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AVIATION INFRASTRUCTURE

Challenges Associated With Building and Maintaining Runways

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Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to testify on challenges associated with building new runways and with ensuring that existing runways are properly maintained. Recent flight delays and cancellations as well as significant media attention to them have heightened public concern about the need to increase the capacity of the National Airspace System. Airport development is key to expanding capacity. However, building new airports is difficult, in part, because of the high cost of construction and the environmental impact of airports—particularly concerns about noise and air quality. The construction of new runways and the maintenance of existing runways are options for improving the capacity at existing airports. According to FAA, 24 of the nation's 50 busiest commercial service airports have proposed, planned, or begun construction on new runways and runway extensions at an estimated cost of $6.5 billion.[1] (See app. I for information on individual airports.) In addition, FAA provided $318 million in airport improvement grants to the 50 busiest commercial service airports for runway rehabilitation and maintenance between fiscal years 1995 and 1999.

In considering options to expand capacity, policymakers face a challenge in determining where to invest federal dollars to bring about the greatest enhancements while considering the environmental impact on adjacent communities. Our testimony, based largely on recently issued reports[2] will highlight environmental and maintenance challenges airports face, actions under way by FAA and the aviation industry to overcome these challenges, and additional actions that need to be taken. In summary:

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[1]Two airports have either new runways and/or extensions planned, proposed, or currently under construction, but cost estimates have not yet been determined. Cost information was included for another airport's new runway, but not for its runway extension. See *Aviation Capacity Enhancement Plan*, Federal Aviation Administration, Dec. 1999.

[2]*Aviation and the Environment: Airport Operations and Future Growth Present Environmental Challenges* (GAO/RCED-00-153, Aug. 30, 2000), *Aviation and the Environment: Results From a Survey of the Nation's 50 Busiest Commercial Service Airports* (GAO/RCED-00-222, Aug. 30, 2000), and *Airfield Pavement: Keeping the Nation's Runways in Good Condition Could Require Substantially Higher Spending* (GAO/RCED-98-226, July 31, 1998).

- Airports and FAA face challenges in building new runways and in determining at what point runway pavement conditions warrant repair in order for existing runways to be maintained in the most cost-effective manner. In the case of new runways, airports must address the potential environmental impact of aircraft noise and air pollutant emissions that new infrastructure is likely to generate. For example, community concerns with aircraft noise are already high around many airports, and adding new runways may generate additional noise and community concerns. Moreover, airports in areas that are not in compliance with Clean Air Act requirements may find it challenging to add new runways because of the concern about increased air quality problems caused by additional aircraft and cars using the airport. This difficulty is important, given that 33 of the nation's 50 busiest commercial service airports are in areas that do not meet the act's requirements. As we recently reported, shortcomings in the environmental review process add to the challenge and can result in delays in projects without necessarily providing commensurate environmental benefits. For example, meeting overlapping federal and state environmental requirements can cause airports rework, additional negotiations, and renegotiations. For runways that are in use, data found in pavement management systems can pinpoint when runways should be rehabilitated based on pavement conditions. However, FAA has only collected this type of information on a case-by-case basis and may not be in a position to weigh the importance of similar projects at different airports. Our July 1998 report included recommendations to address this problem.

- The federal government and the aviation industry are involved in a number of efforts to balance airports' growth with environmental concerns and to address runway maintenance in a cost-effective manner. For example, FAA supports airports' efforts to mitigate aircraft noise through a voluntary noise compatibility program and has developed guidance for local governments and other interested parties to encourage compatible land uses around airports. Moreover, many airports conduct public outreach and education efforts to address aircraft noise and other environmental

issues. In addition, the Secretary of Transportation has a study under way to assess the environmental review requirements pertaining to airport improvement projects that will potentially address the shortcomings identified above, among others. Furthermore, FAA is taking steps as we recommended to improve the quality of some data collected on runway conditions at airports in the national airport system in order to help ensure that dollars are spent effectively on rehabilitating existing runways. For example, the agency requires airports to provide pavement condition data to support certain grant applications for pavement projects.

- Additional actions would help to minimize some delays associated with adding capacity and problems with preserving existing capacity. With respect to the environmental review process that is required to build new runways, these actions include (1) eliminating overlap between federal and state environmental requirements, (2) eliminating duplicative air quality processes under federal laws, and (3) clarifying guidance and providing adequate technical assistance to airports to help them meet Clean Air Act requirements. As for maintaining existing runways, it is important that FAA fully implement our recommendations to obtain runway pavement condition data from all airports and maintain this information in a national database. This would allow the agency to use these data to forecast pavement conditions and, therefore, determine in advance when maintenance and rehabilitation can be done most cost-effectively.

Background

New runways or other major expansion projects are subject to federal laws and regulations that address, among other things, environmental concerns about the noise generated by aircraft operations and the impact on air quality of burning fossil fuels to operate automobiles, airport service vehicles, and aircraft. These laws give various responsibilities to federal agencies—including FAA and EPA—and to state and local governments.

FAA works with airport officials to help them minimize the environmental effects of expansion projects, including providing grants to reduce the impact of noise on surrounding communities. In addition, the agency is responsible for preparing documents to comply with the National Environmental Policy Act. The act sets forth a broad national policy aimed at protecting the quality of the environment and requires that federal actions receive an environmental review, the level of which depends on an action's potential impact on the environment. EPA reviews environmental impact statements prepared by federal agencies, including FAA.

EPA also oversees the implementation of the Clean Air Act, as amended, which regulates the emission of air pollutants from area, stationary, and mobile sources. However, the day-to-day responsibility for overseeing the implementation of the act is generally delegated to the states. EPA has also encouraged voluntary measures to reduce aviation emissions and has undertaken numerous regulatory actions, such as setting standards for aircraft engine emissions. Other federal agencies play more limited roles in assisting airport officials with managing the environmental impact of airport operations.

Runways, like highways, deteriorate from weather and use. Left unchecked, such deterioration can eventually pose safety risks to planes that are taking off or landing. Maintaining runway pavement includes preventive maintenance and rehabilitation of aging pavement. Preventive maintenance is designed to forestall the need for runway rehabilitation, which typically involves adding a strengthening layer to an existing surface that has not deteriorated to the point of needing complete replacement. Federal grants through the Airport Improvement Program are available for rehabilitating and maintaining airport runways and since 1982, this program has provided over $3 billion for this purpose.

Runways Present Environmental and Maintenance Challenges for FAA and Airports

FAA and the nation's airports face a dual challenge: building new runways to expand capacity and maintaining existing runways to ensure that the system's current capacity is fully utilized. Meeting these challenges will require addressing airport noise and air quality issues and shortcomings in the environmental review process associated with building new runways. In addition, FAA will need to improve its process for considering which runway maintenance projects to fund.

Airports Face Noise and Air Quality Issues

Noise. According to our survey of officials from the nation's 50 busiest commercial service airports, noise generated by aircraft operations is the most significant environmental concern facing them now and in the future. Additional runways could potentially mean more air traffic, changes in flight patterns, and potentially a larger number of people affected by high aircraft noise levels.

Community dissatisfaction with aircraft noise is already high around many airports. For example, citizens' groups and local government officials from several communities surrounding the Los Angeles International Airport said they are dissatisfied with the airport's efforts to address the impact of aircraft noise. In particular, these community and local officials are concerned that the airport has "incrementally" increased its capacity by 20 million passengers annually without any type of environmental review. In Miami, complaints about aircraft noise have increased from about 18 to 19 per month in 1993 to 300 to 400 per month in 1999, and communities are showing resistance to the airport's current expansion plans.

In addition, because some of the nation's busiest airports do not participate in FAA's voluntary noise compatibility program (otherwise known as the Part 150 Noise Compatibility Program),[3] citizens in communities surrounding these airports are not eligible to receive the benefits of federal funding from this program designed to mitigate the impact of noise on residents. In particular, 14 of the nation's 50 busiest commercial service airports do not participate in this program—leaving more than 320,000 people living near these 14 airports without access to program funds set aside for noise mitigation.

Despite the efforts of airports, airlines, FAA, and others to mitigate the effects of aircraft noise on surrounding communities, citizens' concerns persist today and are likely to increase as airports seek to expand—by adding runways and other means. Many aircraft noise complaints come from residents who live outside areas that are considered "noise-impacted." For example, officials from 35 of the nation's 50 busiest airports reported that more than half of their noise complaints came from areas that FAA has designated as compatible with airport operations in terms of noise.[4] Given this, increased traffic resulting from new runways could lead to more complaints from both citizens within and outside areas that are considered noise-impacted.

Air Quality. According to our survey, air quality is a major concern for many of the nation's busiest commercial service airports and is expected to become a more serious issue for them in the future, particularly if runways are added to airports and flight operations are increased. Minimizing future air emissions at airports is important, given that 33 of the nation's 50 busiest commercial airports are located in areas in violation of the act's requirements. As a result, airports may find it challenging to demonstrate that new runway projects will not create additional air quality problems.

[3]The Part 150 Program provides airports with, among other things, funding to soundproof buildings and acquire homes in areas where noise levels are high.

[4]Areas around airports that experience aircraft noise below the 65-decibel Day-Night Sound Level are considered to be compatible with airport operations.

The major source of air pollutant emissions at airports is vehicles that rely on fossil fuels, including aircraft, vehicles transporting people to and from the airport, and ground support equipment. Officials from 27 of the 50 busiest commercial service airports reported that the demand for parking is currently a major concern. Options to reduce the number of cars and buses traveling to an airport and to help meet air quality standards include using intermodal centers--including light rail connections—and establishing remote park and ride facilities for passengers and airport employees.

Shortcomings in the Environmental Review Process Can Delay Airport Projects

Satisfying federal and state environmental requirements designed to help ensure that projects that expand capacity do not adversely affect the environment can be a lengthy, time-consuming process, and shortcomings in the review process can delay these projects. This is true especially when expansion project, such as runways, require the most detailed reviews under the National Environmental Policy Act—known as environmental impact statements (EIS). FAA prepares the EIS in coordination with the airport. According to an FAA senior environmental manager, the EIS process takes an average of about 2.5 years to complete.

Overlapping Federal and State Environmental Requirements Can Delay Airport Projects

Our review of environmental requirements impacting airport operations and growth found that some federal and state environmental review processes can overlap and delay airport projects.[5] According to some airport officials, airport projects in some states may have to undergo two completely independent, redundant environmental reviews that do not necessarily provide incremental environmental benefits. For example, officials from one airport said that the consensus developed under federal environmental review processes for an expansion project reduced the number of feasible runway options from 17 to 4, which meant that the airport would only need to perform an environmental

[5]GAO/RCED-00-153, Aug. 30, 2000.

review of the 4 options. Under the state's process, which came after the federal process, the airport was forced to reconsider all 17 options—lengthening the time required to select a preferred option.

According to airport and FAA officials, when airport projects require the destruction of wetlands, duplicative negotiations with multiple governmental entities may be required. The Army Corps of Engineers acknowledges that this is a problem in some states. For example, an airport official from Florida said that airport officials have had to go through time-consuming negotiations with three different agencies to obtain wetlands permits. FAA regional officials told us that some airports in the New England region must repeatedly negotiate wetland destruction agreements with different levels of government.

Air Quality Processes Under Federal Laws Burden Some Airports

As we reported in August 2000, airports seeking to expand capacity must address two sets of air quality requirements under federal law that can be duplicative and can cause delays in completing federal environmental documentation—creating burdens. Federal law requires the governor of each state to certify that federally funded additions to airport runways or major expansions conform to local air quality standards. Similarly, the Clean Air Act, as amended, requires FAA to determine that the emissions from airport projects conform to a state's plan to implement national air quality standards. These requirements can delay airport projects in two ways. First, delays can occur if environmental reviews are required to be done sequentially—federal first, followed by the state—and the federal review does not satisfy state requirements, which can be more stringent. Second, each time a runway project is undertaken, many states go through the time-consuming process of redeveloping expertise and a process for certifying that new or expanded runways meet air quality requirements because these types of reviews are not routinely done. The relearning costs money and causes delays and frustration.

Unclear Federal Guidance and Insufficient Technical Assistance Makes It Difficult for Airports to Understand and Fulfill Their Responsibilities Under the Clean Air Act

As we recently reported, despite available federal guidance and technical assistance, a wide range of officials from airports and federal and state agencies remain confused about what is required for airports to conform to local air quality standards when undertaking capacity expansion projects. This is due, in part, to the fact that in-depth reviews—for projects such as new runways—to determine conformity with the Clean Air Act occur infrequently. EPA's regulations for general conformity under the act are very broad because they are designed to accommodate a diverse group of facilities—such as ski resorts and coal mines—leaving airports without the specificity they need to fully understand and meet their responsibilities. In addition, because of the infrequent nature of these reviews, some FAA and EPA regional staff lack experience with applying the Clean Air Act's requirements to airports. As a result, some airport officials may undertake analyses that are more complex and costly than necessary.

Process Needed to Help Ensure Timely and Cost-Effective Runway Maintenance

It is important not to consider the construction of new runways in isolation—preserving existing runway capacity is also critical to the efficient operation of the National Airspace System and depends on timely maintenance. This maintenance is particularly important for airports that are physically unable to expand because they are surrounded by water or development. For some of these airports, operating runways continuously is critical to helping maintain current capacity. As we reported in 1998,[6] while the runways at the nation's airports were in generally good condition, a small but significant portion of runway pavement needed immediate attention. The timing of runway maintenance is crucial if it is to be done in a cost-effective manner.[7] Our work has shown that

[6]GAO/RCED-98-226, July 31, 1998.

[7]Reference to timing is in the context of determining the condition of the pavement so that proposed rehabilitation projects will deliver the best return for the dollars spent. We are not referring to the time—in terms of hours of the day—to perform the work.

rehabilitating pavement in poor condition may cost 2 to 3 times as much as rehabilitating pavement in good condition because more expensive methods may be required. For example, in 1998, we estimated that an up-front investment of $774 million and an additional $606 million over 9 years would help to avoid an unmet need of $2.37 billion at the end of 2008 that would occur if the historical annual funding level of $162 million was maintained over this same period.[8] This is because deferred maintenance costs so much more.

Runway rehabilitation projects are given high priority under FAA's National Priority System—the agency's primary method for determining which grant applications from individual airports should be funded. The challenge, in part, is for FAA is to collect and maintain accurate, consistent sources of information about runway conditions at all airports in the national system.[9] In turn, this information can be used to prioritize requests to help ensure runway maintenance is conducted at the most economical point in time. FAA has only collected such information on a case-by-case basis. As we recommended, improvements in the quality of the data and a comprehensive national database containing this information would allow FAA and airports to maximize their investment in runways by pinpointing the most cost-effective time for maintenance and replacement.[10]

Federal and Aviation Industry Efforts Are Under Way to Address These Challenges

The federal government has been working collaboratively with the aviation industry to help balance operations and growth with environmental impact. In addition, FAA has some efforts under way to improve the quality of data on runway pavement conditions.

[8]The historical funding level cited includes the total amount of Airport Improvement Program funds allocated to rehabilitation and maintenance of runways from fiscal year 1982 through 1997.

[9]FAA's national airport system—the primary network of airports throughout the country—comprises more than 3,300 airports.

[10]Congress also directed the FAA to fully evaluate options for improving data available to the agency on pavement conditions of airports in the national airport system and report by April 2001.

The Federal Efforts

FAA provides grant funding to mitigate the impact of aircraft noise on communities adjacent to airports. For example, through an agency grant program called the Part 150 Noise Compatibility Program, FAA has spent $2.7 billion from fiscal year 1982 through 1999 to provide airports with, among other things, funding to soundproof buildings and acquire homes in areas where noise levels are high. In addition, for fiscal years 1992 through 1999, FAA approved the collection of $1.6 billion in passenger fees for noise-related projects. The agency also provides guidance to state and local governments for their use in controlling and preventing incompatible land uses near airports, such as homes and schools. This effort is particularly important for future airport expansion because land use decisions that conflict with aviation activity and airport facilities can make it difficult for airports to grow to meet the increasing demand for air transportation.

According to our survey of the nation's 50 busiest commercial service airports, most airport officials generally believe that FAA effectively assists them with their environmental activities. For example, officials from 32 of these airports reported that they were satisfied with the way FAA answered their questions and addressed their concerns about environmental issues. In addition, officials from over half of the airports reported that FAA was effective in coordinating activities among its offices, providing standard rules and guidance, and processing paperwork.

In 1998, EPA and FAA, in cooperation with the Air Transport Association, created a stakeholder group on the local air quality issues associated with airport operations. The group's goal is to find voluntary ways to track and reduce the emission of air pollutants around airports. This effort has brought together many groups to work on the issue of air quality, including airline manufacturers, airports, state and local environmental regulators, and nonprofit interest groups. To date, this group has worked to establish a baseline of the types and sources of emissions from airports and options for reducing

these emissions. The group hopes to have the aviation industry enter into an agreement by the fall of 2000 to achieve reductions in air pollutant emissions.

The Secretary of Transportation, as directed by Congress, is conducting a study of federal environmental requirements related to the planning and approval of airport improvement projects. This assessment is looking at coordination, staffing, and time required for reviews, and has the potential to identify more specific solutions for alleviating the burdens we identified. Ultimately, addressing these shortcomings will require a coordinated effort among FAA, EPA, states, airports, airlines, and others working with the Congress.

The Aviation Industry Efforts

Airports: Airports have undertaken a wide range of activities to balance their operations and growth with the environmental impact, including the use of preferred flight paths and other measures to reduce the impact of aircraft noise on surrounding communities and offering incentives to airport tenants to reduce pollution from vehicles that support aircraft operations and access to the airport. Some airports have also reduced the impact of noise on surrounding communities by undertaking mitigation measures, including acquiring noise-sensitive properties, relocating people, modifying structures to reduce noise, encouraging compatible zoning, and assisting in the sale of affected properties.

A number of airports also sponsor community noise roundtables, which include local citizens' groups, FAA, airlines, and other interested parties working collaboratively to address noise and other environmental concerns. For example, the San Francisco International Airport created the San Francisco Airport Roundtable in 1981—a voluntary body that includes representatives from 13 Bay Area jurisdictions, FAA officials, airline advisers, air traffic managers, and the airport director—to discuss and attempt to resolve primarily noise-related issues. A representative of a national nongovernmental organization on aviation noise cited the San Francisco Airport Roundtable as a model for community involvement in the decision-making process for airport development,

including the identification of environmental effects and concerns. Similar airport/community noise groups have been established at other airports, including the Fort Lauderdale/Hollywood International Airport, the Minneapolis/St. Paul International Airport, the Oakland International Airport, and Chicago's O'Hare International Airport.

Airlines: Airlines have also undertaken activities to reduce the impact of their operations and growth on the environment, including working with local citizens' groups to address aircraft noise issues; using airport-provided power at gates that is less polluting than other sources, such as on-board generators; increasing the use of ground support vehicles that rely on alternative fuels to reduce emissions; and having aircraft use single engines for taxiing. For example, when operationally feasible, the use of single engines—instead of multiple engines—for taxiing can reduce the impact on local air quality significantly. One airline estimates that its use of this practice has reduced its fleet's fuel consumption by 40 million gallons per year and, in turn, has reduced the impact of air pollutant emissions.

FAA Has Taken Steps to Improve the Quality of Runway Pavement Data

Acting on recommendations from our 1998 report, FAA took steps in fiscal year 1999 to revise its approach for evaluating the timing of runway maintenance projects. One option we recommended was to improve the quality of the rating criteria used by inspectors to yield more useful information. In response, FAA requested information from a representative cross-section of airports, evaluated these data in conjunction with our recommendations, and determined that improved guidance for inspectors on rating the condition of runway pavement was needed. According to FAA, training for inspectors should be available by spring 2001. Similarly, as we recommended, FAA determined that it would be beneficial for airports to submit pavement condition data or comparable information in airport master plans and to encourage states to include such data in their state system plans. In addition, FAA plans to continue to require that airports provide such data to support certain types of grant applications for pavement projects.

Additional Actions Could Help Airports to Expand Capacity and Effectively Utilize Existing Runways

Some progress has been made in addressing challenges associated with building new runways and in maintaining existing ones. However, several actions, by federal and/or state officials working with the Congress, could help reduce the time required to meet environmental requirements for new runway projects and improve the quality of information used to make decisions about maintaining existing runways. As we have discussed in our reports, these include the following:

- eliminating the overlap between state and federal environmental requirements;
- streamlining requirements for obtaining permits to build on wetlands;
- clarifying guidance and providing adequate technical assistance to airports to help them meet Clean Air Act requirements for airport capacity projects; and
- creating a national database to better pinpoint the most cost-effective time for runway maintenance and rehabilitation.

Given that the Congress has authorized nearly $10 billion to address airport infrastructure needs over the next 3 years, it is critical to ensure that sufficient attention is given to both maintaining runways and building new ones so that this significant taxpayer investment is spent in the most cost-effective manner.

Mr. Chairman, that concludes my prepared statement. I would be happy to respond to any questions that you or Members of the Subcommittee may have.

Contact and Acknowledgments

For further information, please contact Gerald L. Dillingham at (202) 512-2834.
Individuals making key contributions to this testimony included Beverly Dulaney, Belva Martin, and Kieran McCarthy.

Appendix I

Estimated Cost of Runways Planned, Proposed, or Currently Under Construction

Millions

Airport	Cost of new runway	Cost of runway extension	Total
Atlanta Intl.	$450.0		$450.0
Baltimore-Wash. Intl.	150.0		150.0
Boston Logan Intl.	50.0		50.0
Charlotte/Douglas Intl.	140.0	$22.0	162.0
Cleveland-Hopkins Intl.	467.0	40.0	507.0
Dallas/Ft. Worth Intl.	367.3	92.0	459.3
Denver Intl.	160.0		160.0
Detroit MW County	116.5		116.5
Ft. Lauderdale Intl.		300.0	300.0
Houston/GB Intl.	130.0	85.0	215.0
Indianapolis Intl.	80.0		80.0
Kansas City Intl.		12.0	12.0
Lambert St. Louis Intl.	850.0	50.0	900.0
Miami Intl.	206.0		206.0
Milwaukee Intl.	160.0		160.0
Minneapolis-St. Paul Intl.	490.0	7.0	497.0
Newark Intl.		55.0	55.0
New Orleans Intl.	400.0		400.0
Orlando Intl.	115.0	To be determined	115.0
Phoenix Intl.	180.4	7.0	187.4
Port Columbus Intl.	100.0		100.0
Raleigh-Durham Intl.	To be determined	To be determined	0.0
San Jose Intl.		54.3	54.3
Seattle Tacoma Intl.	750.0		750.0
Tampa Intl.	To be determined	To be determined	0.0
Wash. Dulles Intl.	400.0		400.0
Total	**5762.2**	**724.3**	**6486.5**

Source: Federal Aviation Administration, 1999 Aviation Capacity Enhancement Plan, December 1999.

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