAY, MAY 26, 2005

U.S. SENATE,
SUBCOMMITTEE ON AVIATION,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10 a.m. in room SR–253, Russell Senate Office Building, Hon. Conrad Burns, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF HON. CONRAD BURNS, U.S. SENATOR FROM MONTANA

Senator BURNS. We'll call the meeting to order. We have some folks on the way I'm told. I'm one of these kind of guys who will count them when they show, but we've got a little bit of ground to cover today. We're also conflicted today with marking up the energy bill. Energy, that's where I'm supposed to be and here. I'm big enough to be two people, but it ain't working. And also Intelligence is marking up and is fairly busy today. So it's sort of a busy day here on the Hill. We're trying to get ready to go on the Memorial Day week break, and everybody kind of wants to go home.

I thank the panel for showing up today. I appreciate you postponing any plans that you might have had for traveling for this Memorial Day weekend to be with us today. As most of you know, Memorial Day seems to be the beginning of a busy summer travel season for most Americans. We felt there would be no better time to take a look at the upcoming season than today.

We also need to look beyond this summer and examine our long-term challenges. It's important to this Committee that we know the imminent problems that face us today, the long-term challenges, and what technologies and ideas are out there to effectively and efficiently modernize our system.

Since Congress deregulated the airlines in the late 1970s, flying has become an essential form of transportation; and between 1980 and 2000 it grew faster than any other form of transportation. In fact, the number of travelers more than doubled during those years.

By the year 2000 the growth was starting to cause large-scale delays and bottlenecks. In 2001 we lived through the horrific events of 9/11. Those terrorist attacks drastically impacted the aviation system; and for the past 4 years, we're back to record numbers.

We find ourselves approaching the summer of 2005, and many of the problems we were facing in 2000 have returned. The problem doesn't stop there though. FAA is forecasting one billion passengers in the next decade.

Most of what we will hear today is dependent on the overall economy. We realize that, but I think most everyone would agree that there's going to be a lot of planes in the skies the next couple of years. We're seeing trends toward regional jets, and their use is projected to double by the year 2015.

Additionally, we have exciting new markets for business. Micro, mini, air taxi and fractional ownership of jets. That market is also expected to double in the next decade, and we need to be ready.

Our National Airspace System is complex, and it has many different aspects to it. The list of elements that cause congestion and delay numbers far too many times, and there are far too many of them to name today.

I anticipate and I am hopeful that we will hear a multi-pronged approach to the problem. It's extremely important we have adequate airport and air traffic control infrastructure in place to handle today's traffic and the traffic of tomorrow. We need to explore technology like the ADS-B; and it is important that we continue to design, manage and utilize airspace in the most efficient ways possible.

Again, I want to thank everybody for coming today, knowing that we have a holiday ahead of us; and we appreciate you being here and sharing your ideas with this panel, with this Committee.

We've been joined by the Chairman of the Full Committee, Senator Stevens of Alaska.

STATEMENT OF HON. TED STEVENS,
U.S. SENATOR FROM ALASKA

The CHAIRMAN. I'm delighted to be here with you. I'm here to hear the witnesses.

Senator BURNS. That's very simple. He's never handed it off like that before. Surprising.

We have Director Blakey, FAA. We look forward to your statement, and thank you for coming today.

STATEMENT OF HON. MARION C. BLAKEY, ADMINISTRATOR,
FEDERAL AVIATION ADMINISTRATION

Ms. BLAKEY. Thank you very much, Mr. Chairman and Chairman Stevens. I'm delighted to have the opportunity to testify before you today on what truly is an important and critical issue for us these days.

And Chairman Burns, I have to congratulate you too on the new leadership here. We have been looking forward to working very closely together. We are heading into the toughest part of the year, without question, in terms of aviation. The delays and congestion we worry about are right in front of us, and the summer and convective weather brings it out.

I think it's important too for us to step back a minute. Our drive and determination have also brought us to the very safest point in aviation history.

Our record right now is one fatal accident for every seven million departures. It's really remarkable. And if you look at just in-flight accidents, not things that happen with the baggage car on the tarmac, it improves to one fatal accident for every 11 million departures. So I'm very confident that with the same kind of determination and drive we can address the congestion and delay challenges we have in front of us.

As this Subcommittee is very well aware and, as Chairman Burns just outlined, traffic is back. It's good news for the passengers because as we have low ticket prices and scheduling flexibility is good all around.

Last year 688 million passengers flew. This year we expect the number to go up to around 715 million. But with increased traffic does come delays and congestion.

Last year set a record for delays, some 455,000. I think it's important to note that 70 percent of those were weather related. So while we cannot control severe weather, I think we can work very hard to prepare for it; and we are.

I'm especially proud of our program to reduce vertical separation in the domestic airspace. DRVSM, as it's affectionately known, has provided a tremendous boost since January because it essentially doubles the capacity in the high altitudes, adding six jet lanes above 29,000 feet. This is a huge deal because this procedure essentially permits controllers to separate properly equipped aircraft in the high altitudes so that they are only a thousand feet apart without diminishing safety.

In addition, obviously, the issue of fuel efficiency is huge right now; and we estimate that at this point with current fuel prices, we are talking $5 billion in savings over the next 10 years just for those procedures alone.

We are also using airspace redesign as one of the ways to address the problem. We're using an air traffic concept known as Area Navigation, or RNAV for short; and while the concepts, I think, are a little difficult to envision, what it does for aviation is very clear.

Simply, RNAV is an advance in navigation capability that begins to move us away from the ground-based navigational aids to a system that really is much more efficient. It's not the old system of Federal airways and jet routes that everyone knew. It gives us much greater predictability and precision for both the pilot and the controller.

Now, I want to show you what this means because I'm very excited about this, I'll have to tell you. [refers to a chart.] I think this chart of Atlanta—these are departure routes that we just put in place. Over there before RNAV, you can see how it's all split out; and by the way, you have four departure fixes. Not very efficient for getting them out of a very congested airport.

Take a look at this after RNAV. At this point you're talking about highly precise departure routes, six fixes. You get them out quicker. By the way, it helps from a noise standpoint because these are the optimal routes. It's not all over communities that don't want it.

From the standpoint of fuel efficiency, Delta is at this point estimating a $30 million savings on an annual basis out of Atlanta just

for this. So it's a very big deal, and it's something we are moving with a number of communities to do.

At this point, I think it's important to go to the Required Navigational Performance. You all have heard us talk about RNP before because it also helps us boost efficiency. This is a marriage of onboard navigation technology and GPS satellites. Because it allows crews to fly precisely defined computer routes with unprecedented accuracy; and it's in places where you can't get conventional procedures. I don't have to tell Chairman Stevens how important RNP has been in Alaska. It is a very big deal for us; and it is going to give us also very big savings in places like Kennedy, LaGuardia. We're hoping we will be able to unveil an RNP procedure out here at Reagan before the year's out.

As you'll hear in a moment, the Inspector General recently issued a report on our efforts with airspace redesign. The assessment I think was fair and balanced. The report emphasized that airspace redesign is important to enhance capacity and meet demands for travel, and we agree with this.

Our redesign of national airspace continues to be a critical element in addressing congestion, especially when you don't have the option of putting in a new runway. Unfortunately we have a very few tied-up airports where that's the case.

Our intensive effort also has been to address choke points. We've done that in the busy northeast and Great Lakes corridor where we are already establishing new centers and routes. They have increased the throughput. No question about it, we think this effort has saved airlines over $90 million in reduced delays and fuel.

Now another thing that has just come up, which I'm hearing from the airlines; and I thought this Committee would find important is that the airlines are indicating that they plan this summer to fly full. What this means is that they anticipate full passenger loads; and they will not cancel flights as they did a lot last summer because of convective weather.

They intend to keep to the schedules, flying later and opting to incur delays if need be to reach the destinations. It's good news for the passengers because it means you're not looking at cancellations; but boy, I'll tell you, we can be looking at some real delays.

The lack of cancellations will extend the flying day while aircraft wait out the storms before departing. It puts pressure on the airports and will also require us to put additional staffing in place in the evening hours to accommodate all these later operations. Because I think, as you all know, the National Weather Service is talking about a very rough convective weather season this year. I hope they're wrong, but that's what they're telling us.

So with this new approach by the airlines this summer, we're going to incur greater costs to cover the service that we're going to have to cover; and it's a cost, of course, that hasn't factored into the FAA's budget.

We are making inroads wherever possible to find ways to increase capacity. We commissioned a study of 300 airports in 300 metropolitan areas, looking at the socioeconomic trends, to see what's really coming at us in the future. This FACT study, as we call it, serves as an early warning, if you will, of anticipated aviation demands.

The year 2020 and 2030 sounds like a long way out there, but it's not when we're talking about building runways. Our taskforce found that the capacity investment in making runways is money well spent. If our targets to boost capacity are not met, demand will exceed capacity at 27 of our major airports and metropolitan areas in that timeframe. That's why pavement is one of our major areas of focus.

In the last 2 years we've opened runways at Cleveland, Denver, Miami, Houston, and Orlando. By the end of 2008, we'll have added a runway at Atlanta, and an extension in Philadelphia, both of which are on the top ten list of the airports with the most delays. This is a list that the Inspector General tracks pretty carefully.

Also by the end of 2008, we will have added runways in Minneapolis, Cincinnati, St. Louis, Boston, Charlotte and Seattle. All of these projects represented investment of $4.75 billion. The new runways' improvements already in place have added investments to our economy and will accommodate a million more operations annually.

Even with all these advances, we know that our forecasts show ever-increasing operations in the system. We will have a greater likelihood that delays will get worse before they get better. This is all the more reason why I say with emphasis that the financial health of the Aviation Trust Fund is essential.

Under Secretary Mineta's leadership we have begun a dialogue of how our services are funded. Our Next Generation Air Transportation System, which takes us through the year 2025, is crucial if we're going to be able to handle the continued upward trajectory of traffic. We've got to have the capacity in place to handle it, and I don't think there's any way to get to the Next Generation System and be able to pay for it unless we expect to do that and commit to it.

This body has directed the FAA to function more like a business, and I'm proud to say we are. We're controlling our costs; managing our resources much more efficiently; labor costs are the single-largest cost driver for the agency; and with our upcoming labor negotiations, I've gone on record to state we cannot and will not sign an agreement we cannot afford.

We're consolidating services, such as accounting and personnel. We've just made the largest A–76 award in government history through a private/public competition over the provision of automated flight services. We're going to save the taxpayer $2.2 billion.

So in closing, my message is that in the short term, specifically this summer, we're going to do everything we can to get ready for the traffic and the weather. The big unknown is the long term. We know that the FAA needs a stable, consistent revenue stream in place in order to be able to pay for the capacity enhancements we'll need.

In the interim, you have our firm commitment we're going to be diligent in using the resources we have to provide the world's safest and most efficient aviation system. Thank you.

[The prepared statement of Ms. Blakey follows:]

PREPARED STATEMENT OF HON. MARION C. BLAKEY, ADMINISTRATOR, FEDERAL AVIATION ADMINISTRATION

Good morning Chairman Burns, Senator Rockefeller, and Members of the Subcommittee. Thank you for the opportunity to be here this morning to discuss our plans to ease air traffic congestion this spring and summer. Secretary Mineta and I wish to offer our congratulations to you, Mr. Chairman, on assuming the Chair of this Subcommittee and to extend our good wishes to the new and returning Members of the Subcommittee. But before we discuss capacity and delays, let me address safety. As you know, safety is and will always be the FAA's top priority. Every decision we make is done with the safety of the flying public in mind. The system must be safe, as you know, and we deliver a remarkably safe system. I am pleased to note that over the last three years, the commercial airline fatal accident rate is the lowest in history. That's a tribute to the men and women of the FAA and the industry we support.

The health of our aviation system is critical to our economy, and the good news is that air travel has rebounded. We now project that overall passenger demand and commercial activity at FAA air traffic facilities will return to pre-9/11 traffic levels by the end of this year, reaching about 710 million passengers. Commercial operations at 17 of this country's top 35 airports have already exceeded their pre 9/11 levels, with some airports like Salt Lake City and Fort Lauderdale already showing very high growth, above 11.5 percent and 6.6 percent over pre 9/11 levels respectively.

With approximately 9 percent of our country's Gross Domestic Product tied to aviation, this is a very welcome rebound. However, we need to brace up because with this rebound will come delays, potentially serious ones, as early as this summer, and we need to do all we can to avoid them. That's why today's hearing is both important and timely.

Certainly some aviation markets have fared better than others, and new trends have emerged. Low-cost carriers have increased their market share, while the larger "legacy carriers" have been restructuring and downsizing. Also, regional and commuter carriers have been replacing and supplementing flight routes once dominated by legacy carriers, as well as introducing new services that use longer range regional jets. As a result, we are seeing significant growth in the regional carrier market, and we expect it will continue to grow.

Following 9/11, the agency worked with this Committee and industry stakeholders to prepare for the return of air traffic demand. We developed careful plans and worked to ensure that the agency was better situated to avoid the delay problems of past summers. We will continue the successful innovative steps begun in recent years that have helped to avert a repeat of past delay-riddled summers. To address and alleviate congestion and delays over the short term we will work to implement new procedures, more pavement, and better technology.

Our plan takes into account the myriad of factors—some well beyond our control—that contribute to system delays, including weather, security, airline operations, air traffic control, airports, infrastructure, and equipment. We are confident that this approach will provide effective inroads to manage the surge in traffic that will coincide with the busy summer travel season.

To emphasize the difficulty some of these factors create for the National Airspace System, you may recall that last summer four major hurricanes made landfall in the State of Florida, one of the country's primary tourist and travel destinations, in just a six-week period. Airports and air traffic facilities across the state suffered significant damage, including Southwest Florida in Fort Myers; Orlando International in central Florida—which was hit by three different hurricanes; and the FAA's Pensacola TRACON in the Panhandle. The FAA responded quickly to restore capabilities damaged by the storms. For example, the Pensacola TRACON was nearly destroyed by Hurricane Ivan. The facility was closed on September 15th because of the forecasted winds and storm surge. Employees volunteered to stay behind to monitor the facility condition and begin service restoration after the hurricane passed. However, during the height of the storm, the roof of the Pensacola TRACON was partially torn off. Employees on site quickly unplugged and protected the sensitive ATC equipment from the wind and rain, saving millions of dollars worth of equipment. Through the dedicated work of our employees and the cooperation of several agencies, the Pensacola TRACON was reopened for daylight operations only within two days, and to full ATC operations only 20 days after Ivan's devastation. Additionally, FAA's Airports Organization distributed $25 million from the Emergency Hurricane Supplemental Appropriations Act to 85 airports in Alabama, Florida, Kentucky, Mississippi, North Carolina, Pennsylvania, West Virginia and Puerto Rico in record time, allowing the airports to make repairs and resume operations.

Many of the new procedures we are now using were the result of a first-of-its-kind meeting of industry decision makers and the government, known as "Growth Without Gridlock," which we convened last year. The group agreed to a series of new procedures designed to relieve congestion during the heavy summer travel season. We moved away from the "first come-first served" model of air traffic when demand far exceeds capacity by issuing revised flight plans or rerouting some aircraft away from problem areas, allowing us to maximize utilization of available airspace under adverse conditions.

The most innovative of these new procedures, a concept we call "delay triggering," imposes minor delays on the ground to avert massive delays across the National Airspace System. When delays at an airport are anticipated to reach 90 minutes or more, other airports sending aircraft into the congested area will hold flights until our controllers clear the congestion. Although this may mean brief delays for some flights, it helps prevent the massive delays that can occur system-wide when critical airports become gridlocked. This procedure has been so successful that we have incorporated the philosophy into other areas of managing demand and delays. Most recently, we began using this concept in managing departure delays from Fort Lauderdale. The feedback from our customers has been very positive, and we will continue to apply this procedure during the upcoming convective weather season.

A major accomplishment this year is our implementation of Domestic Reduced Vertical Separation Minimums or DRVSM. This is a tremendous boost to air traffic capacity because it essentially doubles capacity at high altitudes, adding six cruising altitudes or jet lanes above 29,000 feet. The procedure permits controllers to reduce minimum vertical separation at altitudes between 29,000 and 41,000 feet from 2000 feet to 1000 feet for aircraft that are equipped with dual altimeter systems and autopilots. Not only does this double the capacity options for controllers and pilots, but the higher altitude routes are more fuel efficient. We estimate the DRVSM will save airlines approximately $5 billion through 2016, an estimate that will prove to be conservative if fuel prices remain high.

Another major initiative is the expanding implementation of Area Navigation (RNAV) procedures to additional airports. RNAV procedures have been implemented and are performing successfully at Las Vegas, Philadelphia, and Dulles airports. Just last month, 13 RNAV departure procedures went into full operation at Atlanta Hartsfield-Jackson International Airport—the world's busiest airport. These procedures provide flight path guidance incorporated in taxi procedures, with minimal instructions required during departure by air traffic controllers. This significantly reduces routine controller-pilot communications, allowing more time on frequency for pilots and controllers to handle other safety-critical flight activities. Key benefits of the RNAV procedures include more efficient use of airspace, with improved flight profiles, resulting in significant fuel efficiencies to the airlines. RNAV procedures are scheduled for implementation at Dallas-Ft. Worth airport this year as well.

Another technological innovation, known as Required Navigation Procedure or RNP, promises to add to capacity. RNP is on-board technology that allows pilots to fly more direct point-to-point routes reliably and accurately. RNP gives pilots not only lateral guidance, but vertical precision as well, and the system is highly precise and accurate. RNP reaches all domains of flight—departure, en route, and arrival. This not only will allow more efficient airspace management, but also provide savings in fuel costs for the airlines. For example, in January 2005, in partnership with Alaska Airlines, we implemented new RNP approach procedures at Palm Springs International Airport, which is located in very mountainous terrain. Under the previous conventional procedures, planes could not land unless the ceiling was at least 2,300 feet. With the new RNP procedures, approved air carriers can now operate to a ceiling of 684 feet, which allows much better access during bad weather. Additionally, RNP has enabled aircraft to cut significant mileage out of their flight path into Palm Springs—nearly 30 miles—which translates into substantial fuel savings for operators. The U.S. is leading the world in RNP, by issuing the first set of criteria and standards in this area in the very near future. Boeing and Airbus support RNP, and our standards are being embraced in Europe, Asia and South America, and by our neighbors to the north in Canada.

In addition, we improved communication among the system users and the FAA. Airlines agreed to improve their input to the FAA's flight schedule monitor system using new software so that it will more accurately reflect the latest airline schedule plans. This move minimizes unused airport capacity when flights are rescheduled or cancelled. Also, airlines are encouraged to file flight plans earlier, allowing for more time to address potential congestion problems. In addition, our relationship with the air carriers who participate in our daily conference calls is genuinely cooperative, reflecting our common understanding that we all have a stake in the process. The conference calls—scheduled every 2 hours during the busiest portion of the

day—also provide an opportunity for feedback. Customers let us know if they believe they were disadvantaged by a prior day's delay reduction measures or offer ideas on how we can all improve the system. We all know that continued cooperation is essential to the success of our spring and summer airspace management plans. Delays are bad for business, regardless of whether you are a large, legacy carrier, a low-cost carrier or a regional airline.

I'd like to take a moment to recognize this Committee's role in addressing system capacity constraints. With the passage of *Vision 100—Century of Aviation Reauthorization Act,* you provided the FAA and DOT with additional tools to address unexpected challenges that threaten to reduce capacity or cause delay at critical chokepoints. We must be ready to react to situations when they unfold. For example, the authority provided by *Vision 100* enabled us to take initial action last year at Chicago O'Hare International Airport to address over-scheduling by air carriers and the resultant excessive delays that affected the entire National Airspace System.

As you know, two major carriers, American Airlines and United Airlines, have hubs at O'Hare. The competition for market share is compounded by the obvious physical limitation on the number of planes that can take off and land during any time period. Moreover, it has been well demonstrated over the years that delays at O'Hare have the potential to cause delays at as many as 40 other airports nationwide. Consequently, managing delays at O'Hare is essential to the effective management of air traffic nationally. In November 2003, major delays began occurring as a result of steady increases in flights, as O'Hare's slot rules phased out, and a shift by American Airlines of flights from St. Louis to O'Hare. *Vision 100* enabled us to take action.

Early last year, Secretary Mineta and I asked United and American to make a voluntary 5 percent schedule reduction during peak travel times. This voluntary reduction took effect March 4, 2004. American and United further agreed to reduce their overall peak-hour schedules by another 2.5 percent by June 10, 2004. This voluntary agreement was extended through last summer, as negotiations between the FAA and all airlines serving O'Hare continued in an effort to craft a more comprehensive plan to reduce flight delays, and one which treated all air carriers serving O'Hare fairly. Eventually, in August 2004, a voluntary agreement for schedule reductions during peak hours was reached involving all airlines currently serving O'Hare, and which allowed some leeway for new entrant carriers as well. This agreement took effect in November, and in March 2005 was extended through October 29, 2005. At the same time we extended the agreement, we also published a Notice of Proposed Rulemaking (NPRM) which proposes options to address congestion at O'Hare for the next three years. By that time, if approved by FAA, O'Hare's proposed Modernization Project or a reasonable alternative to that project could provide additional airport capacity.

Since the voluntary agreement took effect last November, O'Hare's on-time arrival performance has improved by more than 10 percent, and overall delay minutes from November through this past February have been cut by 22 percent, as compared to the previous year. We estimate that maintaining limits on the number of arrivals through April 2008 will result in a reduction in delays at O'Hare, and save airlines and passengers over $700 million lost through delays as compared to November 2003. As noted above, the proposed rule is timed to expire as airport capacity improvements are expected to take hold. Under the terms of the NPRM, we will review every six months the level and length of delays and other operating conditions, to determine if the airport can accommodate more arrivals. If additional capacity becomes available while the rule is in effect, we propose a method to assign the additional capacity to air carriers interested in initiating or expanding service at O'Hare.

We partner with airports to address capacity and delay concerns and we support implementation of solutions with funding from the Airport Improvement Program (AIP). By the end of 2008, eight new runway projects are scheduled for commissioning. These include new runways at: Minneapolis-St. Paul; Cincinnati; St. Louis; Atlanta; Boston; Charlotte; and Seattle, and a runway extension at Philadelphia. Beyond 2008, we are working with other airports to increase capacity. We recently announced our final Record of Decision for Los Angeles, which will permit the airfield reconfiguration project to go forward. We continue to maintain and monitor the schedule for the Environmental Impact Statement at Chicago as well. We are also working closely with Fort Lauderdale on a major runway extension, and three major metropolitan areas Chicago, Las Vegas, and San Diego who are considering the need for new airports. We are supporting, through AIP funding, the preparation of regional studies in the New York Metropolitan area and the LA Basin.

While new runway construction typically provides the largest increase in capacity, there are new technologies and procedural improvements, such as Traffic Manage-

ment Advisor (TMA) and Precision Runway Monitor (PRM), which add capacity, as well. TMA is a tool that assists the air traffic controller to sequence and schedule aircraft to the runway to maximize airport and terminal airspace capacity without compromising safety. PRM approaches have been implemented at San Francisco, Philadelphia, Cleveland and Minneapolis-St. Paul, and are planned for Atlanta and St. Louis. PRM allows air traffic controllers to run simultaneous operations on closely spaced parallel runways. It should be noted that increases in capacity from new runway construction often cannot be fully realized unless implemented along with new procedures and technology.

As with other networks that experience peak period demand surges, congestion management, such as congestion pricing, could be an option at a small number of airports where demand may come to exceed capacity in the short term, pending capacity expansion, or in the long term if capacity expansion is not a practical option.

In FY 2004, the FAA completed a study analyzing system capacity, taking into account the socio-economic and demographic trends expected to occur in the United States through 2020. This study expanded the focus of the 35 OEP airports and evaluated nearly 300 commercial service airports nationwide. This study identified airports and metropolitan areas expected to have significant growth in population and/or income that could result in an increase in the demand for air transportation that may not have been previously anticipated. The study identified the airports that need additional capacity and any constraints to enhancing capacity. Without capacity improvements at airports in these areas, this demand may go unsatisfied. In FY 2005, the FAA will complete a second phase of this study that will take a more detailed look at the non-OEP airports and will begin to identify possible solutions to increase long-term capacity

We must also make sure we are using the best technology to maintain a safe and efficient air traffic system. One example of this is the Wide Area Augmentation System, known as WAAS. WAAS is a precise navigation system that enhances the satellite signals from the Global Positioning System (GPS) to provide the accuracy and reliability necessary for pilots to rely on GPS during flight. Because the system is satellite-based, WAAS procedures cost a lot less to implement and maintain than traditional ground-based navigation systems. WAAS makes more airspace usable to pilots, provides more direct en route paths, and provides new precision approach services to runway ends. The implementation of WAAS into the NAS will result in safety and capacity improvements. Since WAAS became operational in July 2003, the FAA has developed 3,000 WAAS approaches. This is a significant accomplishment in modernizing how we use our airspace, and one which will have a lasting, positive effect on capacity.

In the longer term, however, we know that these short and mid-term efforts will simply not be enough. The recent FAA aviation forecast provides further evidence that our current system, already coming under stress in some areas, will be stretched to its limit as future demands continue to grow. Passenger totals are expected to exceed one billion by 2015, and we project up to a tripling of passengers, operations and cargo by the year 2025. As Secretary Mineta said in a speech before the Aero Club in January 2004: "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."

Our overarching goal in the Next Generation initiative is to develop a system that will be flexible enough to accommodate very light jets and large commercial aircraft, manned or unmanned air vehicles, small airports and large, business and vacation travelers alike, and to handle up to three times the number of operations that the current system does with no diminution in safety, security and efficiency. At the same time, the system would minimize the impact of aviation on the environment.

However, the move to a modern, efficient and technology-driven aviation system is going to require sustained, long term investments. The problem we face is that the status of the Aviation Trust Fund, which supports these investments, is inextricably tied to the fortunes of the aviation industry. Policy makers need to know that there is a gap that exists between our revenue and expenses, and this gap is quickly eroding the Trust Fund. The FAA needs a stable source of funding that is based both on our costs and the services we provide so that we can meet our mission in an extremely dynamic business environment. Tying fees to the cost of providing service protects both FAA and the customers who use FAA services by not subjecting our ability to provide a critical level of service to unrelated factors like ticket prices. A stable, cost-based revenue stream can also ensure funding for long-term capital needs. We also believe that a cost-based revenue structure would provide incentives to our customers to use resources efficiently and to the FAA to operate more efficiently, as stakeholder involvement can help us ensure that we are concentrating on services that the customer wants and is willing to pay for.

Mr. Chairman, with a comprehensive plan in place, cooperative initiatives underway, and thanks to the tools provided to us by this Committee, we are ready for the spring and summer travel season. This completes my statement. I will be happy to answer your questions at this time.

Senator BURNS. Thank you very much. The Honorable Kenneth Mead, Inspector General, United States Department of Transportation.

STATEMENT OF HON. KENNETH M. MEAD, INSPECTOR GENERAL, DEPARTMENT OF TRANSPORTATION

Mr. MEAD. Thank you, Mr. Chairman, Chairman Stevens, and Senator Nelson. On May 18 of last year, this Committee had a hearing on the same subject; and it's timely as we approach the unofficial start of summer this weekend. In 2004 the number of passengers on planes were nearly 700 million, just short of 2000 levels; and flight operations this past April were 4 percent greater than in April of 2000. One factor stimulating growth is the decline in airfares.

Last month the average fare on a thousand-mile flight was $118. In 2000 the fare on that same flight was $147. A major exception to the rebounding traffic levels is in the area of small communities and cities with non-hub airports like Missoula, Texarkana, and Charleston. Scheduled flights to these airports this coming July are down 21 percent from July of 2000. Congestion-related delays are also coming back. In the first quarter of this year, delays affected more than one in every four flights and in some airports, one in every three flights.

Last year delays affected 22 percent of all flights. Delays this year are averaging about 52 minutes a flight, last year it was 49 minutes. This summer you can expect delays to get worse. In addition, as Administrator Blakey pointed out, there's the inevitable, but unpredictable, summer storms that can compound delays.

The airports to watch this summer include Philadelphia, Washington-Dulles, New York-Kennedy, Newark, Fort Lauderdale, New York-LaGuardia, and Atlanta. All these airports are currently experiencing delays, and traffic at most of them is projected to grow substantially this summer.

Now, you'll note that Chicago-O'Hare was not on my list. O'Hare went from the worst airport last year to number 14 this year. The delay rate went from 37 percent in 2004 to 27 percent this year. The improvement is at least, in part, due to the Department's interventions three times this past year.

Here's another interesting factoid: Only five of the fifteen most delayed airports are among the Nation's fifteen busiest airports. And based on the lessons we learned this past Christmas season when one airline's understaffing, weather problems and traffic volume nearly tripled traffic in Philadelphia, to say nothing of the luggage problems, it's imperative that FAA, airports and the airlines are ready for what I think is shaping up to be the busiest summer travel season in 6 years.

Several factors are driving delays. These factors change a bit from year to year, but here's what it appears to be for this summer:

Low-cost carrier growth, especially in markets that have historically been legacy carrier strongholds. This is driving down fares, stimulating demand, and sparking scheduling battles.

Another factor is legacy carrier hub downsizing. For example, US Airways downsized its Pittsburgh hub and shifted operations to hubs in Philly, Charlotte and Fort Lauderdale. At those airports delays increased by more than 60 percent. Another factor, Administrator Blakey pointed out, is traffic growth by smaller jet aircraft. It is really driving congestion as network carriers continue to shift service to regional jets. Benchmark back to 2000 when regional jets accounted for about 10 percent of flights. Now it's about 32 percent.

Also general aviation jet traffic is growing. Beyond this summer, congestion's likely to grow as low-cost carriers continue to expand. We also expect international cargo and international passenger flights to pick up as well.

More affordable microjets. That's a price tag of $1 million, compared to about $4 million for a business jet today. They may come online as early as next spring and will pose challenges to air traffic control. This is because microjets are likely to operate in the same airspace as the larger jets.

Since the gridlocked summer of 2000, FAA has taken actions to improve the flow of air traffic. These include putting administrative controls in place at O'Hare, improving communications between airlines and FAA's Command Center, and relying on new procedures to better manage effects of bad weather. Also, this past January FAA reduced vertical separation for aircraft traveling at high altitudes, in effect, creating more highways in the sky.

Moreover, seven new runways have come online since 1999. So without question, things would be much worse if these things had not been done. I'd like to highlight five key actions. I think they're important for both the short and long term.

First, keeping new runway projects on schedule. There are projects in Minneapolis, Cincinnati, St. Louis, Atlanta, Boston, Philadelphia, Charlotte and Seattle. Only three of those fifteen, though, are among the fifteen most congested airports. Those airports are Atlanta, Boston, and Philadelphia. All three are expected to complete new runway projects within the next two to 3 years.

This year, we are facing a key decision point on Chicago O'Hare's Runway Expansion and Modernization Program. This decision point focuses on the environmental impact statement.

A second factor that I think FAA needs to move on is taking steps to materially improve its management of Airspace Redesign projects. Sometimes you can complete a runway project; but if you don't make changes in the airspace, you're not going to yield the benefits of the runway. And I know Administrator Blakey alluded to that. I think they're committed to making a good number of changes that we recommended there.

A third factor is addressing the wave of controller retirements. Over the next 10 years, three-quarters of the controller workforce is planning—will be eligible to retire. FAA has published a plan, and later this year they need to come out with numbers by facility. There's over 300 of them in the country.

The fourth factor focuses on getting a handle on exactly what FAA's new office for developing a Next Generation Air Traffic Sys-

tem can do in 5 and 10 year benchmarks. The 2025 timeframe is just not that meaningful. It's difficult for people to relate to 25 years from now, and that is why I think we need benchmarks in 5 and 10 year intervals.

Also, the current air traffic system was designed to handle a much lower level of traffic than we have today. It's largely based on a paradigm of ground based systems and procedures that hasn't changed appreciably in the last three decades. So I'm hoping that this year FAA will be able to articulate what new capabilities it needs, when they need them, and what the financing requirements will be for them.

Finally, in the short term we are facing decision points at two airports, O'Hare and LaGuardia. I mentioned the runway decision for September, but administratively imposed flight caps are in place now at O'Hare. They're set to expire this November, and FAA is considering whether or not to extend them for another 3 years until the runway is built.

At LaGuardia slot restrictions imposed under the High Density Rule are in place. They are due to expire, I believe, in January 2007. New construction's not an option at LaGuardia. FAA will have to do something at LaGuardia.

Market-based solutions may offer some relief, but the devil's going to be in the details if we move to market-based solutions. Some of those details will be how to value capacity, how to price it, small community access, and of course, who's going to get the money. That concludes my statement.

[The prepared statement of Mr. Mead follows:]

PREPARED STATEMENT OF HON. KENNETH M. MEAD, INSPECTOR GENERAL, DEPARTMENT OF TRANSPORTATION

Mr. Chairman and Members of the Subcommittee,

Thank you for inviting us to testify today. As we venture into the summer months—historically the peak air travel time—congestion and delays are on the forefront of concern. In many markets, traffic and delays are back at a rate as severe as 2000, when travel disruptions were at their peak. And in some markets they are worse. Today I want to describe the scenario—what we've seen recently, and where we're likely to be this summer, what is driving the delays, and what FAA must do to address congestion in both the short- and long-term.

Traffic Levels Are Growing as Are the Number, Rate, and Length of Delays in Key Markets

Both enplanements and operations are back to or greater than 2000 levels, when air travel was at its peak. Enplanements in 2004 were 698.7 million, just about 250,000 short of 2000 enplanements. Flight operations in April 2005 actually exceeded April 2000 operations by 4 percent.

One of the factors stimulating traffic growth is the continued decline in average airfares. In April 2000, the average one-way airfare on a 1,000-mile flight was $147—this past April the fare was down 20 percent to $118. The one exception to rebounding traffic levels is in the area of small communities. In cities with non-hub airports like Missoula, Montana; Texarkana, Arkansas; Yuma, Arizona; and Charleston, West Virginia, scheduled flights in July 2005 to large, medium, small, and other non-hub airports are down 21 percent and seats are down 12 percent from July 2000.[1] Service levels remain depressed despite a doubling in recent years in Essential Air Service funds, and a near 50 percent increase in the number of subsidized cities.

As traffic has increased, so have delays. In the first quarter of 2005, arrival delays were up 17 percent over the first quarter of 2004, and affected more than 25 percent of all flights. The average length of delay is also rising, with first quarter 2005

[1] Includes all domestic and international flights.

delays averaging 52.3 minutes compared to 48.5 minutes in the same period in 2000. During the first quarter of 2005, more than one-third of all arrivals were delayed at five airports, including LaGuardia, Philadelphia, and Newark. We note that the most delayed airports are not necessarily the busiest airports. In fact, of the 15 *highest-volume* airports during the first quarter of 2005, only 5 are among the top 15 *most delayed* airports.

Overall, we expect the traffic and delay growth to continue, especially in those markets where we are already experiencing problems. Total operations are continuing to increase, and summer storms are notorious for adding delays in Southeast and Northeast markets like Atlanta and New York which are already suffering from capacity-related delays.

Outlook for This Summer and Beyond: Six Airports to Watch

Airports to watch this summer include *Philadelphia, LaGuardia, Newark, Washington-Dulles, Atlanta,* and *Fort Lauderdale.* All have some or all of the following characteristics: significant delays last summer, in most cases exceeding summer 2000 delays; substantial projected traffic growth this summer; or consistently elevated delay rates sustained over the past year or longer. On a cautionary note, we learned a hard lesson last December when weather problems and traffic volume in a handful of cities bumped up against the pared-down operations of one network carrier. Many network carriers have been trimming operations to lower costs and improve their financial conditions. With traffic expected to grow this summer, the airlines—as well as FAA and the airports—need to ensure that staff and resources are commensurate with the level of scheduled operations.

On a positive note, delays appear to be improving at Chicago-O'Hare, an airport which has been plagued by congestion for more than 30 years, despite regulatory intervention. We expect the improvement to continue through the summer months. O'Hare ranked fourteenth in delays during the first quarter of 2005 in contrast to its rank of first in the same period in 2004. The improvement appears to be, at least in part, a result of the Department's administrative actions in 2004 to cap hourly operations at O'Hare at a level consistent with available capacity. The controls on landing slots and schedules have temporarily brought some short-term relief, but in the long run, controls do not accommodate demand and can stifle competition.

Causes of Delay Growth Include Significant Low-Cost Carrier Expansion, Down-Sizing of Network Carrier Hubs and Subsequent Transfer of Service to Alternative Hubs, and Continued Growth in Regional Jet Operations

Incursion of Low-cost Carriers into Legacy Hubs Spurs Traffic and Congestion Growth. Low-cost carriers are now challenging legacy carriers in their hubs in most large- and medium-sized markets, increasing traffic and contributing to delays. For example, the increasing presence of JetBlue and other low-cost carriers at New York-JFK are causing delays in an airport that has been operating at under-capacity since traffic dropped off in late 2000. During the first quarter of 2005, low-cost carrier traffic increased more than five-fold while other traffic[2] was down by 34 percent from the first quarter of 2000. During this same period, delays at JFK were 34.5 percent higher than during the same period in 2000 and represented an increase of more than 52 percent over the first quarter of 2004. Likewise, following the start-up of new low-cost carrier Independence Air at Washington-Dulles, traffic levels there increased by 79 percent and delays more than doubled.

New market entry by low-cost carriers can have dramatic effects on the average fares in those markets, often stimulating demand and driving additional service frequencies. For example, when Southwest began service between Philadelphia and Providence in 2004, the average one-way fare dropped from $328 to $54 and the number of passengers in the quarter following Southwest's market entry (third quarter 2004) increased from fewer than 10,000 to more than 100,000.

Displaced Traffic from Down-sized Legacy Carrier Hubs Contributes to Congestion Growth in Other Hubs. In an effort to reduce costs and improve efficiency, several mainline carriers have closed hub operations at some airports and transferred operations into remaining hubs. For example, US Airways downsized its Pittsburgh hub operations by 3,800 flights in the fourth quarter of 2004 and shifted mainline aircraft and operations to its hubs in Philadelphia, Charlotte, and Fort Lauderdale. While delays in Pittsburgh were down minimally in the first quarter of 2005 from the first quarter of 2004, delays increased in each of the other three hubs by more than 60 percent.

---

[2]Domestic and international operations by U.S. flag carriers, international operations by foreign flag carriers, and charter service.

Increased Regional Jet Operations and Rebounding Jet-powered General Aviation Traffic Are Increasing Demands on High-Altitude Airspace and Airport Runways. Network carriers continue to shift service to regional jet aircraft. In July 2000, scheduled flights aboard regional jets accounted for 10 percent of all flights. In July 2005, they will account for 32 percent of all flights. Unlike their turbo-prop driven predecessors, regional jets occupy the same airspace and require access to the same runways as larger jet aircraft.

While the rest of the industry has shown signs of recovery, general aviation (GA) operations as a whole have continued to decline and remain 12.4 percent below 2000 levels. However, within the GA market, one sector—jet aircraft activity—is improving. Flight hours logged by GA jets in 2004 were up 6.2 percent over 2000 levels.

Future Drivers of Congestion Will Include Continued Low-Cost Carrier Growth, Increased International Operations, and Expanding Jet-powered General Aviation Traffic

Continued growth of low-cost carrier networks in hubs formerly dominated by legacy carriers will increase demand on airport and air traffic control operations.

International traffic, which has lagged behind domestic rebounding traffic, is once again picking up. In the summer 2005, scheduled international passenger and cargo operations are projected to exceed summer 2000 levels by 16 percent and 12 percent, respectively.

One of the new challenges that we are likely to encounter within the next year is operations by a new class of aircraft called Very Light Jets (VLJs) or microjets, which are scheduled to enter the market as early as March 2006. Priced as low as $1 million per aircraft, microjets may be more attractive to the business travel market than the currently available comparable aircraft priced at about $6 million. Microjet manufacturers anticipate that these twin-engine, 4–6 passenger jets, will find a niche among a variety of corporate and private owners as well as on-demand air taxi service. While supporters believe that microjets have the potential to redefine business travel, others are more conservative about how quickly, where, and to what extent the market will materialize.

FAA Has Made Progress in Managing and Enhancing Capacity but Additional Actions Need To Be Taken To Meet the Demand for Air Travel in the Short- and Long-Term

Since the Summer of 2000, FAA has taken a range of actions that have improved the flow of air travel. These include putting administrative controls in place at Chicago O'Hare, improved communications between airlines and FAA's Command Center, and procedural changes to help manage the affects of bad weather. Moreover, a number of new runways have come on-line. Most recently in January 2005, FAA reduced vertical separation for aircraft traveling at high altitudes (between 29,000 and 41,000 feet) to enhance the flow of air travel.

Without question, congestion and delays would be much worse this summer without these actions, particularly the administrative controls at Chicago O'Hare and the commissioning of new runways. However, the anticipated demand for air travel highlights the need for additional actions in both the short- and long-term.

Keeping new runway projects on schedule, including projects at Minneapolis, Cincinnati, St. Louis, Atlanta, Boston, Philadelphia, Charlotte, and Seattle Airports, is important because FAA reports that new runways provide the largest increases in capacity. We note that of the 15 most congested airports (in terms of percent of operations delayed in the first quarter of 2005), only 3 airports (Atlanta, Boston, and Philadelphia) are expected to complete new runway projects within the next 2 to 3 years.

Getting FAA's airspace redesign efforts on track is critical to enhance capacity. Earlier this month, we issued a report on FAA's airspace redesign efforts and found that cost and schedules for projects are not reliable, projects are delayed 3 years or more, and airspace redesign efforts are not effectively coordinated among FAA organizations. We made recommendations aimed at strengthening and speeding the transition from project planning to implementation by establishing cost and schedule controls for airspace projects, prioritizing efforts, and linking airspace projects to agency budgets.

Addressing the pending wave of controller retirements will be a challenge. Over the next 10 years, FAA estimates that approximately 73 percent of the organization's 15,000 controllers will become eligible to retire. This past December, FAA issued the first in a series of reports outlining how the problem will be addressed. While a good first step, the plan does not discuss cost nor hiring and staffing needs by location. This information is critical because FAA has over 300 air traffic control facilities, and many (like Chicago O'Hare) have the potential to impact the entire

National Airspace System. Without accurate facility-level planning, FAA runs the risk of placing too many or too few controllers at key locations and could waste a one-time opportunity to address longstanding concerns about controller staffing imbalances. FAA must also be cognizant that a much higher percentage of its controller workforce will be trainees. FAA will need to continually monitor the training results from individual facilities to ensure that the significant increase in trainees does not adversely impact efficiency or safety.

Setting expectations for FAA's new Joint Planning and Development Office is critical. This office was mandated by Congress to develop a vision for the next generation air traffic management system in the 2025 timeframe. There are a number of reasons why this effort is important, including the forecasted demand in air travel and the factors (i.e., microjets) that may drive increased operations. It is also important because much of FAA's current capital account focuses on keeping things running (i.e., infrastructure sustainment), not new initiatives. FAA reports that the current air traffic control system (or "business as usual") will not be sufficient to accommodate future growth in traffic or the changes facing the aviation community. Key issues focus on what new systems are needed and how new systems, capabilities, procedures, and changes in airspace management can transform the way air traffic services are provided. FAA needs to determine what the new office can do in 5- and 10-year intervals and establish corresponding funding requirements.

In the immediate term, there are two airports—Chicago-O'Hare and New York-LaGuardia—where traffic, if unchecked, is likely to overtax available capacity. Slot restrictions were in place in both airports through 2002, when O'Hare's were lifted. At LaGuardia, slot controls were lifted in 2002 and then reinstated when delays became unmanageable. At O'Hare, the Administration has imposed administrative controls to cap the number of hourly flights at a level consistent with the airport's capacity. The Department has a rulemaking underway that would extend these caps for 3 years until planned runway projects can add capacity.

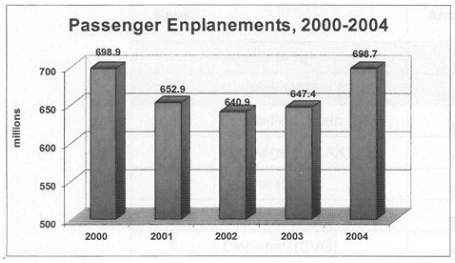
At LaGuardia, however, new construction is not a viable option because of land constraints. At LaGuardia, and potentially other airports where delays may return to a crisis level faster than capacity can be added, market-based solutions may offer some temporary, or even permanent, relief. Market-based solutions such as congestion pricing or slot auctions may allocate scarce capacity without distorting the market, but they entail difficult policy decisions such as how to value capacity, what the appropriate price is for the respective users, who should determine the price, who collects the revenues, and how the revenues should be used.

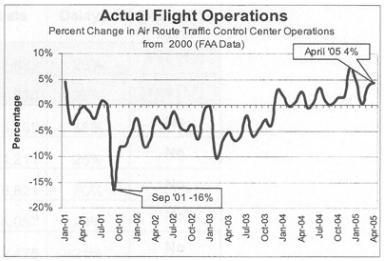
Mr. Chairman, this concludes my formal statement. An attachment to this statement includes charts, graphs, tables and other data that further illustrate the issues I have highlighted today. I would be happy to answer any questions.

ATTACHMENT

Traffic Growth In Key Markets Is Driving Delays and Congestion While Smaller Communities Continue To Experience Depressed Service Levels

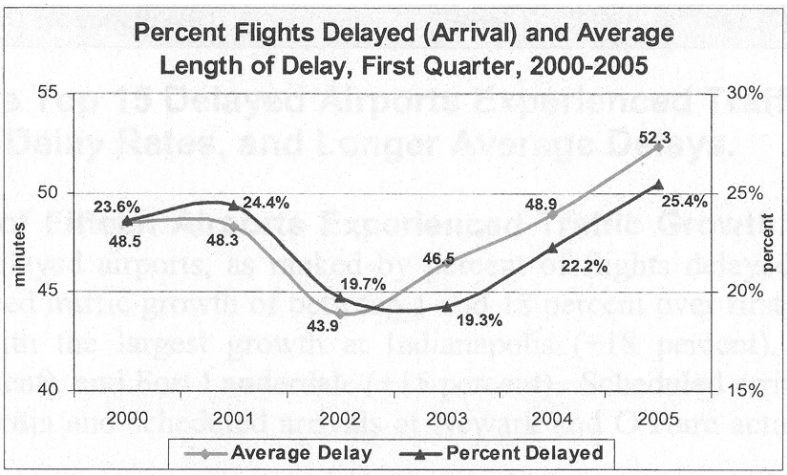
Both enplanements and operations are back to or at even greater levels than 2000, when air travel was at its peak. Enplanements in 2004 were 698.7 million, just about 250,000 short of 2000 enplanements. Flight operations in April 2005 actually exceeded April 2000 operations by 4 percent.





Traffic growth has led to a resurgence in congestion and delays. Systemwide arrival delays in the first quarter of 2005 were up 17 percent over the first quarter of 2004, affecting more than 25 percent of all flights. The number and percentage of delays in the first quarter of 2005 were also greater than the number of delays in the first quarter of 2000, generally considered to be the hallmark of poor on-time performance. The average length of delay is also rising, with first quarter 2005

delays averaging 52.3 minutes compared to 48.5 minutes in the same period in 2000.



The increased rate of flight delays for the first quarter of 2005 was concentrated in airports in the Northeast and Florida. We note that the most delayed airports are not necessarily the busiest airports. In fact, of the 15 highest-volume airports during the first quarter of 2005, only 5 are among the top 15 most delayed airports. The following table identifies the Top 15 highest-volume airports as ranked by scheduled arrivals and their delay profiles.

Delay Profiles at 15 Highest-Volume Airports: First Quarter of 2005				
Volume Rank	Airport	Scheduled Arrivals	Percent Delayed	Top 15 Delayed?/ Rank
1	Atlanta (ATL)	117,862	28%	Yes (11)
2	Chicago-O'Hare (ORD)	114,870	27%	Yes (14)
3	Dallas-Fort Worth (DFW)	85,505	18%	No
4	Los Angeles (LAX)	74,211	25%	No
5	Denver (DIA)	65,821	20%	No
6	Houston Int'l (IAH)	64,057	20%	No
7	Cincinnati (CVG)	62,475	21%	No
8	Minneapolis (MSP)	61,864	22%	No
9	Washington-Dulles (IAD)	61,270	25%	No
10	Detroit (DET)	61,265	24%	No
11	Phoenix (PHX)	60,309	25%	No
12	Philadelphia (PHL)	60,291	33%	Yes (4)
13	Charlotte (CLT)	57,929	23%	No
14	Las Vegas (LAS)	50,518	27%	Yes (15)
15	Newark (EWR)	49,399	33%	Yes (5)

Most of the Top 15 Delayed Airports Experienced Traffic Growth, Increased Delay Rates, and Longer Average Delays.

Twelve of Fifteen Airports Experienced Traffic Growth. Among the top 15 delayed airports, as ranked by percent of flights delayed, 12 airports experienced traffic growth of between 1 and 18 percent over first quarter 2004 levels, with the largest growth at Indianapolis (+18 percent), Philadelphia (+16 percent), and Fort Lauderdale (+15 percent). Scheduled arrivals were flat at LaGuardia and scheduled arrivals at Newark and O'Hare actually declined by 2 percent and 3 percent, respectively. Both O'Hare and LaGuardia are operating under administratively-imposed traffic caps.

Fourteen of Fifteen Airports Experienced Growth in Delay Rates. The percent of flights delayed increased over first quarter 2004 levels in all of the top 15 delayed airports except O'Hare, most notably at Fort Lauderdale (+11.3 percentage points), LaGuardia (+11.2 percentage points), and Philadelphia (+9.6 percentage points). The percentage of flights delayed at O'Hare actually decreased by nearly 10 percentage points from this period.

Fourteen of Fifteen Airports Experienced Increased Average Lengths of Delay. In the first quarter of 2005, the average length of delay increased over the first quarter of 2004 at 14 of the 15 airports, with the greatest increases at Fort Lauderdale (47 to 57 minutes), Philadelphia (50 to 60 minutes), and Atlanta (52 to 61 minutes). The average length of delay at O'Hare was 62 minutes, which was more than a 2 minute decrease from the average 65 minute delay experienced during the first quarter of 2004.

The following table identifies the 15 most delayed airports and their net growth in traffic, percent of flights delayed, and change in average length of delays. Chicago-O'Hare is highlighted because it is the only airport on the list that improved in the first quarter 2005 over the first quarter of 2004.

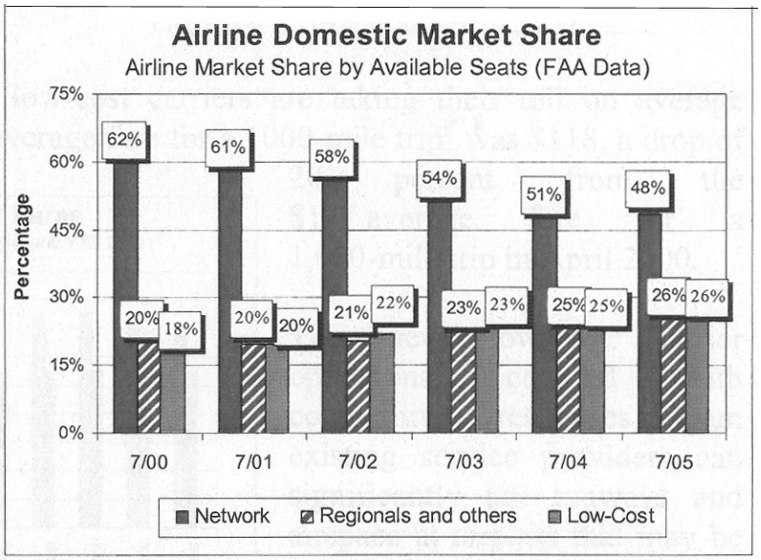
Top 15 Delayed Airports – First Quarter 2005 vs. First Quarter 2004, by Percent Delayed *(Columns may not total due to rounding)*

1Q05 Rank	Airport	Arrivals	% Delay	Average Minutes	1Q04 Rank	Arrivals	% Delay	Average Minutes	Change Arrivals	Percentage Point Change	Change Minutes
1	West Palm Beach	13,354	40.0%	51	2	13,171	35.3%	47	1%	4.7%	4
2	Fort Lauderdale	32,502	37.8%	57	3	28,287	26.5%	47	15%	11.3%	10
3	NY-LaGuardia	47,642	35.5%	59	8	47,738	24.3%	51	0%	11.2%	8
4	Philadelphia	60,291	33.3%	60	10	52,135	23.7%	50	16%	9.6%	10
5	Newark	49,399	33.3%	61	4	50,611	26.4%	53	-2%	6.9%	7
6	NY-JFK	37,783	30.4%	56	12	33,078	22.8%	51	14%	7.6%	5
7	Louisville	17,776	29.3%	43	7	17,369	25.4%	42	2%	3.9%	1
8	Burbank	9,658	28.7%	45	13	9,182	21.5%	43	5%	7.2%	1
9	Dayton	9,977	28.1%	52	6	9,780	25.6%	49	2%	2.5%	3
10	Boston	42,996	27.8%	52	15	41,977	19.9%	47	2%	7.9%	5
11	Atlanta	117,862	27.7%	61	5	116,842	25.9%	52	1%	1.8%	9
12	Tampa	29,283	27.5%	51	14	25,745	20.2%	44	14%	7.3%	7
13	Indianapolis	24,420	27.3%	49	9	20,741	24.2%	46	18%	3.1%	3
14	*Chicago-O'Hare*	*114,870*	*27.2%*	*62*	*1*	*118,276*	*36.9%*	*65*	*-3%*	*-9.7%*	*(2)*
15	Las Vegas	50,518	26.9%	53	11	47,144	23.3%	50	7%	3.6%	3

Of the top 15 delayed airports, the only airport to improve over the first quarter of 2004 was O'Hare. For the first quarter 2005, O'Hare ranked fourteenth in percent of delayed arrivals (27 percent), a sea-change from its ranking of first in the same period in 2004, when 37 percent of flights arrived late. This improvement, at least in part, can be attributed to the Administration's interventions with the carriers serving O'Hare. In 2004, the Department intervened on three separate occasions to negotiate and/or impose schedule reductions to cap operations at a level consistent with O'Hare's available capacity. The first intervention in March 2004 resulted in a 5 percent reduction in schedules by United and American. The second intervention in June 2004 reduced schedules another 2.5 percent. The third and final intervention in November 2004 capped scheduled peak-hour departures at 88 combined among all carriers. Congestion in the Chicago area was also mitigated after bankrupt ATA Airlines reduced operations out of Chicago-Midway Airport by 19 percent.

Growth in Low-Cost Carriers, Hub Consolidation, and Regional Jet Growth Drive Congestion

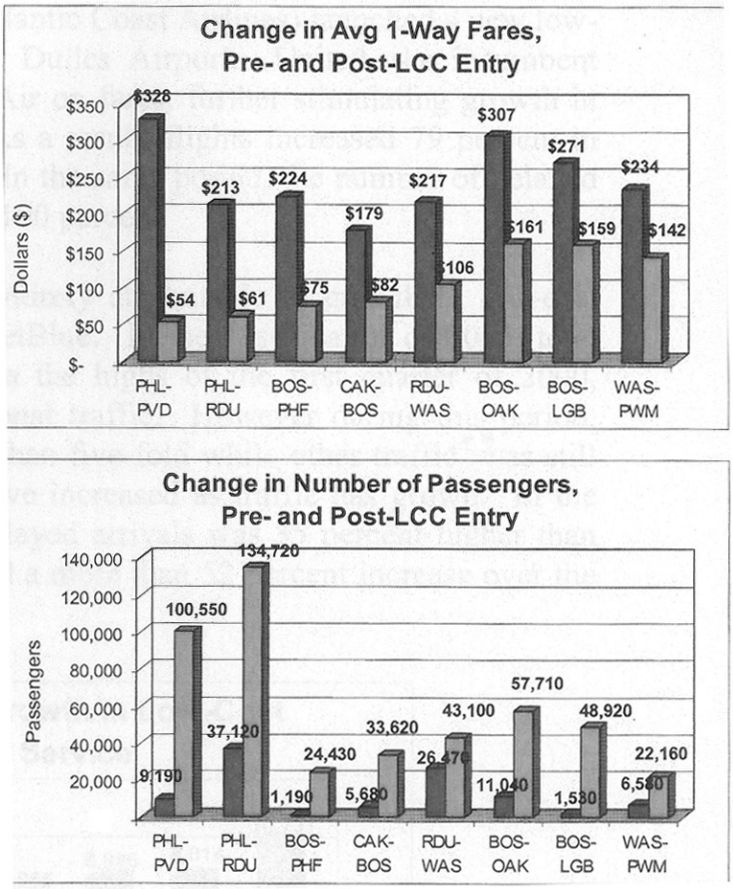
Incursion of Low-Cost Carriers into Legacy Hubs Spurs Traffic and Congestion Growth. Low cost carriers (LCCs), which once opted to operate at alternative but more affordable secondary airports, are now challenging legacy carriers in their hubs in most large and medium-sized markets. Based on July 2005 scheduled flights, low-cost carriers will account for 26 percent of all departures, compared to 18 percent in 2000. The share of service provided by network carriers and their regional affiliates has likewise declined from 82 percent in July 2000 to 74 percent in July 2005.



The entry of new low-cost carrier service can have dramatic effects on the average fares on those markets as all carriers are pressured to reduce fares to levels competitive with the new low-cost service.

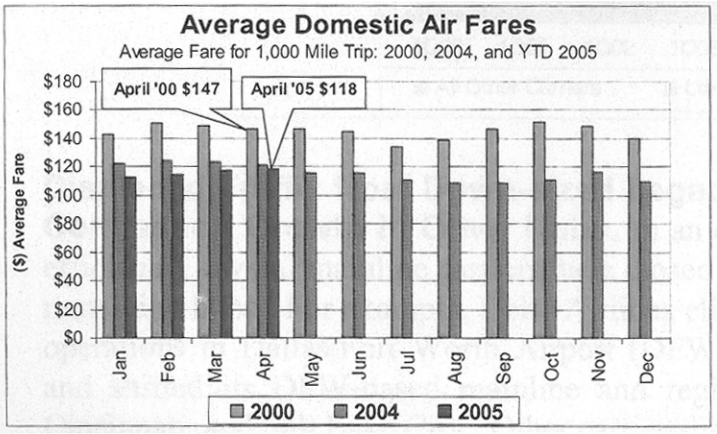
Significant fare reductions often stimulate demand, driving additional service offerings. For example, when Southwest began service between Philadelphia (PHL) and Raleigh-Durham (RDU), the average one-way fare dropped from $213 to $61, spurring passenger growth of 263 percent in the third quarter of 2004 over the third quarter of 2003.

Similar effects occurred when Southwest initiated service from Philadelphia to Providence (PVD), AirTran began service to Newport News (PHF) and Akron (CAK) from Boston (BOS), Independence Air began service to Raleigh Durham and Portland, Maine (PWM) from Washington (WAS-Dulles), and JetBlue began service to Oakland (OAK) and Long Beach (LGB) from Boston.



Systemwide, the effects of low-cost carriers are taking their toll on average airfares. In April 2005, the average fare for a 1000-mile trip[3] was $118, a drop of 20 percent from the $147 average fare for a 1,000-mile trip in April 2000.

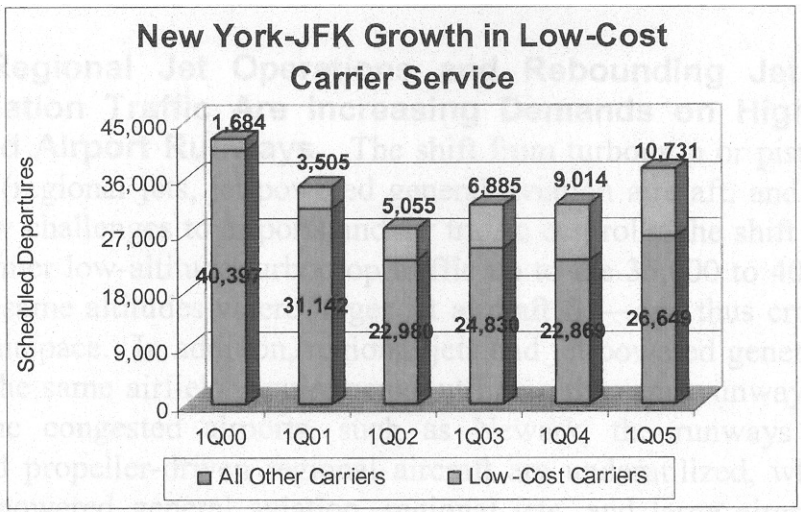
[3] For eight major U.S. Airlines, as reported to the Air Transport Association.



The new low-cost carrier operations, coupled with competitive responses from existing service providers can significantly tax runways and airspace at airports that may be already congested. Examples of the impact of low-cost carrier entry on congestion include Independence Air's operation out of Washington-Dulles and JetBlue's growing operation at New York-JFK.

In 2004, Independence Air (formerly Atlantic Coast Airlines) launched a new low-cost service with its hub operation at Dulles Airport. United, the incumbent legacy carrier, matched Independence Air on fares, further stimulating growth in the markets served by both carriers. As a result, flights increased 79 percent in March 2005 over March 2004 levels. In the same period, the number of delayed flights increased by 7,700 or more than 100 percent.

Growth at New York-JFK is almost entirely attributable to growth in low-cost carrier service, led predominantly by JetBlue. In the first quarter of 2005, total JFK traffic was down 11 percent from the highs of the first quarter of 2000, largely as a result in lagging International traffic. However during this period, low-cost carrier traffic increased more than five-fold while other traffic[4] was still down by 34 percent. Delays as well have increased as traffic has grown. In the first quarter of 2005, the number of delayed arrivals was 35 percent higher than the same period in 2000 and represented a more than 52 percent increase over the first quarter of 2004.



[4] Domestic and international operations by U.S. flag carriers, international operations by foreign flag carriers, and charter service.

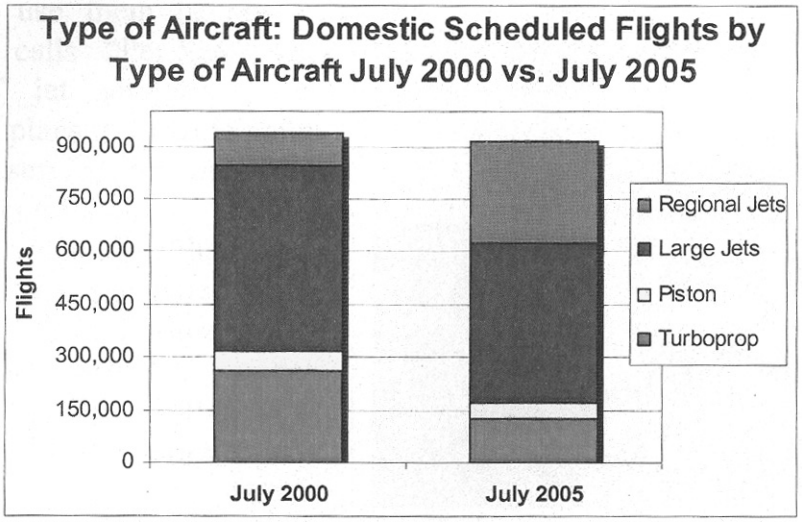
Displaced Traffic from Down-sized Legacy Carrier Hubs Contribute to Congestion Growth in Other Hubs. In an effort to reduce costs and improve efficiency, several mainline carriers have closed hubs and transferred operations to remaining hubs. For example, Delta Airlines eliminated 7,500 flights from its hub operations in Dallas/Fort Worth Airport (DFW) during the first quarter of 2005 and shifted its DFW-based mainline and regional affiliate aircraft to Atlanta, Cincinnati, and Salt Lake City. Other carriers backfilled some of the vacated slots, but the net impact was a 17 percent decrease in total scheduled operations at DFW.

On the flip side, however, operations in Atlanta, Cincinnati, and Salt Lake City in March 2005 were 7 percent, 5 percent, and 22 percent greater than operations in March 2004, respectively. Delays in the first quarter at these airports showed effects of these shifts, with delays down 14.4 percent at DFW from the first quarter of 2004 and up in Atlanta, Cincinnati, and Salt Lake City 7.9 percent, 13 percent, and 3.4 percent, respectively.

In a similar pattern, US Airways cut its Pittsburgh hub operations by 3,800 flights during the fourth quarter of 2004, shifting mainline aircraft and service to Philadelphia, Charlotte, and Fort Lauderdale. Overall traffic in Philadelphia increased by 29 percent, and was up 20 percent in Charlotte and 23 percent in Fort Lauderdale. Compared to the 402 daily Philadelphia departures scheduled on a typical day last summer, US Airways is now scheduling 495 daily flights, an increase of 23 percent. While delays in Pittsburgh were down minimally in the first quarter of 2005 over the first quarter of 2004, they were up 62.4 percent in Philadelphia, 65.2 percent in Charlotte, and 63.7 percent in Fort Lauderdale.

Increased Regional Jet Operations and Rebounding Jet-powered General Aviation Traffic Are Increasing Demands on High-Altitude Airspace and Airport Runways. The shift from turboprop or piston aircraft to jet aircraft (regional jets, jet-powered general aviation aircraft, and microjets) are posing new challenges to airports and air traffic control. The shift essentially pushes the former low-altitude turboprop traffic up to the 35,000 to 40,000+ foot airspace—the same altitudes where larger jet aircraft fly—and thus crowding the high-altitude airspace. In addition, regional jets and jet-powered general aviation aircraft have the same airfield requirements, utilizing the same runways as larger jets. In some congested airports, such as Newark, the runways that once accommodated propeller-driven regional aircraft are underutilized, while delays mount as jet-powered general aviation, regional jets, and large aircraft vie for landing slots on the longer runways.

Regional Jets Now Represent Nearly One-third of All Scheduled Flights. The airlines are continuing to shift service to jet aircraft. In July 2000, scheduled flights aboard jets accounted for 66 percent of all flights offered. In July 2005, scheduled flights aboard jets will account for 81 percent of all offered flights. In contrast, scheduled turboprop flights decreased from 28 percent in July 2000 to 14 percent in July 2005. The growth in jet traffic reflects, in large part, significantly increased reliance on regional jets. In July 2000, scheduled flights aboard regional jets accounted for 10 percent of all offered flights. In July 2005, scheduled flights aboard regional jets will account for 32 percent of flights.



General Aviation Jet-powered Aircraft Activity Is on the Rebound. While the rest of the industry has shown signs of recovery, general aviation (GA) has not improved since a steep drop-off after September 11th. In fact, GA operations at combined FAA and contracted towers declined 1.6 percent in 2004 and remain 12.4 percent below 2000 levels. However, within the GA market, one sector—jet aircraft activity—is showing signs of improvement. The number of GA jets filing instrument flight rule flight plans (generally not filed by locally operating recreational pilots) and the number of flight hours were up 1.6 percent and 6.2 percent, respectively, during 2004.

And it appears the trend will continue. The General Aviation Manufacturers Association (GAMA) reports that shipments of business jet units were up 26 percent in the first quarter of 2005 compared to the first quarter of 2004. FAA forecasts the number of general aviation hours flown by jet aircraft to expand at an average annual rate of 6.7 percent over the next 12 years. The large increase in jet hours is largely due to expected increases in the fractional ownership fleet and its activity levels. The growth of this traffic sector is a concern to the FAA because GA jets fly at the same altitudes, occupy the same airspace, and could potentially require use of the same runways as large commercial jets.

Microjets Have Potential To Further Crowd Dense Airspace. Beginning as early as March 2006, microjets or VLJs (Very Light Jets) are scheduled to enter the market priced between $1 million and $3 million per aircraft.[5] Manufacturers anticipate that these twin-engine jets carrying four to six passengers will be attractive to a variety of owners and operators. For example, Florida-based DayJet has ordered 239 Eclipse 500 microjets and plans to use them to operate what it calls "Per-Seat, On-Demand" jet services. The company plans to provide point-to-point service to and from small community airports, including markets that have limited, if any, scheduled airline services. The Eclipse 500™ and several other VLJ models are undergoing testing this spring, and manufacturers have announced that customer deliveries will begin in 2006, pending FAA certification.

Beyond the air taxi business model, manufacturers of VLJs also see a market in private ownership, corporate business jet fleets, and logistics (on-demand air cargo—when "overnight" is not fast enough). While supporters believe that the microjets have the potential to redefine business travel, others are more conservative about how quickly and to what extent the market will materialize. FAA's forecast assumes that the VLJs begin to enter the fleet in 2006 (100 aircraft) and grow by between 400 to 500 aircraft a year thereafter, reaching a total of 4,500 aircraft by 2016. However, some industry estimates suggest that the market could reach 5,000 aircraft by as early as 2010, although it is not clear to what extent this represents domestically deployed aircraft.

[5] Compared to comparable aircraft currently priced at around $6 million.

Eclipse 500™ Very Light Jet (VLJ) during testing; Photo Courtesy of Eclipse Aviation

Short-term Outlook Is for Trouble Spots This Summer

The summer travel season is historically the busiest travel time for the airlines. Schedules increase to accommodate increased demand and traffic volume increases, elevating the potential for an increased number of delays. Extreme weather conditions often add an additional layer of difficulty in meeting on-time performance goals. The following table identifies the 13 airports with summer 2004 arrival delays of greater than 25 percent. The airports with an asterisk, (Washington-Dulles, New York- JFK, and Fort Lauderdale) are those airports whose absolute delays in the summer of 2004 exceed the number during the summer of 2000 (considered the peak in aviation delays), and are projecting scheduled operations growth of greater than 10 percent for the summer of 2005.

In addition to *Washington-Dulles, New York-JFK,* and *Fort Lauderdale,* three other airports are likely to experience significant disruptions this summer. Delays in *Philadelphia* last summer affected more than 29 percent of all flights and scheduled departures this summer are 18 percent higher than the summer of 2004. *Newark* and *Atlanta* bear watching as both have sustained consistently high delays since the summer of 2000 and are likely to experience similar delay levels this summer.

Thirteen Airports with Summer 2004 Arrival Delays Greater Than 25 Percent

		June-August 2004		June--August 2000		Summer 05 vs Summer 04	
Airport	Rank 2004	% Delayed Gate Arrivals	Delayed Gate Arrivals	% Delayed Gate Arrivals	Delayed Gate Arrivals	Increase in Scheduled Departures	% Increase in Scheduled Departures
Newark	***1***	***29.60***	***16,116***	***31.96***	***16,130***	***45***	***0.1%***
Washington-Dulles*	***2***	***29.46***	***16,623***	***31.59***	***15,537***	***5,920***	***12.6%***
Philadelphia	***3***	***29.42***	***16,577***	***36.76***	***18,842***	***8,540***	***17.6%***
NY-Kennedy*	***4***	***29.16***	***11,670***	***33.32***	***11,283***	***2,889***	***11.5%***
Miami	5	28.23	10,339	32.72	12,522	627	3.2%
Atlanta	***6***	***28.10***	***34,108***	***27.74***	***30,180***	***7,496***	***6.6%***
Fort Lauderdale*	***7***	***26.49***	***6,820***	***30.31***	***6,626***	***4,622***	***23.0%***
Chicago-O'Hare	8	26.42	33,103	40.49	44,029	-2,568	-2.3%
Boston	9	26.22	13,237	39.39	21,797	372	0.8%
Chicago Midway	10	26.12	9,301	29.51	8,055	-6,139	-19.4%
Las Vegas	11	25.90	12,913	28.81	12,808	4,140	9.3%
Orlando	12	25.76	9,662	29.46	11,564	3,185	9.1%
NY-LaGuardia	13	25.36	12,522	37.72	16,399	453	0.9%

Long-Term Outlook Calls For Continued Growth

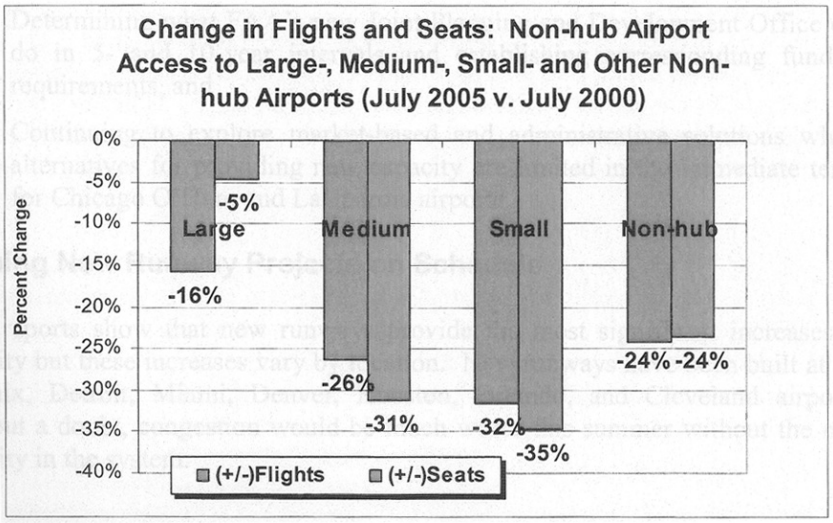
International Traffic Is on the Rebound. International traffic is forecast to exceed pre-September 11th levels this year, with approximately 145 million passengers traveling to and from the United States; an increase of 11 million passengers since 2004. In the summer 2005, scheduled international passenger and cargo operations are projected to exceed summer 2000 levels by 16 percent and 12 percent, respectively. According to the FAA, the move toward deregulation overseas, privatization of national carriers, and expansion of open-skies agreements could result in significantly greater international traffic growth. This month the United States signed a bilateral open-skies agreement with the Maldives which follows agreements recently signed by India, Sri Lanka, Paraguay, and Pakistan.

General Aviation Will Continue To Grow. The Department will need to closely monitor the growth and utilization of VLJs, which will expand jet traffic in airspace above 38,000 feet and increase the demand for air traffic services for jet aircraft. Depending on how and where VLJ traffic materializes—much of which is unknown at this point—the impact on safety, staffing needs, airspace, and infrastructure could be significant. In addition, VLJs could raise complex policy issues in areas such as landing rights, airport congestion, and security.

Despite Growth in Traffic and Congestion at Large and Medium-Sized Hubs, Small and Non-hub Airports Still Lag Their Larger Counterparts in Service Recovery Since 2000

Service this summer connecting the smallest airports—otherwise known as non-hub airports—to large, medium, and small hub airports will remain significantly below service scheduled during the summer of 2000. Non-hub airports include those in cities like Key West, Florida; Missoula, Montana; Roanoke, Virginia; Lincoln, Nebraska; Charleston, West Virginia; and Redmond, Oregon. Access to large hub airports (like Phoenix, Honolulu, and Newark) from non-hub airports is down 16 percent from July 2000 levels. Scheduled flights to medium-sized hub airports (like San Antonio, San Jose, and Manchester) are down 26 percent from July 2000 levels. Scheduled flights to small-hub airports (like Spokane, Washington; El Paso, Texas; and Portland, Maine) are down 32 percent. Finally, flights between non-hub airports (e.g. Helena-Great Falls, Montana; Juneau-Ketchikan, Alaska; and Ithaca-Elmira (New York) are down 24 percent.

Service levels remain depressed despite funding increases in the Essential Air Service (EAS) program. Annual funding between FY 2002 and FY 2005 has averaged about $100 million, or twice the level of subsidy available in 2000 and 2001. The number of cities with EAS subsidies has increased also, growing from 106 in 2000 to 151 in 2005.



The Department Faces Short- and Long-term Challenges in Addressing Congestion and Delays

Since the Summer of 2000, FAA has taken a number of actions in managing and enhancing capacity. These include putting administrative controls in place at Chicago O'Hare, improved communications between airlines and FAA's Command Center, and procedural changes to help manage the impact of bad weather (including greater use of joint civilian/military airspace on the East Coast). FAA has also established a new office to develop a vision for the next generation air traffic management system. Most recently in January 2005, FAA reduced vertical separation for aircraft traveling at high altitudes which provided for six new flight levels between 29,000 and 41,000 feet. In addition, a number of new runways have come on-line.

Without question, congestion and delays would be much worse without these actions, particularly the administrative controls at Chicago O'Hare and the commissioning of new runways. However, the anticipated demand for air travel and the factors we discussed earlier highlight the need for additional actions. We see several areas that require attention in the short- and long- term:

- Keeping new runway projects on schedule,
- Getting FAA's airspace redesign efforts on track, which is critical to enhance capacity,
- Determining what FAA's new Joint Planning and Development Office can do in 5- and 10-year intervals and establishing corresponding funding requirements, and
- Continuing to explore market-based and administrative solutions where alternatives for providing new capacity are limited in the immediate term, for Chicago O'Hare and LaGuardia airports.

Keeping New Runway Projects on Schedule

FAA reports show that new runways provide the most significant increases in capacity but these increases vary by location. New runways have been built at the Phoenix, Detroit, Miami, Denver, Houston, Orlando, and Cleveland airports. Without a doubt, congestion would be much worse this summer without the new capacity in the system.

Between 2005 and 2008, eight additional new runway projects (7 new runways and a major extension of an existing runway) are expected to be completed. FAA will need to make sure, among other things, that new procedures and navigation equipment are in place when new projects are commissioned. We note that of the 15 most congested airports (in terms of percent of operations delayed in the first quarter of 2005) only 3 airports (Atlanta, Boston, and Philadelphia) are expected to complete new runway projects within the next 2 to 3 years. The following table provides information on the eight runway projects FAA is monitoring as part of its Operational Evolution Plan (OEP), the agency's blueprint for enhancing capacity.

Status of Major New Runway Projects—May 2005

Airport	Initial OEP (June 2001) Estimated Completion Date	Current Estimated Completion Date	Phase	Cost Estimate as of Oct 2001 (Millions)	Current Cost Estimate (Millions)
Minneapolis	Dec. 2003	Oct. 2005	Construction	$563	$682
Cincinnati	Dec. 2005	Dec. 2005	Construction	$233	$255
St. Louis	May 2006	Apr. 2006	Construction	$1,100	$1,043
Atlanta	May 2005	May 2006	Construction	$1,200	$1,200
Boston	Dec. 2005	Nov. 2006	Construction	$95	$118
Philadelphia	Not in initial OEP	Dec. 2007	Design	n/a	$40
Charlotte	June 2004	Feb. 2008	Design	$187	$201
Seattle	Nov. 2006	Nov. 2008	Construction	$773	$1,129

Note: The Philadelphia project is a runway extension
Source: FAA and Airport Sponsors

There are about 10 other new runway projects in various planning stages, including major efforts at Chicago O'Hare, Los Angeles, and Washington-Dulles. However, FAA does not yet have firm completion dates for them and therefore has not yet

included them in the OEP.[6] We will issue a report shortly on plans to revamp Chicago O'Hare, which represents the largest and most costly reconfiguration of an existing airport in the United States.

While adding new capacity (via new pavement) may ultimately be the most comprehensive solution, it is not always a *feasible one.* For example, at congested New York-LaGuardia, where slot controls are slated to expire in 2007, land constraints preclude new construction. This is why FAA and some airports are looking into market-based or administrative solutions to manage congestion and delays. However, a number of policy questions need to be resolved with such approaches.

Getting FAA's Airspace Redesign Efforts on Track Is Critical to Enhance Capacity

Airspace redesign efforts are critical in getting the most benefits (in terms of capacity and delay reduction) from new runways. FAA's OEP indicates that 40 to 60 percent of projected capacity improvements from new concrete will be lost without corresponding changes in airspace. In some cases, airspace redesign plays an even greater role.

For example, very few of the benefits of the Chicago O'Hare Modernization Program (the addition of one new runway, the extension of two runways, and the relocation of three others) will be realized without significant airspace changes. For the first stage of the O'Hare Modernization Program expected to be complete in 2007 (the new north runway only), a combination of airfield and airspace changes provides for more than a 50 percent reduction in the average minutes of projected delay per flight, from 19.6 to 9.6 minutes. FAA and Mitre analyses show the new north runway, without corresponding airspace changes, will have little impact on delays.

On the other hand, the Choke Point initiative (following the summer of 2000) demonstrated that airspace changes can also have important benefits even without new runway construction. FAA reports that the Choke Point initiative reduced delays and resulted in an annual savings to airspace users of $70 million. The Choke Point initiative was successful because it was placed on a fast track, had significant management oversight, and linked plans and resources—all of which are best practices that need to be transferred to all airspace projects.

We recently issued a report on the importance of FAA's airspace redesign projects in enhancing capacity and the range of actions the agency needs to take to get these efforts on track.[7] We reviewed the 42 approved airspace redesign projects in FY 2004 and found that FAA's overall process for controlling costs, mitigating risks, and coordinating local, regional, and headquarters efforts is diffused and fragmented. Specifically, we found:

- Cost and schedule estimates for the vast majority of airspace redesign projects are not reliable. Cost estimates—for the program as well as individual projects—include costs for planning but not for implementation. Therefore, we could not, nor could FAA, determine the cost of implementing the 42 approved projects in FY 2004.
- FAA's redesign projects are often delayed 3 years or more because of changes in a project's scope, environmental issues, and problems in developing new procedures for more precise arrival and departure routes. For example, of the 42 approved projects in FY 2004, 7 were affected by environmental concerns, 10 by problems in developing new procedures, and 21 by changes in a project's scope.
- Projects are not effectively coordinated among agency organizations that manage resources (e.g., new equipment and radio frequencies) or linked to the agency's budget process. This directly affects a project's implementation. We found that 19 of the 42 approved projects in FY 2004 had unresolved equipment issues.

We recommended that FAA (1) establish cost and schedule controls for airspace redesign projects (and include costs for both planning and implementation), (2) establish procedures to ensure projects are coordinated among agency offices, (3) prioritize airspace projects and establish criteria for assessing a project's systemwide impact, and (4) re-evaluate how resources are used at the local and regional levels. FAA has actions underway to address our recommendations.

---

[6] FAA includes a new runway in the OEP when all the planning and environmental processing has been completed, a Record of Decision has been issued, and the sponsor has provided FAA with the dimensions, timing, and planned use of the runway. FAA just recently added Philadelphia to the plan.

[7] OIG Report Number AV–2005–059, "Airspace Redesign Efforts Are Critical To Enhance Capacity But Need Major Improvements," May 13, 2005.

FAA's Joint Planning and Development Office—Determining What Can Be Done in 5- and 10- year Benchmarks and Establishing Funding Requirements

Another important effort to help meet the anticipated demand for air travel is FAA's Joint Planning and Development Office (JPDO). The establishment of this new office was mandated by Congress to coordinate research and development efforts among diverse Federal agencies, including the National Aeronautics and Space Administration and the Department of Defense, and develop a vision for the next generation air traffic management system in the 2025 timeframe.

There are a number of reasons why this effort is important, including the forecasted demand in air travel as well as the factors (i.e., microjets) that may drive increased operations. The new office is also important because the majority of projects in FAA's current capital account ($2.4 billion for fiscal year 2006) focus on keeping things running, or "infrastructure sustainment." The combined effects of increased operations costs and the fact that modernization projects have suffered so much cost growth over the years has left little room for new initiatives.[8] This is one of the reasons why there is so much discussion about how to finance new air traffic management initiatives.

FAA reports that the current air traffic control system (or "business as usual") will not be sufficient to accommodate the anticipated future growth in traffic or the changes facing the aviation community. Key issues focus on what new systems are needed and how new systems, capabilities, procedures, and changes in airspace management can transform the way air traffic services are provided. The JPDO published its first plan this past December. It laid out goals and strategies but did not provide details on what capabilities will be pursued or how much they would cost to implement.

While the 2025 timeframe has merit, benchmarks for what can be done in 5- and 10-year intervals are also important. *Other imperatives focus on determining what level of funding is actually required, how much other agencies will contribute, what specific capabilities will be pursued, and when they can be implemented*. The Department committed to Congress that by the year's end, it would provide specifics on how much money is needed, when, and for what purposes.

Administrative and/or Market-Based Solutions May Provide Congestion Relief in Markets Where Alternatives are Limited

As delays return, FAA and some airports are considering a variety of administrative and/or market-based solutions that would allow variable pricing of access in order to control congestion and delays. Some of the congestion management alternatives under study include slot auctions, congestion pricing, administratively imposed scheduling caps, and incentives for up-gauging aircraft.

In 2004 and 2005, the FAA used administrative actions to reduce delays at Chicago-O'Hare by first negotiating and later imposing schedule reductions with the carriers serving O'Hare. The FAA is now soliciting comments on whether to continue the administrative controls at O'Hare for another 3 years, until ultimately, the first phase of the O'Hare Modernization Plan is complete and additional capacity could relieve some of the congestion. At LaGuardia, another airport where scheduled operations are anticipated to exceed capacity when slot controls expire in 2007, new construction is not a viable option. At LaGuardia, some demand management tool—whether market based or administrative, will likely be needed to prevent what could be crippling delay conditions.

Market-based approaches, while on paper appear to be a reasonable solution for some airports, entail difficult policy considerations, such as who sets the fees, how the fees should be set, who collects the fees, how (and whether) fees are shared between airports and the FAA, how general aviation will be treated, and small community access. These are difficult questions that will need definitive answers—the consequences of moving forward without working out the details could result in severe market consequences. We believe this debate needs to be joined with the debate taking shape on financing FAA—there should be some degree of equity between who benefits from premium services (i.e., rush hour departure slots), and who pays for these privileges.

---

[8] We reviewed 16 of FAA's major acquisitions. We found that 11 of the 16 experienced cost growth of about $5.6 billion, which is more than double the amount of FAA's Fiscal Year 2006 budget request for its Facilities and Equipment account. Additionally, 10 of these 16 projects accounted for schedule delays ranging from 2 to 12 years and 2 projects have been deferred until at least 2008. For additional details on FAA's major acquisitions as well perspectives on the JPDO, see our testimony entitled "Next Steps for the Air Traffic Organization" (CC–2005–022, April 14, 2005).

Senator BURNS. Thank you very much. We've been joined by Senator Nelson of Nebraska. He's worried about McCook International. And I'm sorry, Senator, I didn't recognize you before we went to Mr. Mead. Do you have a statement——

STATEMENT OF HON. E. BENJAMIN NELSON,
U.S. SENATOR FROM NEBRASKA

Senator BEN NELSON. No. Thank you for the opportunity, but I'm anxious to get to their statements first. Thank you.

Senator BURNS. We have with us this morning Mr. Gerald Dillingham. He is Director of Aviation Issues with the GAO, and he'll be next.

Senator Lott, thank you for being here. We were just going over the advances that have been made in the FAA and in aviation under your tutelage when you were Chairman of this Committee, and we thank you for your service.

Do you have a statement or anything?

STATEMENT OF HON. TRENT LOTT,
U.S. SENATOR FROM MISSISSIPPI

Senator LOTT. Yes. Just very briefly, Mr. Chairman. Thank you for having the hearing, and thank you for your comments. I've enjoyed very much working with the FAA Administrator, Mr. Mead, and all those involved in aviation. I think we have made some progress, and we dealt with this industry. And with what's trying to be done at FAA, we obviously still have work to do.

Modernization still has a long way to go, and we still have airlines that have a great deal of difficulty. But actually, I just came from a meeting on dealing with that very issue, how we're going to deal with the pension problem; and I expect the Finance Committee to take this issue up in June. If it doesn't, I'm going to offer it as an amendment on the floor in June or July.

I made it clear we're going to act on this pension issue, and we're going to do it this summer. I think that would, set up a way for the pension issue to be dealt with appropriately while we move from the old system to the new.

But I just want to thank our witnesses today for being here.

Keep up the work. We need to make more progress. This is a vital part of our economy, and we must find a way to make it healthy and safe. Thank you, Mr. Chairman.

Senator BURNS. Thank you, Senator. And now Mr. Gerald Dillingham from the Government Accountability Office.

And thank you for your report, Mr. Dillingham. Good report. And it's sort of an eye-opener to many of us who are going to be dealing with this business of keeping everybody in the air and getting there on time. So thank you for joining us this morning. We look forward to your testimony.

STATEMENT OF GERALD L. DILLINGHAM, PH.D., DIRECTOR, PHYSICAL INFRASTRUCTURE ISSUES, GOVERNMENT ACCOUNTABILITY OFFICE

Dr. DILLINGHAM. Thank you, Mr. Chairman, Chairman Stevens, Senator Lott and Senator Nelson.

A few months after 9/11, GAO issued a report to this Committee on airspace capacity issues. The key message in that report was that the decline in air traffic was only a temporary reprieve for system congestion and delays. We characterized it as a window of opportunity to develop and implement plans for long-term capacity enhancements.

As you may recall in 2000, which was billed as one of the worst years for aviation delays, one in every four flights experienced a delay. In 2004 one in every five flights experienced a delay. The 2004 ratio was achieved even though air traffic was near pre-9/11 levels. This could be seen as an indicator of some progress in reducing delays. It could also be seen as an indicator that much more needs to be done.

For example, the Air Transport Association has reported that flight delays in 2004 cost the airline industry an estimated $6.2 billion in direct operating costs. These are costs that the airline industry can ill-afford. Neither can the Nation's economy nor its position in the global economy continue to withstand what has been estimated to be a $30 billion annual loss to the Nation's economy when people and products do not reach their destination within expected time periods.

Since our earlier report, and as you've heard from the previous witnesses, FAA and the other stakeholders have undertaken or planned a wide variety of initiatives to address the delay problems this summer. FAA and the airlines have also focused special attention on some of the choke points in the system, such as in the New York area and Chicago, where delays and congestions tend to have a ripple effect throughout the system.

Mr. Chairman, we believe that the initiatives that FAA and the other stakeholders have implemented will minimize system delays and congestion for the upcoming travel season. To address system congestion and delays for the longer term, FAA has also developed a long-term strategy, the OEP.

The centerpiece of the OEP and, by general consensus, the OEP initiative which holds the greatest promise for increasing system capacity is runway construction. Under the OEP, 15 new runways are scheduled to be in service by the end of 2008; but only three of the nine airports that experienced the highest rates of delay in 2004 are scheduled for additional runways. There is a general consensus that even if all of the OEP initiatives are implemented, the National Airspace System is not expected to keep up with demand, resulting in increased congestion and delays over the 10-year OEP time frame.

The question seems to be, how much congestion and delays will there be? On the one hand, FAA's Management Advisory Council estimates passengers will experience 63 percent more total delay hours in 2012 than they did in 2000. On the other hand, FAA's position is that if all the OEP initiatives are implemented, delays will be maintained at or below the delay levels of 2000.

You will recall that in 2000, one in every four flights was delayed. Both of these scenarios indicate that the OEP initiatives will not be enough to solve the delay and congestion problems. Our written statement identifies some other potential capacity-increasing options that are not in the OEP but have been cited by GAO and others over the last decade. These options basically fall into two categories.

The first category involves measures to add new infrastructure, such as building new airports or greater utilization and development of regional airports near major cities.

The second category focuses on developing alternative modes of intercity travel other than air transportation, such as high-speed rail to reduce the number of short-haul flights.

We recognize that adopting many of these other options is likely to be a much greater challenge than implementing initiatives in the OEP principally because of stakeholder opposition.

Mr. Chairman, as has been made clear from the statements this morning, there are certainly numerous challenges that lie ahead for enhancing system capacity and moving toward the Next Generation Air Transportation System for 2025. FAA has taken a first and very important step toward addressing the challenges by developing a series of plans, including the 5-year flight plan, the 10-year OEP, and the twenty-year Next Generation Air Transportation System plan, all of which give direction and focus to enhancing system capacity.

However, we think one of the most serious challenges to the successful implementation of the plans is the availability of funding. We agree with the Administrator that the FAA is in an untenable financial position where its costs are exceeding its revenues.

In 2004 the gap between its costs and revenues was about $4 billion. Although FAA has been able to fund its key systems acquisitions, the FAA budget accounts that fund capacity-enhancing projects and the acquisition of ATC systems had reduced funding in 2005, and further reductions are proposed for 2006.

Additionally to meet budget targets, FAA also eliminated all of the $1.4 billion that it had designated for early R&D activities in support of new system projects. Taken together, it would seem that FAA will have a difficult time moving from its current investment strategies, wherein as much as 80 percent of its annual budget is to maintain the status quo rather than increasing capacity and efficiency within the system.

In a final analysis, Mr. Chairman, we think that most of what can be done for the short term is at various stages of implementation. However, meeting the challenge of keeping up with the increasing demand for safe and efficient air transportation services in the 21st Century will require additional actions including integrating the various plans that currently exist and adequate funding to implement the plan through new or existing funding mechanisms.

Meeting the challenge will also require continuous use and improvement of sound business practices and cost control efforts by the FAA.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Dillingham follows:]

PREPARED STATEMENT OF GERALD L. DILLINGHAM, PH.D., DIRECTOR, PHYSICAL INFRASTRUCTURE ISSUES, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss flight delays and capacity issues in the national airspace system. Since the unprecedented flight delays in 2000, a year in which flight delays totaled 1.4 million and one in four flights were delayed, our aviation system has been adversely affected by many unanticipated events—such as the September 11 terrorist attacks, the Iraq war and associated security concerns, and Severe Acute Respiratory Syndrome (SARS)—that significantly reduced the demand for air travel. However, that demand for air travel is rebounding. For example, the number of passengers traveling by air increased from 642 million in 2003 to 688 million in 2004. FAA estimates that by 2015 there will be as many as one billion travelers per year in the United States.

The current rebound in air travel has been a significant factor in a resurgence of flight delays today. Flight delays have many causes. Historically, the major cause of flight delays has been bad weather. For example, 70 percent of the flight delays from 2000 to 2004 were weather-related. Apart from weather, the next main cause is lack of capacity—that is, the inability of the national airspace system to handle the amount of traffic seeking to use it. Changes in the composition of the aircraft fleet—including the airlines' greater reliance on regional jets with an average of 49 seats—has also increased the number of aircraft in the national airspace system, which has placed greater demand on the system. Besides airlines, other parts of the aviation community are also likely to place more demands on the national airspace system. For example, corporations may make increasing use of their corporate jets, which often use the same airports and airspace as those used by airlines.

Flight delays have also been among the most vexing problems in the national airspace system and are defined by the Department of Transportation as instances when aircraft arrive at the gate 15 minutes or more after scheduled arrival time. In 2004, the number of flight delays totaled over 1.4 million and almost one in five flights were delayed primarily at New York La Guardia, Newark International, Chicago O'Hare, and Atlanta Hartsfield. Because these are some of the busiest airports in the country, their delays generally have significant ramifications for the rest of the national airspace system. Our Nation's airspace system is a critical engine of economic growth that facilitates the safe and efficient movement of people and goods around the globe, consequently flight delays and capacity issues have significant ramifications. According to the Commission on the Future of the United States Aerospace Industry, consumers stand to lose $30 billion dollars annually if people and products do not reach their destinations within expected time periods. The Air Transport Association also reports that flight delays in 2004 cost the airline industry an estimated $6.2 billion in direct operating costs (e.g., pilots, flight attendants, and fuel).

My statement today updates our 2001 report entitled: *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays* [1] and addresses the following questions:

- What initiatives are ongoing by the Federal Government, airlines, and airports to address flight delays and enhance capacity?
- What are some of the challenges in reducing flight delays and enhancing capacity?
- What other options are available to address flight delays and enhance capacity?

To answer these questions, we obtained and analyzed information from FAA, Airports Council International, and the Air Transport Association on the status and impact of initiatives to reduce flight delays that were identified in our December 2001 report. We performed our work in accordance with generally accepted government auditing standards.

In summary:

Several initiatives to reduce flight delays, such as those shown in figure 1, and enhance capacity are ongoing.

---

[1] U.S. Government Accountability Office, *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays*, GAO–02–185 (Washington, D.C.: December 14, 2001).

Figure 1: Illustration of Flight Delays

Source: FAA.

Many of these initiatives are reflected in FAA's February 2005 Operation Evolution Plan which is a 10-year plan to increase capacity and efficiency of the national airspace system and focuses on airport congestion, air traffic management flow efficiency, en route congestion, and terminal area congestion at 35 of the busiest airports in the United States.[2] FAA acknowledges, however, that the OEP is not intended as the ultimate solution to congestion and delay problems. Also, over the last six years, new runways were opened at the Phoenix, Detroit, Denver, Miami, Cleveland, Houston, and Orlando airports, which provided those airports with the potential to accommodate about one million more annual operations (take-offs and landings). Seven more runways and one runway extension are scheduled to open by the end of 2008 with the potential to accommodate 889,000 more annual operations. In addition to building runways, several new systems or technologies were implemented. For example, in January 2005, FAA implemented the Domestic Reduced Vertical Separation Minimum which is designed to increase available high altitude routes which gives pilots and air traffic controllers more choices so that aircraft can fly more direct routes at the most fuel-efficient altitudes. FAA is also pursuing some additional solutions for flight delays that are not in the OEP. To reduce flight delays at some of the delay-prone airports such as New York La Guardia and Chicago O'Hare, FAA is also exploring administrative and market-based options. For example, FAA is considering auctioning off landing and take off rights and using congestion pricing at New York La Guardia and limiting the number of takeoffs and landings during peak periods at Chicago O'Hare.

A number of challenges in reducing flight delays and enhancing capacity remain. Chief among them is obtaining funding for many of the initiatives mentioned above; their successful implementation is predicated on the availability of funding from several sources, including FAA, airlines, and airports. However, since 2000, the financial condition of the aviation industry has changed significantly. Many structural changes, such as the growth of the low cost carriers which led to lower average fares and external events (e.g., global recessions and a steep decline in business travel) have caused a dip in demand for air travel and resulted in sharp decreases in airline industry revenue and the amount of revenues flowing into the Airport and Airway Trust Fund.[3] FAA expects that over the next four years there may be an $8.2 billion dollar gap between its costs and revenues. In 2004, the airline industry losses totaled $14 billion and the industry is expecting similar losses in 2005, which will make it difficult for them to equip their aircraft with some of the new air traffic control technology, according to Air Transport Association officials.

Other options are available to address delay problems. One option is to add new capacity—not by adding runways to existing capacity-constrained airports, but rath-

[2] See appendix 1 for a list of the 35 airports that are in the OEP.

[3] The Airport and Airway Trust Fund help funds the development of a nationwide airport and airway system and air traffic control facilities.

er by building entirely new airports. According to FAA, airport authorities in Chicago, Las Vegas, and San Diego are evaluating the need for new airports. Another option is to develop other modes of intercity travel, such as, but not limited to, highspeed rail where metropolitan areas are relatively close together. These options may conflict with the interests of one or more key stakeholder groups, and, in many cases, would be costly.

Background

Although recent events may have moved airport congestion off center stage as a major national issue, delays remain a pervasive problem, in part because of the interdependence of the Nation's airports. The effect of delays can quickly spread beyond those airports where delays tend to occur most often, such as New York La Guardia, Chicago O'Hare, Newark International, and Atlanta Hartsfield. Delays at these airports can quickly create a "ripple" effect of delays that affects many airports across the country. For example, flights scheduled to take off from these airports may find themselves being held at the departing airport due to weather or limited airspace. Similarly, an aircraft late in leaving the airport where delays are occurring may be late in arriving at its destination, thus delaying the departure time for the aircraft's next flight.

Delays have many causes, but weather is the most prevalent. Figures compiled by FAA indicate that weather causes about 70 percent of the delays each year. Apart from weather, the next main cause is lack of capacity—that is, the inability of the national airspace system to handle the amount of traffic seeking to use it. Capacity can be measured in a variety of ways. For example, at individual airports, one measure is the maximum number of takeoffs and landings that can be conducted in a given period, such as 15 minutes or 1 hour. In our 2001 report, we noted that FAA had established such a capacity benchmark at each of the 31 of the Nation's busiest airports.[4] FAA's data on capacity and demand at these airports showed that even in optimum weather conditions, 16 airports had at least three 15-minute periods each day when demand exceeded capacity.[5]

Weather and capacity problems are often linked, because bad weather can further erode capacity. For example, some airports have parallel runways that are too close together for simultaneous operations in bad weather. When weather worsens, only one of the two runways can be used at any given time, thereby reducing the number of aircraft that can take off and land. FAA's data in 2001 showed that in bad weather, 22 of the 31 airports had at least three 15-minute periods when demand exceeded capacity. Another measure of capacity, apart from the capacity of individual airports, is the number of aircraft that can be in a given sector of the airspace. For safe operations, aircraft must maintain certain distances from each other and remain within authorized airspace. If too many aircraft are trying to use the same airspace, some must wait, either on the ground or en route.

Addressing flight delay problems also requires action by multiple aviation stakeholders because no single entity has the authority or ability to solve delay-related problems. The Federal Government, especially through the Federal Aviation Administration (FAA) and its parent agency, the Department of Transportation (DOT), plays a major role by operating the national airspace system, distributing Federal funding for airports, and setting operating standards for all aircraft and airports. Airports and airlines are also important decision makers and funding sources. The Nation's airports are primarily owned and operated by local units of government, so that decisions about such steps as expanding airport capacity are primarily local in nature. Airlines' business decisions have a strong effect on the volume and routing of flights, the type and size of aircraft used, and the degree to which aircraft are upgraded to take advantage of new technology.

A Number of Initiatives to Reduce Flight Delays and Enhance Capacity Are Ongoing

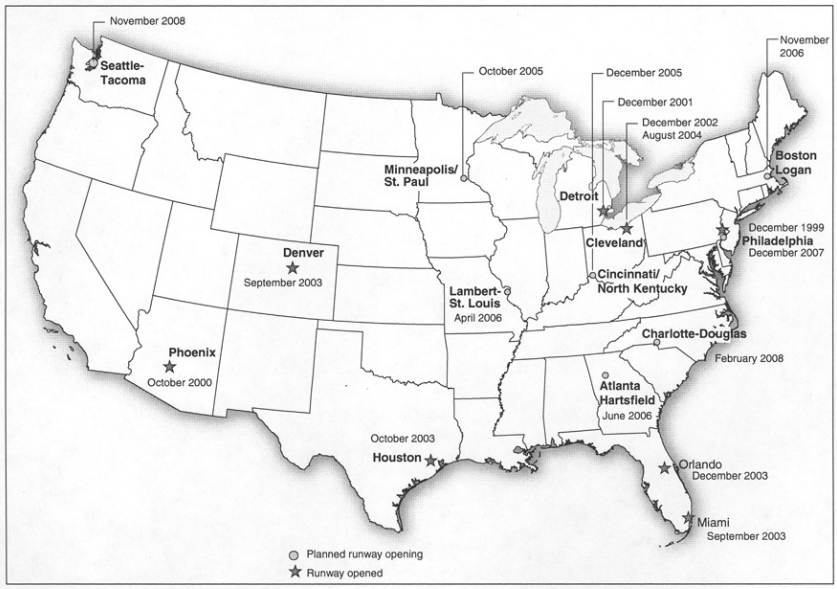
Several initiatives to reduce flight delays and enhance capacity are ongoing. These initiatives which FAA, the airlines, and the airports are implementing are incorporated into FAA's major capacity-enhancing effort: the Operation Evolution Plan (OEP). The OEP is a rolling 10-year plan to increase capacity and efficiency of the national airspace system and focuses on airport surface infrastructure, and technological and procedural initiatives at 35 of the busiest airports in the United States. FAA acknowledges, however, that the OEP is not intended as the ultimate solution to congestion and delay problems. Responsibility for the various initiatives is still shared among the various segments of the aviation community. In February 2005,

[4] FAA updated its capacity benchmark report in 2004.
[5] The current OEP includes 35 of the busiest airports in the U.S.

FAA published version 7 of the OEP and organized it into the following four quadrants:

Airport Congestion. The Airport Congestion quadrant focuses on capacity enhancements for the airport surface. One of the most effective ways to increase capacity is to build runways; however, it takes an average of 10 years from the time planning begins for a runway until it is commissioned. To help expedite the process for building runways, Congress and FAA streamlined the environmental review phase of the runway process. In addition, according to FAA, over the last six years, seven new runways were opened at Phoenix, Detroit, Denver, Miami, Cleveland, Houston, and Orlando airports which provided those airports with the potential to accommodate about one million more annual operations (take-offs and landings). Seven more runways and one runway extension are included in the OEP and are scheduled to open by the end of 2008. These runways are expected to provide those airports with the potential to accommodate 889,000 more annual operations in the system, as shown in figure 2.

Figure 2: Commissioned and Planned Runways, December 1999 to November 2008



Source: MapArt.

Note: Included in the planned runways is one runway extension project.

In addition to the runways listed in the OEP, nine more projects are in the planning or environmental stages, including one new runway, three airfield reconfigurations, one runway extension, and three new airports in major metropolitan areas. FAA also has additional flight reduction activities that are not included in the OEP. To reduce flight delays at some of the delay-prone airports, such as New York La Guardia and Chicago O'Hare, FAA is exploring administrative and market based options. For example, FAA is considering auctioning off landing and take off rights at New York La Guardia and is currently limiting the number of scheduled arrivals during peak periods at New York La Guardia and Chicago O'Hare.

Air Traffic Management Flow Efficiency. This quadrant focuses on new technology and procedures to optimize the flow of traffic and maximize system throughput which may allow better control and utilization of current airspace. Included is the Collaborative Convective Forecast Product which is a graphical forecast of potential convective activity areas (i.e., thunderstorms) for use in the strategic planning and management of air traffic. It is intended to provide advance planning for long haul flights and allows for schedule predictability based on 2-, 4-, and 6-hour forecasts. This tool is most useful during the severe weather avoidance procedures season, which is from March to October. Another program is Collaborative Decision Making, which is a joint government/industry initiative. Collaborative Decision Making focuses on electronic data exchange; optimized airspace utilization; shared planning and decision-making; and post-analysis reporting. In addition, the Traffic

Management Advisor, which is in operation at eight air route traffic control centers, is an automated decision support tool, is intended to provide controllers and traffic management coordinators more information on airport arrival demand and available capacity for making decisions on aircraft spacing.

En Route Congestion. Although the flying public is impacted by delays at the airports, many times this occurs in the en route areas as the airways become congested. The tools in this quadrant reduce delays and contribute to time and fuel savings for the vast majority of airspace users. One of the tools currently in use is reduced lateral (side-to-side) separation may provide space for additional routes between current city pairs or allow for new direct routes. Reduced longitudinal (nose-to-tail) separation may provide more opportunities to add flights without incurring delays. For domestic flights, Domestic Reduced Vertical Separation Minimum was implemented in Fiscal Year 2005 in the contiguous United States and Alaska and adds six additional flight levels between existing flight levels. The User Request Evaluation Tool which was installed at l7 air route traffic control centers and is operational at 13 air route traffic control centers, allows controllers to predict aircraft-to-aircraft and aircraft-to-airspace conflicts, which allows them to construct alternative flight paths. Airspace redesign projects also provide significant capacity improvements. For example, new routes added as part of the High Altitude Redesign increased en route throughput from the Pacific Northwest into the San Francisco Bay and the Los Angeles Basin areas.

Terminal Area Congestion. Terminal airspace is a critical component in the efficient use of airport capacity. In instances where volume has increased and the current airspace structure is the limiting factor, redesigning arrival and departure procedures, including the addition of Area Navigation and Required Navigation Performance procedures, will allow more efficient use of constrained terminal airspace. Also, by applying existing technology with new procedures may provide instrument approaches to nearly all runways greater than 5,000 feet and under a wider range of meteorological conditions that are insensitive to airport surface traffic. Area navigation procedures provide flight path guidance from the runway to the en route airspace with minimal instructions given by air traffic controllers. As a result, routine controller/pilot communications are reduced, which frees time to handle other safety-critical flight activities. Other key benefits include more efficient use of airspace, with improved flight profiles, resulting in significant fuel efficiencies to the airlines.

Additional solutions for increasing capacity in this arena are Time Based Metering which is used in conjunction with Traffic Management Advisor,[6] became operational at seven air route traffic control centers. By optimizing the flow of aircraft from the en route to the terminal area, Time Based Metering with Traffic Management Advisor may help an airport to efficiently use the full capacity of its runways which increases acceptance rates as well as peak throughput. An air traffic management tool called Integrated Terminal Weather System which provides full color graphic displays of essential weather information to promote the safety, capacity, and efficiency of air traffic control operations was also implemented at Boston Logan, Denver International, and Minneapolis-St. Paul airports in 2004. According to FAA, the plan is to install the production version of Integrated Terminal Weather System at the New York terminal radar control facility in 2006.

Challenges in Reducing Flight Delays and Enhancing Capacity Remain

A number of challenges in reducing flight delays and enhancing capacity remain. A daunting challenge that FAA and other aviation stakeholders will have to address is funding the various initiatives that are designed to address flight delays and enhance capacity. The successful implementation of many of these initiatives is predicated on the availability of funding. However, since 2000, which is to date the worst year in history for delays, the financial condition of the aviation industry has changed significantly. A number of structural changes within the airline industry, such as the growth of the Internet as a means to sell and distribute tickets, the growth of the low cost airlines, and fare reductions by legacy carriers, all transformed the industry and led to lower average fares. These lower fares have resulted in lower ticket taxes and less revenue into the Airport and Airway Trust Fund. In addition, a series of largely unforeseen events, including the September 11 terrorist attacks, war in Iraq and associated security concerns, SARS, global recessions, and a steep decline in business travel seriously reduced the demand for air travel and resulted in sharp decreases in airline industry revenue.

---

[6] Traffic Management Advisor provides an aircraft arrival schedule in the en route and terminal units and produces meter lists for controllers that display that estimate optimal arrival times.

Consequently, FAA expects that over the next four years there may be a multi-billion dollar gap between its costs and revenues. According to one aviation expert, this gap could have consequences that would increase air traffic delays. For example, FAA's Facilities and Equipment account, which provides funding for modernizing the air traffic control system and improving its reliability, capacity, and efficiency, was reduced by 15 percent in Fiscal Year 2005 and the President's 2006 budget proposes to reduce it by 20 percent in Fiscal Year 2006. These are the funds that are key to the national airspace system's future ability to handle demand and to minimize delays. For example, to provide the $4.4 billion needed for its major system acquisitions while remaining within its budget targets through fiscal year 2009, FAA has made significant cuts elsewhere in its capital funding plans. Specifically, FAA eliminated all of the $1.4 billion that it had set aside for what it calls the "architecture segment." These funds would have been used to perform about two years' worth of early research on new programs before they are mature enough to receive formal Joint Resources Council approval.[7] FAA also made significant reductions in planned investments for facilities—an action that runs counter to its reported need to refurbish or replace its physical infrastructure. Thus, even if all OEP initiatives are implemented the national airspace system is expected to fall behind demand, resulting in an increase in congestion and delays over the 10-year period of the OEP. FAA's Management Advisory Council estimates that passengers would experience 63 percent more total delay hours in 2012 than they did in 2000.

In contrast, FAA states that if all of the OEP initiatives are implemented, delays will be maintained at or below the flight delay levels in 2000. However, FAA also stated that capacity at some airports will not keep pace with demand and in these cases delays will get worse over time because not all airports have improvements planned. In 2004, the airline industry losses totaled $9 billion and the industry is expecting similar losses in 2005, which will make it difficult for them to equip their aircraft with some of the new air traffic control technology, according to Air Transport Association officials.

Another important challenge is reducing flight delays and enhancing capacity at delay-prone airports, such as those shown in table 1, some of which have little capacity to physically expand and would find it difficult to build even one more runway, either because they lack the space or would face intense opposition from adjacent communities.

Table 1: Most Delay-Prone Airports in 2004

Airport	Delays per 1,000 operations
Chicago-O'Hare	97
Atlanta Hartsfield	72
Newark International	70
Philadelphia International	58
New York La Guardia	56
Houston International	36
Washington Dulles International	36
San Francisco International	32
New York John F. Kennedy	27

Source: FAA.

Although eight runways were opened during the last six years and seven new runways are scheduled to be opened by the end of 2008, only three (Atlanta Hartsfield, Philadelphia International, and Houston International) of the nine airports that experienced the highest rate of delays in 2004 will receive new runways. Because these delay-prone airports can cause delays that ripple throughout the system, other airports that have increased their own capacity could still experience delays. For example, in 2000, Phoenix Sky Harbor International put an additional runway into service, and the airport had sufficient capacity to allow flights to take off on time. However, the airport ranked among the top 15 in the United States for flight delays. According to airport officials, most of the delays in Phoenix were the result of delays and cancellations at other airports—circumstances unrelated to the capacity at Phoenix. FAA also projects that the three New York-area airports—La

[7] The Joint Research Council is a FAA executive body consisting of associate and assistant administrators, acquisition executives, the chief financial officer, the chief information officer, and legal counsel. The council determines, among other things, whether an acquisition meets a mission need and should proceed.

Guardia, Newark, and Kennedy—will experience relatively small capacity gains during this decade—just 7 percent for Newark and 1 percent each for the other two airports.

In addition to addressing the capacity needs of the most delay-prone airports, FAA, airlines, and airports will also have to address the emerging capacity needs of new metropolitan areas in the South and Southwest. Among those metropolitan areas FAA believes will need additional capacity by 2013 are Tucson, AZ; Austin-San Antonio, TX; and South Florida.

Other Options Could Help Address Capacity Needs

Other options—not in the OEP—exist as potential measures to address capacity needs as shown in table 2. These options, which have been cited by various researchers and policy organizations over the last decade, basically fall into two categories. The first category involves measures for adding airport infrastructure besides adding runways to existing airports, such as building new airports or using nearby underdeveloped regional airports. The second category includes developing alternative modes of intercity travel other than air transportation, such as high-speed rail.

Table 2: List of Potential Options—Not in OEP—to Reduce Airport Capacity Gap

Options	Description
Category 1: Adding airport infrastructure	
Building new airports in metropolitan areas.	This measure involves new airports within metropolitan areas to provide additional capacity, especially where the existing airport has little expansion potential. This measure has recent limited use since only two major new airports—at Dallas-Fort Worth and Denver—have been built in large metropolitan areas since 1973.
Developing regional airports.	Existing regional airports located within 50 miles of metropolitan hubs would be developed to take advantage of unused system capacity. A regional approach is in place at several airports including Boston Logan and is being contemplated in other areas such as New York and Los Angeles.
Category 2: Using ground transportation alternatives	
Building high-speed, intercity ground transportation.	Building high-speed ground transportation (e.g., rail) between populous cities within 200 miles of each other may free up capacity at congested airports by reducing the air traffic demand at those locations. Such trains could travel at speeds of 200 mph or more. Technologically, high-speed rail has proven successful in Europe and Asia; efforts are under way in the United States to develop high-speed rail in several designated corridors.
Connecting nearby airports with high speed ground transportation.	Using high-speed ground transportation to connect congested airports with underused airports nearby could accommodate passenger transfers within the current hub-and-spoke system. This measure has not been done in the United States.

Source: GAO analysis of previous studies

The applicability of any particular option is likely to vary by location, considering the circumstances at each major airport. There is no "one-size fits-all" solution; rather, substantially reducing delays will probably require a combination of options spread out over time. For example, the airspace surrounding the greater New York metropolitan area is perhaps the most congested airspace in the Nation. The three major airports in the area (La Guardia, Newark, and Kennedy), which currently are among the nation's most delay-prone airports, are expected to continue to experience substantial air traffic growth. But these airports have very limited expansion potential, largely because they cannot realistically build new runways. Building new airports or developing regional airports to serve these airports are long-term solutions that will likely take many years to materialize. In the meantime, other short-term options would need to be considered as passenger demand increases, such as ways

to use existing facilities more efficiently. This is the direction that FAA and the New York/New Jersey Port Authority, which operates the three area airports, were moving before the drop in passenger demand following the events of September 11.

As demand and delay are once again increasing, the FAA and Port Authority are reevaluating a regional approach to addressing these issues. As noted earlier, FAA and the Port Authority are also considering market-based and administrative approaches, such as auctioning off landing and take-off rights and congestion pricing for La Guardia. However, the airlines oppose auctions because of the uncertainty regarding the number of slots and gates that they might receive. The airlines also, to a lesser degree, oppose a market-based mechanism such as congestion pricing because of concerns over who would have responsibility for the revenue generated. Because major airports in other locations may face different circumstances than the New York airports face, they may need an entirely different set of solutions to address flight delays.

Options—such as building new airports, developing regional airports, or using ground transportation alternatives—are likely to be a more daunting challenge than implementing initiatives in the OEP. Implementing the OEP's initiatives will not be easy, but the opportunity for success is enhanced because FAA has the support of major aviation stakeholders on nearly all of the initiatives. By contrast, gaining consensus on any of these other options could be much more difficult because they change the nature of the system to the degree that each one could adversely affect the interests of one or more key aviation stakeholder groups—including passengers; air carriers; and aircraft operators, airports, and local communities. For example,

- Large infrastructure projects, such as building new airports that are located in metropolitan areas, could create major controversy. Such projects are often opposed by adjacent communities that are fearful of noise, displacement, or other environmental concerns. Also, finding suitable sites for such projects in crowded metropolitan areas—with enough land that is compatible with other potential land uses—may be difficult. Airlines may oppose some types of infrastructure projects if they fear that the projects would adversely affect them. For example, an airline with a dominant market position at a major hub airport may oppose building an additional airport nearby because the dominant carrier may view it as an opportunity for their competitors to enter the market in that area. In addition, some airlines are concerned about the need to divide their hub resources between the current airport and a new airport.
- Administrative, regulatory, and other measures for managing the demand for existing capacity could generate opposition from various sources as well. Airlines may oppose such measures if they perceive that these measures would restrict their choices in determining rates, schedules, and aircraft sizes—all of which could affect their profits and competitive status relative to other airlines. Smaller communities may also oppose such measures, fearing that commercial air service to and from their airports may be reduced or curtailed because airlines would react by choosing more profitable routes for the limited number of airport slots available.
- Cost, a factor to be weighed in adding runways to existing airports, is also an important consideration when building a new airport. For example, the last major new airport—the Denver International Airport completed in 1995—cost almost $5 billion to build. This cost would have been greater had the airport been located closer to the city, but since it was located on open land away from established communities, the costs of noise mitigation and other land-use issues were minimized. Also, the construction of fast-rail service in populated metropolitan corridors is likely to be costly. For example, Amtrak estimates the cost to construct fast-rail service in Federally designated, high-speed corridors and the Northeast Corridor of the United States will be about $50 billion to $70 billion.

In summary, the initiatives implemented by FAA, airlines, and the airports might help to reduce flight delays and increase capacity in the national airspace system in the short term. However, FAA and other aviation stakeholders continue to face a number of challenges in reducing delays at the most delay-prone airports and developing long term solutions for enhancing capacity. Addressing these challenges is perhaps more difficult today in comparison to 2000 because a number of issues have exacerbated the situation. Chief among them is funding these initiatives during a time when the Federal Government and the aviation industry are experiencing significant fiscal problems. Consequently, keeping up with the economy's increasing demand for air transportation services will require a tremendous amount of planning;

making some tough choices about which initiatives, both short-term and long-term, to pursue; and efforts to ensure that such initiatives are adequately funded.

For further information on this testimony please contact Dr. Gerald Dillingham by email at dillinghamg@gao.gov or Tammy Conquest at conquestt@gao.gov. Alternatively, we can be reached by phone at (202) 512–2834. Individuals making key contributions to this testimony include Colin Fallon, Simon Galed, David Hooper, Maureen Luna-Long, Richard Scott, Laura Shumway, and Nicolas Zitelli.

APPENDIX I: LIST OF 35 AIRPORTS IN THE FEDERAL AVIATION ADMINISTRATION'S OPERATION EVOLUTION PLAN, FEBRUARY 2005

1. Atlanta Hartsfield International
2. Baltimore-Washington International
3. Boston Logan International
4. Charlotte/Douglas International
5. Chicago Midway
6. Chicago O'Hare International
7. Cincinnati-Northern Kentucky
8. Cleveland-Hopkins International
9. Dallas-Fort Worth International
10. Denver International
11. Detroit Metro Wayne County
12. Fort Lauderdale-Hollywood International
13. George Bush Intercontinental
14. Greater Pittsburgh International
15. Honolulu International
16. Lambert St. Louis International
17. Las Vegas McCarran International
18. Los Angeles International
19. Memphis International
20. Miami International
21. Minneapolis-St Paul International
22. New York John F. Kennedy International
23. New York LaGuardia
24. Newark International
25. Orlando International
26. Philadelphia International
27. Phoenix Sky Harbor International
28. Portland International
29. Ronald Reagan National
30. Salt Lake City International
31. San Diego International Lindbergh
32. San Francisco International
33. Seattle-Tacoma International
34. Tampa International
35. Washington Dulles International

Senator BURNS. Thank you, and we appreciate your report.

Now we'll hear from Mr. Amr ElSawy, Senior Vice President and General Manager of the MITRE Corporation. Thank you for coming this morning.

STATEMENT OF AMR A. ELSAWY, SENIOR VICE PRESIDENT/ GENERAL MANAGER OF THE CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT, MITRE CORPORATION

Mr. ELSAWY. Thank you, Mr. Chairman and Senator Burns, good morning. Thank you, Senator Nelson. In addressing the Committee today in my prepared remarks, I talk about four topics: Traffic and delay trends, factors contributing to the increased system duplicity, how the aviation community is responding; and finally, specific actions that we must pursue in order to meet the forecasted demand and maintain global leadership.

As the Administrator, Inspector General and Dr. Dillingham have highlighted, there is a lot going on. There's a lot of changes

that have been implemented, improvements have been—are in place; and the challenges have been described extremely well. So I would ask that my prepared statement be included in the record.

But I'd like to focus this morning on how do we meet the future challenges. In order to meet the challenges of the future, the FAA and the aviation community need to be flexible, agile and adaptive to the very changing set of circumstances, requirements and demands. We must continue to implement changes in technology, procedures, avionics and policy that can together increase operational efficiency and productivity; and we believe that the following actions are required to achieve those goals.

Specifically, first, as the Administrator mentioned, relying on the aircraft capabilities and avionics to implement a roadmap or performance-based navigation is extremely significant. This is a most significant change because it is equivalent to adding precise navigation lanes in the sky without requiring greater ground-based equipment.

Moving to a performance-based system will transform the way that the National Airspace System operates by taking advantage of the aircraft's flight management system in avionics. Area Navigation and Required Navigation Performance procedures lead to safety, efficiency and capacity improvements, especially in complex and congested airspace such as Atlanta and the Eastern United States.

Over 200 procedures are being planned for implementation over the next few years. The initial RNP procedure implementation will be in New York's Kennedy, Reagan National, and Houston Airport. The FAA's addressing key challenges to ensure these procedures are implemented expeditiously by streamlining both FAA and industry processes. I emphasize the collaboration required in those areas.

This will provide direct operating benefits to customers and will enable the FAA to reduce the size, complexity and cost of its infrastructure to selective divestment of ground-based navigational aids.

Second action is to accelerate the implementation of airspace changes—we've heard a lot about that this morning—to be more flexible and to accommodate the expected growth in traffic and new airspace users, such as unmanned area vehicles. Again, this has the real effect of streamlining flows into congested areas and providing more efficient, reliable arrival and departure paths for all users.

Third action, emphasize enhancement of automation and decision support tools to enable controllers to handle more traffic by presenting them with automated conflict-free resolutions, thereby increasing system capacity and productivity and improving safety and the quality of the services provided to customers.

Fourth, develop a firm plan for the implementation of air-to-ground data link that will enable controllers and pilots and their respective ground and onboard aircraft automation systems to exchange digital messages that yield efficiency, productivity and safety improvements.

Fifth, improve traffic flow management capabilities, such as access to timely and accurate information, especially for unscheduled flights. That will permit the FAA to identify and solve congestion problems more quickly and efficiently.

Sixth, transition to a new technology, Automatic Dependent Surveillance-Broadcast. This is equivalent to providing pilots with electronic eyes in the sky and will permit the FAA to migrate to a less costly and more accurate surveillance system. By relying on aircraft avionics and the power of satellite navigation, we can improve situational awareness for the pilots, allowing better access and effective communications about weather and terrain. We can also achieve capacity and performance under instrument flight rules, which are only possible today under visual flight rules.

The positive experience and the results shown by the Capstone Phase I program in Alaska are achievable in the rest of the United States.

Seventh, use advanced simulation technologies to train the new controller workforce. This will reduce the time and cost needed to train controllers and will improve trainee proficiency and readiness to implement the advanced concept we talked about.

Eighth, maintain a strategic view of investments in airport infrastructure and runways. The Administrator, Inspector General, and Mr. Dillingham have all emphasized that point.

Ninth, develop a comprehensive air traffic infrastructure consolidation plan. To the extent that we have an aging infrastructure that adds to the cost, we need to figure out how to reduce that; and with the technologies that we discussed, that will be extremely achievable.

And finally, develop and implement policies that enable enhanced access to airports through the use of modern and improved avionics and procedures instead of ground-based infrastructure.

These actions will position us to meet ever-increasing demands and have the potential for improving overall productivity between 20 percent and 40 percent while reducing future operating costs by several hundred million dollars per year.

Over the next year MITRE will be working the FAA's Air Traffic Organization and Joint Planning and Development Office to simulate and validate the productivity and development cost savings.

Mr. Chairman, implementing these changes will keep the United States as innovators and leaders of the global aviation community; and we have a lot of opportunities ahead.

Thank you, Mr. Chairman.

[The prepared statement of Mr. ElSawy follows:]

PREPARED STATEMENT OF AMR A. ELSAWY, SENIOR VICE PRESIDENT/GENERAL MANAGER OF THE CENTER FOR ADVANCED AVIATION SYSTEM DEVELOPMENT, MITRE CORPORATION

Mr. Chairman, Senator Rockefeller, and Members of the Subcommittee, thank you for inviting me to appear before your Committee. My name is Amr ElSawy and I am a Senior Vice President at the MITRE Corporation. I am also the General Manager of MITRE's Center for Advanced Aviation System Development (CAASD), which is the FAA's Federally Funded Research and Development Center (FFRDC). I would ask that my statement be included in the record.

In addressing the Committee today, I will focus on four topics: Traffic and delay trends, factors contributing to the increased system complexity, how the aviation community is responding, and finally specific actions that we must pursue in order to meet the forecasted demand and maintain global leadership in aviation safety, capacity and efficiency.

Traffic levels and delays have returned to levels seen prior to 9/11 in many areas of the country. These areas include airports in Chicago, Atlanta, the Washington area, the New York area, Las Vegas, and south Florida. There have also been in-

creases in traffic in smaller airports in many areas of the country. Examples include Scottsdale, Teterboro, and West Palm Beach. Traffic in major en route corridors is also generating congestion not just due to higher traffic volume, but also as a result of increasing traffic pattern complexity.

The following factors have created challenges that are different than those experienced in 1999 and 2000. For example:

- Regional jets have replaced larger jets and turboprop aircraft resulting in different traffic flows and mix which require changes in operational techniques and strategies.
- North/south traffic flows have increased in the winter months changing how traffic flows must be managed around ceiling and visibility constraints. Unscheduled traffic has grown in south Florida and the Southwest.
- For the coming summer season, traffic growth is expected at Houston, and the NAS will face its usual severe convective weather challenges.
- Traffic increases in areas such as New York and Washington with airports in close proximity to each other resulted in greater complexity due to traffic climbing, descending, and crossing other traffic in the same airspace.
- Denser overhead traffic streams in areas such as the Chicago/New York corridor create challenges in merging the departing aircraft into already full traffic streams.
- Increased security operations (such as Combat Air Patrol and Temporary Flight Restrictions) have also generated challenges in accommodating higher volume and more complex traffic around restricted areas such as within the New York and Washington airspace, as well as during major events.

The FAA and aviation community have responded to these new challenges in such a way that performance across the NAS is good by most measures:

- The airport and customer community and the FAA worked together on actions to minimize delays resulting from major growth at Chicago's O'Hare and Washington's Dulles Airport. Emerging issues resulting from growth at airports such as Fort Lauderdale and Las Vegas are being actively worked.
- The FAA, the airports, and lead carriers have increased airport capacity through the development of new arrival and departure procedures that use aircraft navigation capabilities. For example, new area navigation (RNAV) departure procedures were implemented at Atlanta's Hartsfield Airport. In addition, new procedures are being implemented at Dulles, Las Vegas, Portland, Philadelphia, Dallas Fort Worth, and South Florida.
- Airspace changes have also been worked collaboratively to relieve congestion points in new "hot-spots" such as south Florida. In addition, the vertical separation minima have been successfully reduced in high altitude airspace and are providing controllers with more flexibility to move the traffic.
- The FAA has been continually refining procedures and actions in conjunction with the customer community to manage traffic flows to minimize delays when congestion does occur.
- The FAA worked in collaboration with organizations that provide flight services for unscheduled operations to receive more timely and more accurate information on planned flights.

Beyond this year, commercial and general aviation will continue to see changes. The NAS will likely continue to see traffic growth, changes in the traffic patterns between major airports and metropolitan areas, and changes in the mix of aircraft that make up the traffic. In addition, unmanned aerial vehicles (UAV), very light jets, and commercial space launches will need to be accommodated in the NAS, with each bringing their own challenges for the operation of airspace, controller workload, system complexity, and overall operational productivity. Projections developed by DOT, FAA and MITRE (and documented in the *Capacity Needs in the National Airspace System*) indicate that by 2013, 15 airports and 7 metropolitan areas will need additional capacity to meet expected demand.

In order to meet the challenges of the future, the FAA and the aviation community need to be flexible and agile in adapting to changing requirements and demands. We must *implement* changes in technology, procedures, avionics, and policy that can—together—increase operational efficiency and productivity. We believe that the following actions will be required to achieve those goals:

Take advantage of aircraft capabilities and avionics to implement the Roadmap for Performance-based Navigation. This is a most significant change because it is equivalent to adding precise navigation lanes in the sky without re-

quiring ground based equipment. Moving to a performance based system will transform the way the National Airspace System (NAS) operates. By taking advantage of the aircraft's flight management systems and avionics, Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures lead to safety, efficiency and capacity improvements, especially in complex and congested airspace such as Atlanta, and the Eastern United States. Over 200 procedures are being planned for implementation over the next few years. The initial RNP procedure implementations will be in New York's Kennedy, Reagan National, and Houston airports. FAA is addressing key challenges to ensure these procedures are implemented expeditiously by streamlining both FAA and industry processes. This will provide direct operating benefits to customers and will enable the FAA to reduce the size, complexity, and cost of its infrastructure through selective divestments of ground-based navigation aids.

Accelerate the implementation of Airspace changes to be more flexible, and to accommodate the expected growth in traffic and new airspace users such as UAVs. Again this has the real effect of streamlining traffic flows into congested areas and providing more efficient arrival and departure paths for all users.

Emphasize enhancement of automation and decision support tools to enable controllers to handle more traffic by presenting them with automated-conflict free resolutions, thereby increasing system capacity and productivity and improving safety and the quality of service provided to customers.

Develop a firm plan for the implementation of air/ground data link that will enable controllers and pilots, and their respective ground and onboard aircraft automation systems, to exchange digital messages that yield efficiency, productivity, and safety improvements.

Improve traffic flow management capabilities, such as access to more timely and accurate information (e.g., for unscheduled flights), will permit the FAA to identify and solve congestion problems more quickly and efficiently.

Transition to Automatic Dependent Surveillance-Broadcast—This is equivalent to providing pilots with electronic eyes in the sky and will permit the FAA to migrate to a less costly and more accurate surveillance system. By relying on aircraft avionics and the power of satellite navigation, we can improve situational awareness for pilots, allowing better access and effective communication about weather and terrain. We can also achieve capacity and performance under instrument flight rules (IFR), which are only possible today under visual flight rules (VFR). The positive experience and results shown by the Capstone Phase I program in Alaska are achievable in the rest of the United States.

Use advanced simulation technologies to train the new controller workforce. This will reduce the time and cost needed to train controllers and will improve trainee proficiency and readiness to implement advanced concepts of operation.

Maintain a strategic view of investments in airport infrastructure and runways. We must continue to build runways and improve taxiways to stay ahead of the demand.

Develop a comprehensive air traffic infrastructure consolidation plan.

Develop and implement polices that enable enhanced access to airports through the use of modern and improved avionics and procedures instead of ground based infrastructure.

These actions will position us to meet ever increasing demands and have the potential for improving overall productivity between 20 and 40 percent while reducing future operating costs by several hundred million dollars per year. Over the next year, MITRE will be working with FAA's ATO and JPDO to simulate and validate the productivity and cost saving estimates.

Implementing these changes will keep the United States as innovators and leaders of the Global aviation community. We have a lot of opportunities ahead.

Thank you, Mr. Chairman. I would be happy to answer questions.

Senator BURNS. Thank you for your testimony, and I've just been handed a note by our Chairman. He has an obligation at 11 that is sort of a must, and I'm going to give way to Senator Stevens. Senator Pryor's joined us.

Do you have a statement?

STATEMENT OF HON. MARK PRYOR,
U.S. SENATOR FROM ARKANSAS

Senator PRYOR. No. I'm anxious to hear Senator Stevens's question.

Senator BURNS. Thank you very much. I'm not too anxious to go to the end, but we are going to anyway. Senator Stevens.

The CHAIRMAN. Thank you very much, and I'm sorry, but we do have a conference on allocations of funds, appropriations and it's——

That leads me to my first question, Ms. Blakey. We had a long discussion about the concept of up-front money and paying it off over a period of years, a concept of creating some sort of an entity that would bond and go to the general market to get funds and be repaid through the normal flow of funds to FAA.

Have we come anywhere close to that yet?

Ms. BLAKEY. After your initial discussion about this in January, certainly we began looking at this very carefully; and we held a forum at the end of April where we were looking at the various ways to approach changing the funding structure for the Trust Fund and also looking at the challenges there. We also brought in a number of the analysts from the financial community who were real experts on the issue of bonding and debt financing and how it can be approached; and I was very encouraged by the number of ways that this can be addressed, even in a government context.

I will also tell you that it was very interesting because we invited the Tennessee Valley Authority, the TVA, which is one of the examples where debt financing is being used in the Federal Government arena. And again, they talked about what this has made possible in terms of capital investment in the Tennessee Valley. It's very impressive.

I can't tell you where we may go at this point from the standpoint of proposals; but we're looking forward very much to sitting down with you and others to discuss what the potential could be. But this is obviously one of the ways you can have a large trough of up-front capital to invest in the Next Generation System to really begin to get the benefits of that and lower the unit costs, which is something we all want to do when we're talking three times the travel.

The CHAIRMAN. If we look at the myriad of instances in our Federal Government where immediate up-front capital is needed for modernization and look at the Federal budget, it's really not possible to achieve what we have to do in a short period of time without charting a concept similar to TVA in several different places in the government and relying on private capital to come in and take part of the risk; but actually, they will be relying upon the continued level of existing appropriations in various areas to repay the bonds to be issued.

I still think that that's the only way to accomplish what we have to do in aviation, and I would—I think Chairman Barton and I would be pleased to call a summit between literally everybody to sit down and work out something jointly so we can introduce—to start this on its road.

I think we absolutely have to have that money up front; and you have to know how much you have before you can really solidly fol-

low Mr. Mead's suggestions that some of them—maybe not all of them, Mr. Mead—but most of them; and I think he's been very astute in pointing out the areas of real concern; and there has to be some prioritization on that. But I do hope we can get to that point.

I want to applaud what you've done in terms of Reagan Airport. I think that solution, if it works, ought to be looked at to see how we might regulate the use of general aviation at some of these highly congested places. Now, they may not like to hear that, but there's just too many new business jets coming online for you to—and put them fully into the total freedom of the airways system as it's existed in the past.

I think we'll have to find some way to prioritize flights and to have some flights—some entities know how many flights a week they can have in a certain airport, rather than just an announcement that they're coming 2 hours from now. That concept of advanced planning has got to come into this. Am I right? Mr. Mead, do you disagree?

Mr. MEAD. No, sir. No, sir.

The CHAIRMAN. Are we going to have to move to a satellite-based system for your communications? Are we going to change our basic concept of communications as these new technologies tumble in communications? Are you going to broadband? Are you going to save your existing system? What's going to be the basic communications concept for your airwaves into the future?

Ms. BLAKEY. I think there's no question about the fact we will be moving very significantly to a satellite-based system; and we, of course, are looking at the communications issues in terms of spectrum and what will be required. We have a real expert at the table in Amr ElSawy.

Amr, you might want to address that.

Mr. ELSAWY. Thank you, ma'am. I think the answer is, we'll have to use multiple communications systems. Satellite communications is an integral part of the future concept. ADS-B is an integral link, is an integral part of the concept.

As we move to the future with routing technologies and Internet technologies, we are able to, in fact, have every element of it be addressable with an address so that we can know where it is; and we can direct communications to it. And I think that broadband communications, satellite communications, ADS-B are all elements of the future—for the future concept.

The CHAIRMAN. Well, what you choose will really have an impact on the modernization of some of the aircraft, right? I think you have to be—people have to know in advance what you're going to do.

Mr. ELSAWY. Precisely.

The CHAIRMAN. Let me thank you for your comment about Capstone.

Mr. Mead, did you ever look into the Medallion program in Alaska as far as safety is concerned? Are you familiar with what we've done up there?

Mr. MEAD. I'm not familiar with the term Medallion, but I am familiar with Capstone and ADS-B.

The CHAIRMAN. Medallion is a voluntary concept that was worked out with Ms. Blakey, and it is a concept of continued up-

grading of pilot skills and commitment of the entities that own these aircraft to the expenditures that are necessary to accomplish that.

We have reduced our fatalities in aviation dramatically; and we have increased awareness of not only the pilots and the basic operators but of the public, of the things that must be done to reduce the fatalities in aviation in our state where, as you know, we only have one main road system. We depend either on air or water for basic transportation. Seventy-five percent of all travel in Alaska is done by air.

But I think you should study it and see if we can't take that out into other areas where they have substantial amounts of general aviation and make—this is a system for general awareness of—of the things that can be done to make flying safer.

Mr. MEAD. I think that program in Alaska has tremendous merit. I really think it is the wave for the future. The only sad part about it is it took so long to get started. There was a fair amount of resistance.

The CHAIRMAN. A little bit of money helped.

Mr. MEAD. Money always helps.

The CHAIRMAN. I think Congress would be perfectly willing to put that up. That was not that much money. After that it became all voluntary support, not Federal money now. Isn't that right, Ms. Blakey?

Ms. BLAKEY. Absolutely. I must tell you, Mr. Chairman, we invited the Capstone Foundation down this spring to join a group of carriers that do not have scheduled service. Whereas, you know we are having some challenges in the lower 48 these days. We really felt that the Medallion Program was a great example of how you can incentivize the private carriers to really step up the pace on the safety front.

The CHAIRMAN. I have a few of my friends coming up to join me for a little bit of marine research this summer. Maybe we can arrange to have some meeting there while we're there for them to talk a little bit about Capstone and about Medallion. They may be able to take it home with them.

Thank you very much, Mr. Chairman.

Senator BURNS. In other words and where I'd say, we're going fishing. Senator Nelson.

Senator BEN NELSON. Thank you, Mr. Chairman. Thank you, Senator Burns. My question with regard to the short-term response to congestion that we might be facing this summer or that we have faced is—I am thinking of capacity issues at O'Hare, just as one example, since many of the flights coming into and from Omaha and Lincoln will go through Chicago as a hub.

Now, my first question is: When there is a backup and flights are getting canceled or delayed, how is it determined which ones to cancel or delay? Is it based on the size of the airplane and the capacity—the passenger capacity? Is it based on where the flight is coming from or going to? Is pain shared equally? Is it based on smaller airports versus larger airports? What is—how is the determination made for those decisions?

I would—I guess, Ms. Blakey, you probably are under some duress to make those decisions or help airports establish priorities.

Ms. BLAKEY. Well, I'll tell you, we certainly have paid a great deal of attention to the issue of service to smaller communities and trying to make sure there was an equitable approach in the system where we have had, in effect, limited capacity. Most of our airports, of course, we have not had to do that; but O'Hare is an example where we were forced into that; and we are talking about essentially 88 arrivals an hour in that congested period. That is to say, there was a very definite concern and a good bit of discussion given to making sure that the smaller communities remain served.

The specific decisions, though, about which flights are delayed or canceled are those of the airlines. The carriers themselves look at what is happening in terms of delays at that airport. They realize that maybe we're only getting 62 flights an hour out instead of 88 because of low ceilings or other kinds of problems.

As you know, O'Hare has wind problems and bad weather; and it is at that point that the carriers themselves have to look at such things as the load factor onboard the aircraft, how many people, where's it going, do they have backup service there, and will there be another flight in an hour or two. All those are kinds of things the airline itself and the dispatcher makes the decisions.

Senator BEN NELSON. Is there any oversight over their determination? In other words, if our concern is for equitable consideration, is that applied to their decision-making process and the results of that process?

Mr. MEAD. I think there's very little oversight of the airline decision-making process on what flights to cancel.

Senator BEN NELSON. Do you have any data that would show over a period of time the cancellation of or delaying of flights that might help us understand how they—how they've decided it or at least look at the results of their decisions?

Mr. MEAD. I can assemble that data.

Senator BEN NELSON. I would like to see it.

Mr. MEAD. If you like. And we'll speak to your staff afterwards about it. A short discussion would be helpful.

I also think—there were really two parts to your question. One part was, how do you get the flight scheduled in the first place? You know, in a place like out of O'Hare or LaGuardia——

Senator BEN NELSON. Or McCook International or Lincoln or Omaha.

Mr. MEAD. You have plenty of departure space in your state. It's the question of getting from a hub—a place like Chicago O'Hare to there, especially now that Chicago O'Hare has administrative caps. And I think the first part of your question had to do with how much you set aside for service to small communities in terms of flights.

The second part of your question is, well, once you've done that set aside, and a decision has to be made about whether to cancel one flight over another, how is that decision made?

Senator BEN NELSON. Well, if pain is spread out equitably, I think everybody understands; but if pain is disproportionate, a lot of folks won't understand. Some people will be happier while other people will be clearly, less happy.

And certainly in a state like Nebraska which would not—Omaha is not going to be in the top one or twenty-five airports; but it's cer-

tainly number one in the State of Nebraska and Eastern Iowa; and Lincoln becomes important and so do all the other airports that experience Essential Air Service issues.

So I would be very happy to see what—how this decision-making is done and what the effects of it are because I think that we're certainly going to look at efficiency, cost effectiveness; but we have to look at the equitable treatment of passengers and communities as well.

What—Ms. Blakey, what is the commitment to smaller airports? We continue to go through the battle for Essential Air Service funds every year, and they're cut. We fight. We get some money in; the next budget comes around; and they're cut; and we go through this dance every year.

Is there a commitment to smaller communities that are, by nature, inefficient but totally dependent on travel? The Chairman says about Alaska that 75 percent of their travel is related to—not to road transportation or surface transportation but to air transportation and water transportation.

I don't know how cost effective it is up there. I know it's probably not cost effective to some of the small airports in Nebraska, but it is essential. That's where we go for these Essential Air Service funds. What is the commitment?

Ms. BLAKEY. Well, the Essential Air Service program is one that the Department is funding; and while it is a Department of Transportation program, not an FAA program so I do not have direct responsibility there, I can tell you that we are assiduously collecting the overflight fees from those carriers, that overfly the U.S, mostly foreign flights, obviously, to be able to put up the $50 million from that source.

Senator BEN NELSON. Do you think that is—it's obviously better than nothing, and it's a lot better than nothing. How far off the mark would you say that this—how much more would we need to really fund Essential Air Service?

Ms. BLAKEY. I've not done any analysis of this because, again, it's outside my realm of responsibility; but I will tell you this, there are several changes in terms of what's going on with the fleet mix that I think are very encouraging to smaller communities to move to smaller regional jets, which really can work out of smaller communities and make it cost efficient for the carriers which is, at the bottom of it, very critical.

The move to the microjets is an example. As we're talking about this movement to four- and six-seat small jets, which are cost efficient, I think you will see much more service into these smaller areas. So those things I think will make a difference.

One of the things, though, that's a countervailing pressure is the fact that many of the low-cost carriers are serving relatively significant city pairs. That means a lot of people are driving instead of flying out of the smaller communities. I can tell you when I sit down with small airport directors, they often bemoan the fact that they will find people in their town willing to drive 200 miles to get a good airfare rather than use the air service going out. So it is an issue there that there are countervailing pressures that the market is largely sorting out.

Senator BEN NELSON. My time has expired. Thank you, Mr. Chairman.

Senator BURNS. Thank you, Senator Nelson.

I think my microphone went dead. So I'll just lung it. I have a couple questions and a followup on what Senator Nelson said.

We who live in rural areas not only whenever we start making the decisions of—in airports like O'Hare, usually those decisions—the delay of persons going to North Platte, Nebraska, or Omaha, Nebraska, that's not because that's where you usually terminate.

What happens is, and when it gets very expensive for travelers, and you really get an amount of humor is when they leave North Platte or Scottsbluff or Omaha and they can't—and they—they're delayed getting into Chicago; and they misconnect; and then you go through this process of a rebook; and then that next flight is sold out.

So we've got this big tie-up that is really—not only is it expensive for the airlines, but it's also expensive for the traveling public because you lose—sometimes you lose an entire day.

In Montana, we've got to make the early morning flight or the evening flight. We don't have anything in between. So we are very, very much aware of those delays that's in a principal or a major hub. Minneapolis being mine to get—and of course you use Minneapolis.

But I wanted to followup on that because sometimes I think we are—we are caught in sort of a catch–22.

If the FAA doesn't, say, monitor some of this, so to speak; and you have a report on it, Mr. Mead, I would be interested in the same report; and if MITRE would have some of the same information, I would be anxious to look at that.

New runways, environmental streamlining continue to be a challenge for us. I guess it is more from a financial end of it or economic end of it or the availability of capital end of it rather than the policies set by government. Is that a true statement? That's for anybody to address if——

Dr. DILLINGHAM. Mr. Chairman, I think you know, the things that Congress has done in terms of streamlining the runway construction process and, in fact, from the work that we've done, we see that there's ample funding for runways. The problem seems to come in the local jurisdiction more than anything else.

There tends to be a lot of groups and persons who are not enamored about having an airport in their area or runway extension that may be involved with environmental issues or noise issues. So I think it's the latter as opposed to the former.

Senator BURNS. Do we—does MITRE have an estimate on what those kinds of discussions and those kinds of delays, what it costs us in the end to save—to expand an airport or to build a new one?

Mr. ELSAWY. We don't, sir; but we would be happy to look at it.

Senator BURNS. How about Ms. Blakey and the FAA?

Ms. BLAKEY. Well, we've got some broad figures in terms of what it has cost recently. It's a little bit hard because every runway is different; so I don't want to extrapolate too much. I wouldn't want us to just divide this up. But the cost of the last eight runways that we did was approximately $1.96 billion; and out of that, the U.S.

Government—the AIP funding was $941 million. So about half, roughly, is what the AIP funds put up.

Now, for 2008 we're expecting to have eight more runways come onboard. The price has jumped way up. At this point we are talking $4.75 billion for those; and again, AIP funding for this is going to be somewhat over a billion dollars.

Senator BURNS. I know it's costly whenever we start talking about getting things done in the local community and environmental rules and this type of thing. So I'm not real sure we shouldn't look at that.

Our numbers of traveling people will almost equal 2000 shortly. They may even make it in 2005; but yet even though our numbers are back, we have increased traffic in the air.

Give me some idea of the comparison and the challenge you might have from—in those 2 years of trying to handle that traffic.

Mr. MEAD. Well, I think one example, a good one, is the regional jets. Regional jets, of course, hold fewer people. Back in 2000 10 percent of flights were regional jet based. Now they're 32 percent. There's an increase in operations there.

Senator Stevens has pointed out repeatedly this phenomena that's expected to hit next year, these microjets. To buy a jet right now at the low end, you're probably talking seven or eight million dollars. There are jets that are going to be hitting the market next year that are—they are originally taking orders for slightly under $1 million and are now up to about $1.2 million. There's a lot of controversy about where exactly are these aircraft going to fly? Questions also focus on: Are they going to be air taxis? Are they going to be fractional ownership with business people? FAA is going to have to deal with this.

Now, the big difference for FAA is that these planes are not propeller-driven. So they are flying up there at high altitudes with your big 777s. They basically have the same impact on air traffic control that's quite comparable to a 777, whereas the old propeller planes did not.

Ms. BLAKEY. I have to admit, I will put in a plug for the fact that certain passenger traffic is coming back; and that's great. The fact of the matter is, we are seeing smaller aircraft carrying those passengers, which means from a workload standpoint for the FAA, it is really ramping up; and that is something we all need to recognize because more aircraft in the sky with fewer numbers of people in them—obviously from our standpoint, it costs the same thing to move a small plane as it does a big one.

Senator BURNS. Senator Pryor.

Senator PRYOR. Thank you, Mr. Chairman.

I think that the witnesses have given us a good sense of what some of the challenges are. You've got some congestion problems; clearly you've got capacity problems, some now and maybe large capacity problems down the road. You've got changing circumstances with these microjets or very light jets, I've also heard them called; and the regional jet phenomenon, even though I like those personally because a lot of those fly in and out of places I fly in and out of.

I understand it does exacerbate the problem or at least it adds to the circumstances in which you have to deal because they occupy airspace, ground space, etc., etc.

Also another thing I think you've touched on, but I just want to make sure that we're on the same page here. So as another concern I have, and that is high-growth areas. We have one part of my state that's growing very very rapidly. It's the northwest corner of the state. It's about four, five counties up in this part of the state that are really among if not the fastest-growing part of the entire Nation.

That's where Wal–Mart, Tyson Foods, University of Arkansas, J.B. Hunt and Trucking, among other companies, are located there; and it is expected to double in population over the next 20 years. I mean, this is a very rapidly growing area. Ten years ago they didn't have a large airport at all. They've now built one.

And the only reason why I mention that is because when I look at you all having to make funding priorities, and certainly you have a lot of challenges in making determinations on where to do capital improvements, where you should have runways and all those things, what makes sense today may not make sense 15 years down the road.

And when you make a big investment in infrastructure, like a runway or more capacity in one way or another, I just hope you'll look to the future and look for areas like what we have in the northwest part of Arkansas; and I'm sure there are a lot of other areas around the country that are experiencing that type of growth; and I just hope you'll be sensitive to that growth.

Another thing that we touched on, but I just would like to get your thoughts on—Ms. Blakey, maybe you're the best one to mention this—is trying to manage the congestion at these larger airports. Not to pick on O'Hare, but we'll talk about Chicago O'Hare.

Let's just say that we've got a regional jet coming out of one of our airports in Arkansas directly to O'Hare; and then there are larger planes coming out of other cities that are connecting into O'Hare; and there's only so much capacity there. Might we get bumped out of O'Hare and our access to O'Hare if the capacity there—or if the capacity there is strained too much?

And so I just have that concern. Do you have any thoughts on that? We kind of get squeezed out as you're trying to manage the slots in and out of, say, O'Hare.

Ms. BLAKEY. Well, it was a legitimate concern of ours, I will tell you, when we did have to impose administrative caps on O'Hare. We analyzed pretty carefully what the major carriers were, therefore, planning to do in terms of either flights that they were moving to the less congested part of the day; there was a good bit of that going on, but also those that were actually canceled on a permanent basis.

We actually found there was very little loss of service—actually none, in fact, to small communities in terms of absolute service. Now, it may have dropped from four to three flights a day, two to one flight a day; but this was a handful of flights. We're not talking significant numbers at all. This was almost a year ago now when a lot of this took place. So I think at this point what the concern would be, I'm sure on your part, is when bad weather hits and can-

cellations hit, is there some view that it's the larger cities that are being served.

I think the Inspector General is taking a look at that and giving us some sense of what happens—that would be a very valuable thing.

Let me return, if I might, to—because as I say, it really is a decision of the carriers. It's a market-based decision.

Senator PRYOR. Right.

Ms. BLAKEY. Let me return to your point on high-growth areas because you are hitting on an important point. One of the things we are doing right now is updating a study we did a couple years ago. We carried it out over last June; but we will quickly update it, looking at 300 communities around the country in terms of what their airport needs will be, looking at 2020 and 2030 and trying to forecast on the basis of the kind of economic and demographic trends you're talking about, where we really are going to—where we are going to need more infrastructure because I think it's vitally important that we anticipate that; and we plan for it.

So we will be bringing out an update on that, and we will certainly be looking at that section of Arkansas.

Senator PRYOR. Great.

Mr. MEAD. One thing that would be good to look at, is FAA's planning profile for airports. I think it's called the NPIAS for short. It's like a national airport planning guide. It would be good to see what the State of Arkansas has submitted in terms of its own expectations for that area of Arkansas.

FAA waits for the area to make suggestions, and there is the document I mentioned. I'll look at it and check it out when I get back to the office this afternoon.

Senator PRYOR. Great. Thank you. Because when you look at, say, the Little Rock area, it's growing about the same rate as the Nation is growing. It's kind of a steady, solid whatever. But that northwest part is really just booming.

Let me—speaking of that northwest part of the state, general aviation, as I understand the microjet or the very light jet phenomenon that's coming, first question I had on that is: Are these coming on the market just because of market-based dynamics? Or has the Federal Government somehow now authorized these lighter jets and so they're entering the U.S. market for the first time? I just don't know the history of that.

Ms. BLAKEY. It's a market-based phenomenon. Some entrepreneurs looked around and decided there was a way to take this technology that had been developed and really be able to put it into a very highly cost-efficient very small aircraft. However, the FAA does have a significant role in certifying it. We must certify it from a safety standpoint before they will ever market it. That's in the process now.

Senator PRYOR. That's in the process now. So I guess another one of these things that you have to consider is you have a lot of congestion around a lot of airports and with these small microjets, or very light jets, that's just more planes in the air, more capacity that's needed, and more congestion's created.

So I would assume that smaller airports maybe near large airports, but smaller airports might pick up a lot of that traffic be-

cause they just can't get into larger airports with the more congested airspace. And I assume, therefore, we need to look at the infrastructure requirements of these smaller airports and look at the general aviation needs of these smaller airports.

Again, it may be very different. If this market does develop like you have indicated, just what will that look like over the next decade or two decades. Any comments on that, I'd appreciate it.

Ms. BLAKEY. Well, I'll certainly say this, the intent, I think, in a lot of the utilization of these small jets is to be able to go into smaller airports, fly point-to-point, closer to where people want to be. After all, who wants to be in the downtown congestion of Chicago if there's another airport closer to where you actually want to go, using the pavement that's out there?

We really don't have a pavement problem in this country. We have one only in terms of these large congested airports. Otherwise, we have a fair amount of tarmac to use. So I think you will see that going on; and it will be a very good thing from the standpoint of congestion.

In terms of Federal funding for airports, you will see if you look at the funding from the Airport Improvement Program, a very significant amount of that funding does go to smaller airports. Larger airports have a lot more flexibility in terms of bond authority, in terms of going to private sources; and they also use passenger facility charges, PFCs, so they can raise money through that. Smaller communities get a fair slice of the AIP funding.

Mr. ELSAWY. If I may add, the issue of access. Senator Nelson asked a question; and you did too, Senator Pryor. I think one of the really pieces of good news here is with the Wide Area Augmentation System. You now have access and precision navigational capabilities at close to 5,000 airports in the United States with the procedures that we talked about.

Now, the requirement for infrastructure, ground-based infrastructure is minimized while the access is actually increased because you now have precision navigation capability almost a category one to a lot of these airports. So in terms of enabling the small communities and enabling access to small communities, the area navigation procedures the Administrator mentioned earlier, the Required Navigational Performance, the higher capability in the aircraft all will contribute toward actually increasing the access with precise navigation and the satellite-based system; but we have to put the procedures in place to make sure that actually materializes.

Mr. MEAD. That's an important point because one thing that may happen with these smaller—these very light jets is—depending on the market for on-demand air taxi service looks like to airports that don't really have scheduled service now. There will be an expectation that they have precision landing capabilities.

Senator PRYOR. Thank you, Mr. Chairman.

Senator BURNS. Thank you. I've got—oh, my light's back on.

I've got a couple of questions, and I think everybody else has kind of covered them. A couple questions.

Mr. Dillingham, in your report, how much will people put up with delays and problems in an airport before they start avoiding that airport? In other words, when I go into New York, I'm just

going to go around LaGuardia. I'm going to try Newark or I'll try Kennedy or I'll try something else. What's our breaking point when we start saying, I'm not going to connect through Chicago anymore; and I want to go to Minneapolis or I'll try to hub out of somewhere else; but I don't want to go through Chicago?

Dr. DILLINGHAM. Mr. Chairman, it's pretty hard to predict where the individual tipping points are; but even personally, I try not to go through Chicago in the wintertime because you never know what will happen; but I think a part of it fits into the plan.

That is, if people can, in fact, go to airports other than the major hub airports, that might help with the situation. So it's an individual decision, and I don't know if you can sort of make that for anybody.

Senator BURNS. Well, in other words, I guess we've all got different levels of intolerance, I would assume.

Dr. DILLINGHAM. Yes, sir.

Senator BURNS. Mr. ElSawy, would you like to comment on that?

Mr. ELSAWY. I agree with Dr. Dillingham.

Senator BURNS. This is something for the whole panel. Some technologies are under consideration, like better surveillance for controllers and pilots. They will require users to equip new avionics. I would imagine this is more geared toward the MITRE Corporation here. This has been a roadblock in the past.

What incentives could FAA rely on to speed up the introduction in these new systems? Is there anything we can do or the FAA can do to require airspace users to install and equip new avionics?

Mr. ELSAWY. I think that, as the Administrator mentioned earlier, as we think about the aircraft as being an integral part of the system, to the extent that the aircraft is capable, the system will operate better; and the examples we saw with the area navigation which was just one example with avionics in the aircraft are really helping us change the procedures, changing the ways to control the traffic.

If we think about the traffic and the volume and complexity and growth and the way we manage traffic today, the controller's actually voicing commands and vectors to the aircraft. Changes the frequencies, changes the vectors, re-routes are all today voiced.

If you think in the future, those routine types of communications can be, in fact, data-linked to the aircraft. Using existing avionics that they have on the aircraft today that they use for airline operational communications, we can, in fact, start the process of changing the procedures, reducing the requirements of voicing commands and increasing the precision and the predictability of the communications, also contributing to a reduction in the operational errors and that is as a result of hear-back/read-back errors.

So I think that as you go forward, the data-link technologies will be critical in helping us improve; and I think the incentive will come from efficient streaming of flows in and out of major areas. And certainly the airlines are very very aware of the benefits of data link and for their operational control.

Senator BURNS. Anyone else want to comment on that?

Mr. MEAD. I think it's important to look at this transition that Chairman Stevens was referring to. How quickly it's going to occur; how quickly you're going to come to a vision of the future is going

to be dependent on how quickly you have universal equipage. FAA's going to have to make some hard calls on some policy issues.

Historically, FAA has tried to rely on voluntary equipage for long periods of time. It gets to be very controversial when you start to tell the carriers or general aviation that they must purchase and install certain avionics. So there's some hard calls ahead.

Ms. BLAKEY. I do think, though, that the carriers respond very well when we begin to say you can reduce the unit cost. So we can have a lot more capacity for less money per aircraft in terms of what it's going to cost to move them through the system.

The other thing that I would mention is that we do also have to remember that there's some foundation building blocks in modernization we're going to have to stick with. The host, if you will, for the entire aviation system of air traffic control is going to be based on a new program called ERAM.

Now, I'm very pleased to say that ERAM is on schedule and on budget; but it really will be the enabling technology for all this. And we're going through a major modernization of our terminals; and again, terminal modernization will have to take place so that some of these other further-out-there technologies will really be incorporated.

Senator BURNS. Now, this leads me to my last question. The Subcommittee is worried about the comments being made that the U.S. airspace industry is losing its competitive edge and that other countries are moving forward technologies that we have abandoned, like controller/pilot data link. Are other countries ahead of us?

Ms. BLAKEY. No, I don't think so.

Senator BURNS. In comparison, I mean around the world.

Ms. BLAKEY. I think what's happening is this: we're seeing major resolve on the part of the European Union in terms of moving ahead with their aviation systems, both the Galileo satellite-based system as well as what they call SESAME, which is their Single European Sky initiative, with a major commitment to air traffic control technology.

They're not ahead of us yet; but they are making major investments. And I think we have to recognize that so that as we are looking at this and the expressed desire on their part to assume the leadership position in aviation technology, which the United States has always held, it certainly is a challenge.

Senator BURNS. What do we have to do to stay ahead and be the imagination of air traffic control?

Ms. BLAKEY. Well, I think one of the things we have to do is stick with the plan that we have laid out. We do have a plan for the Next Generation System, and we will be updating that and bringing that to this Committee before the year is out.

I think you're going to see some very exciting progress on the very things that the Inspector General's saying. We need to have near-term deadlines. We need to know what the investments are, and we need to make real progress over the short range as well as the longer term. We're very committed to making that happen. I think we can do it.

Mr. MEAD. I second that. Senator Stevens made a point about financing. And he's right to be concerned about it. The current situation the FAA is facing, as Mr. Dillingham said, is untenable.

But before you have a financing plan, people have the right to ask how much money do you need; and what do you need it for; and when do you need it? So I totally second what you just said.

Senator BURNS. Mr. Dillingham, I saw your eyes light up.

Dr. DILLINGHAM. We have just started a major study to answer just the question that you've just asked. Where are we; where do we need to be; and what do we need in order to get there?

Senator BURNS. I would imagine—policy has always been on this Committee no matter what field we talk about, we talk about communications or whatever. We try to kind of stay technology-neutral. We figure the marketplace determines what technology will be used and what can be the platform that will launch us into the future and that we can't make that decision as policymakers; but it has to be made by the folks who use these systems.

And I'm wondering—I would hate to get into a position as policymakers to be dictating what we use because nine times out of ten, that will change. Technology changes every—well, more often now than ever before; and you know, we don't change all that quickly.

I've always laughed at how long does it take with government, the bureaucracy to change a lightbulb? Nobody really knows because some of them don't change anything; and we're reluctant to do that; and I don't want to get locked into a technology or a system that prevents us from moving to the next generation because it will change.

How much redundancy in our R&D do we find between NASA and FAA? And can we save dollars there on what each other's doing? Have you ever taken a look at that?

Ms. BLAKEY. I think it's a very important question. What has happened is over time, in terms of R&D, more and more of the research for the air traffic control system has shifted from the FAA significantly to NASA. I might say MITRE also does very important work for us in that area, but NASA is doing some critical work.

The great thing that I must really compliment this Committee on is Vision 100 because when you all called for this plan for the Next Generation System, you said you wanted five agencies of government to pull together: NASA, the FAA, the Department of Transportation, but also the Department of Defense and Homeland Security, they spend significant research dollars as well. And the Department of Commerce is also included because they have the Weather Service, and we've been talking about weather all morning.

With all of that research, we are working very hard to align those research plans and to look at the budgets we're submitting to OMB and then to the Congress. You'll see a lot of that in 2007 where they really are aligned in a way that didn't happen before; and I think it is going to give the taxpayer a lot more benefit for the dollars that are going into that.

Senator BURNS. Do these agencies collaborate and communicate?

Ms. BLAKEY. Absolutely. And they're doing it through a joint planning and development office that was part of the Vision 100

approach. So it is an office that the FAA and NASA are significantly putting resources into and so are the other agencies. We have eight different teams, and each of these agencies is leading at least one of them where they have the particular expertise. But the key is to look at the research dollars, look at the budgets and say, are we spending it on the right things; and are we duplicating or are we complementing and pulling it together?

Senator BURNS. Mr. ElSawy?

Mr. ELSAWY. I'd like to address the issue of leadership because I think there's a really good news story here.

If you look at leadership, leadership comes with implementation. The United States was the first country in the world to have a conflict probe in the airspace most advanced in the world, and it's implemented its operating inspection system today. Time-based mirroring systems are implemented in the system today. We are providing leadership, really, for the entire world in area-based navigation, based on what is happening today.

The implementations in Alaska, ADS-B is absolutely essential to helping the rest of the world move toward ADS-B concepts. So I think we've been very successful with implementing; and I think that ought to be our strategy going forward, getting it done, leading the way.

Senator BURNS. I would say we need competition in the research area because competition usually gives us a lot better product at the end of the day; but I do feel every now and again that redundancy is somewhat—I don't know how you judge it, to be quite honest with you; but I would look at that to save some dollars because we're going to have to do some more work.

I have no more questions for this panel, and I appreciate you coming this morning. There are other Senators that have got conflicts this morning and couldn't make it. They will probably have some questions. If you could respond to their questions and submit your responses to the Committee for the record, we would appreciate that.

And we appreciate your testimony this morning and also your work that you're doing because I know it's one of those—it's in progress every day. And I appreciate your dedication to that and to keep us flying. Keep us flying safely and hope we get from A to B.

And have a nice Memorial Day weekend. Stand adjourned.

[Whereupon, at 11:28 a.m., the hearing was adjourned.]

A P P E N D I X

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. FRANK R. LAUTENBERG TO HON. KENNETH M. MEAD

Question. We know rail is competitive with air for certain markets, and we need rail as part of a balanced transportation system. We all know how essential the aviation trust fund is to the aviation community. Could a Federal rail trust fund be used to provide for rail infrastructure?

Answer. In theory, a rail infrastructure trust fund similar to the aviation trust fund could be used as a mechanism to fund some or all passenger rail capital needs, although developing such a vehicle and ensuring equitable distribution of funds would pose extremely difficult challenges.

The Airport and Airway Trust Fund (aviation trust fund) was established in 1970 to help fund the development of a national system of airports and airways, and to fund investment in air traffic control facilities. To fund these activities, the aviation trust fund relies on a number of taxes for revenue, including passenger ticket, fuel, and cargo taxes That are paid by airline passengers and airlines.

If a similar funding scheme were contemplated for a rail trust fund, Amtrak and commuter rail passengers would be asked to pay higher ticket prices—something which they may or may not be willing to do, especially at the level necessary to provide sufficient funding for infrastructure reinvestment. For example, according to the airlines, it has been difficult for them to pass through to passengers the additional security fees imposed by the government after September 11. This reflects the competitive ticket environment and passengers' unwillingness to pay. The airlines assert that the inability to raise fares to cover the new fees has forced them to lower base fares in order to keep absolute ticket prices constant.

In the same vein, if an infrastructure ticket tax (similar in construct to the aviation security fees) were applied to Amtrak's fares, Amtrak would need to raise its fares. If passengers were unwilling to pay the higher fares, ridership and total revenue would decline, requiring an equivalent increase in Federal operating subsidies. If Amtrak were to respond as the airlines did—lowering base fares to keep total ticket prices constant—the same effect would occur. Amtrak's operating revenues would decline, resulting in a need for higher Federal subsidies. The fact that Amtrak operates at a deficit is strong evidence that this scenario would result. If rail passengers were willing to pay higher fares, Amtrak would have raised fares already so as to reduce the deficit and its dependence on Federal subsidies.

In addition to funding, issues of fairness would need to be addressed. Unlike the aviation industry where the infrastructure is owned by public entities, much of the Nation's rail infrastructure is owned by privately-owned freight railroads. It is unlikely that passenger rail operators would be willing to subsidize the upkeep of privately-owned infrastructure for which they already pay access fees, just as it is unlikely that the privately owned freight railroads would be willing to subsidize (through fuel and cargo taxes) the investment in stations and track required to support higher-speed passenger service for which they receive little or no benefits.

The ultimate challenge in funding the significant infrastructure requirements to support rail service is not the vehicle for funding, but the amount of funding. "Creating" a trust fund is not the same as "funding" a trust fund. Funds distributed from the trust fund to address infrastructure needs would have to come from somewhere—passengers, cargo taxes, and/or fuel taxes—and it is almost certain that any of these options could potentially result in a greater need for increased operating subsidies.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. FRANK R. LAUTENBERG TO GERALD L. DILLINGHAM, PH.D.

Question. We know rail is competitive with air for certain markets and we need rail as part of a balanced transportation system. We all know how essential the

aviation trust fund is to the aviation community. Could a Federal trust fund be used to provide for rail infrastructure?

Answer. We have not conducted any studies to determine whether a Federal trust fund is a viable option for funding rail infrastructure. However, we think that the costs and benefits of this option would need to be assessed to determine its viability.

Past GAO reports and other research have indicated that for rail transport to provide a viable alternative to air service, the distance between markets has to be either short enough, generally between 100–500 miles, or trains must travel at high enough speeds to make rail travel time competitive with air travel, generally with 2 to 3 hours total travel time. [1] Both of these issues could potentially require significant investment in rail infrastructure.

As we have reported in prior reports, transportation programs and funding mechanisms are already largely stovepiped by transportation mode through mode-specific trust funds, and this situation makes it difficult for intermodal projects and other modal projects (e.g., freight or passenger trail) to be integrated into the transportation system. This stovepiping can also prevent states and local governments from choosing the best transportation investment to solve a mobility problem. To break down these stovepipes. there are a number of steps the Federal Government could take, short of creating a new trust fund, such as increasing the flexibility of current programs, applying different Federal matching criteria for projects that reflect federal priorities, establishing a performance-oriented funding or reward-based system, or expanding support for alternative financing mechanisms. [2]

[1] See GAO, *Intercity Passenger Rail: Issues or Consideration in Developing an Intercity Passenger Rail Policy*, GAO–03–712T (Washington, D.C.: April 30, 2003); Economic Research Centre, *Airports as Multimodal Interchange Nodes* (Paris, France; 2005); Reconnecting America and Center for Neighborhood Technology, *Missed Connections II* (Chicago, Illinois: 2003); IATA, *Air/Rail Intermodality Study*, (United Kingdom, 2003); DOT, *Airport Congestion Impacts Resulting from Introduction of Improved Service in Eleven FR Designated High-Speed Rail Corridors* (Cambridge, Massachusetts: March 2002).

[2] See GAO, *Executive Guide: Leading Practices in Capital Decision-Making*, GAO/AIMD–99–32 (Washington, D.C.: December 1998); GAO, *Marine Transportation: Federal Financing and a Framework for Infrastructure Investments*, GAO–02–1033 (Washington, D.C.: Sept. 9, 2002); GAO, *Surface Transportation: Many Factors Affect Investment Decisions*, GA0–04–744 (Washington, D.C.: June 30, 2004); GAO, *21st Century Challenges: Reexamining the Base of the Federal Government*, GAO–05–325SP (Washington, D.C.: 2005).