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# THE NATIONAL ECONOMIC IMPACT OF CIVIL AVIATION

DRI•WEFA, Inc., A Global Insight Company

In collaboration with:

The Campbell-Hill Aviation Group, Inc.

**CIVIL AVIATION**

- Commercial passenger and cargo transportation
- General aviation, including business aviation and air taxi
- Related manufacturers, servicing, and support
- Supply chains
- The effects of income generated (induced impacts) by civil aviation
- The direct, indirect, and induced impacts of related industries, such as travel and tourism, for which air transportation provides an enabling function

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# Preface

The importance of civil aviation to the economy, to the nation, and to the quality of life of Americans was made readily apparent by the terrible events of September 11, 2001. Layoffs and financial losses in civil aviation, its supplier industries, the tourism industry, and the broader economy rose sharply.

As air traffic returns to pre-September 11 rates of growth—as projected in the Federal Aviation Administration's (FAA) most current forecast[1]—air traffic delays will resume and increase dramatically.[2] Congestion and delay, a function of capacity-constrained airport and airway infrastructure, not only will inconvenience passengers and shippers; it also will impose considerable costs on the United States as a whole. Conversely, investment in this infrastructure will foster economic growth and enhance safety and security.

On November 27, 2001, just 11 weeks after the terrorist attacks, John Marburger, Director of the White House Office of Science and Technology Policy, reiterated the continued need for investment in the nation's airports and airways in remarks to the Commission on the Future of the U.S. Aerospace Industry:

> "We need to develop a 21st Century global air transportation system that provides safe, secure, efficient and affordable transportation of people, goods, and information in peacetime and wartime—enabling people and goods to move freely anywhere, anytime, on time. We need a system that:
>
> - Enhances national security by strengthening homeland defense while enabling the military to project power anywhere in the world at any time;
> - Increases U.S. economic competitiveness by building a more efficient, higher capacity air transportation system; and
> - Improves the quality of life of all Americans by enabling them to do *what* they want to do *when and where* they want to do it.?[3]

This study addresses the economic competitiveness and quality of life benefits that Dr. Marburger describes.

[1] *FAA Aerospace Forecasts: Fiscal Years 2002-2013*, FAA-APO-02-1, March 2002.
[2] This study, initiated in the summer of 2001, could not have foreseen the tragic events of September 11. Nonetheless, current expectations of demand reinforce the aviation sector's concern regarding airport and airway capacity. This concern is shared by the Department of Transportation, which, through the FAA, has re-instituted a proceeding to address reducing delays at LaGuardia and has launched a new proceeding to entertain alternative options to broadly address aviation capacity shortfalls and demand management. These developments provide further evidence that calendar year 2000 is an appropriate baseline for analysis.
[3] John Marburger, *The Future Belongs to the Mobile,* Presentation to the Commission on the Future of the United States Aerospace Industry, November 27, 2001.

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## Executive Summary

Civil aviation has become an integral part of the U.S. economy. It is a key catalyst for economic growth and has a profound influence on the quality of life of populations around the globe. It integrates the world economy and promotes the international exchange of people, products, investments, and ideas. Indeed, to a very large extent, civil aviation has enabled small community and rural populations to enter the mainstream of global commerce by linking such communities with worldwide population, manufacturing, and cultural centers. Civil aviation products and services generate a significant surplus for the U.S. trade accounts and are in the forefront in the development and use of advanced technologies. Fundamentally, civil aviation touches nearly every aspect of our lives, and its success will, to a great degree, shape American society and the U.S. economy in the coming decades.

The ability of civil aviation to foster economic growth and engender social mobility is not, however, guaranteed. By 2000, the economic and personal cost of delays caused by constrained airport and airway capacity and reduced aviation system efficiency reached unacceptable levels. The recent economic downturn and the decline in air transportation following the tragic events of September 11, 2001, provided only temporary relief from the growing problem of congestion and delay—it by no means eliminated the problem. Without swift and thorough intervention, the costs of delay will continue to rise, further harming the U.S. economy, the competitiveness of its industries, and all who rely on aviation in the conduct of their business and personal affairs. Conversely, additional investment in the nation's aviation infrastructure will facilitate economic growth and employment.

This study provides insight into the contribution of civil aviation to the U.S. economy, as well as the economic and employment costs of congestion and delay to the nation and its citizens. Analyzing the Federal Aviation Administration's (FAA) Operational Evolution Plan (OEP), which consists of air traffic initiatives aimed at slowing the growth in congestion and delay, as well as a variety of additional runway investments, this study reveals the essential role that increased airport capacity and modernization of the air traffic system play in managing the growth of these problems and points to the need for additional efforts to reduce them.

The study's findings are based on econometric models that capture the detailed workings of the U.S. economy. The framework of the study ensures consistency between its results and those of the U.S. national system of economic accounts. Using a base year of 2000, the study estimates (in year 2000 constant dollars) the total cost of commercial passenger flight delays in the United States for 2000, 2007, and 2012, and the benefits of increased capacity for the two forecast years.[4]

In contrast to a recent U.S. General Accounting Office report,[5] this study considers the national benefits of making additional capacity-enhancing investments in aviation infrastructure. The study examines the positive economic impact of reducing congestion by increasing capacity, concluding that early investments are more effective in resolving capacity and delay problems, resulting in significant gains for the United States and its citizens. The analysis indicates the following:[6]

[4] As the Department of Transportation does not gather comprehensive data about the air traffic delays encountered by general, all-cargo, unscheduled, and military aviation, this study does not include those costs. Nonetheless, these costs are believed to be substantial and proportional to those incurred by other users.

[5] *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays*, GAO-02-185, December 14, 2001.

[6] All values are in year 2000 constant dollars.

1. In 2000, the total impact of civil aviation exceeded $900 billion and 11 million jobs, representing nine percent of the U.S. gross domestic product. This economic contribution is split as 88 percent commercial aviation and 12 percent general aviation.
2. Congestion and delays had a significant negative effect on the economy in 2000. Commercial airline passenger delays, averaging 12.0 minutes per flight segment for a total of 142 million hours of passenger delay, amounted to $9.4 billion in U.S. delay costs.[7] Hundreds of millions of dollars in additional delays accrued to general aviation and commercial cargo operators.[8]
3. If committed OEP aviation infrastructure projects are under-funded or not completed on schedule, the present situation will deteriorate significantly. If no new airport construction or air traffic system improvements are completed, *average* delay per flight segment will rise to 14.5 minutes in 2007 and 16.5 minutes in 2012, increases of 21 percent and 38 percent, respectively, over the 2000 average. Between 2000 and 2012 inclusive, the cost to the U.S. economy of no further infrastructure enhancement beyond 2000 would approach $170.2 billion.
4. Even if currently committed projects are completed on schedule, the situation in 2012 will be worse than in 2000. Average 2012 delay per flight segment would be 14.7 minutes, an increase of almost three minutes over 2000. Total 2012 passenger delay would rise to 231 million hours, a 63 percent increase over 2000. Total U.S. congestion-related costs for 2000-2012 would fall to $156.7 billion, a $13.5 billion improvement relative to no investment.
5. Early completion of aviation infrastructure projects would reduce annual passenger delays by 64 million hours (12 minutes per passenger per roundtrip), or 25 percent. Relative to no investment, these savings would translate into U.S. benefits of $30.7 billion, plus more than a billion dollars saved by business and personal users of general and cargo aviation. If only current OEP projects and timelines are achieved, congestion and delay will remain well above 2000 levels. On the other hand, advancing the completion of OEP projects and widening their scope would positively impact U.S. employment and economic growth.
6. The FAA estimates that $11.5 billion will be required to implement OEP air traffic control improvement projects in full; an additional $5 billion is needed for the runway portion of the OEP. However, history and the pace of current efforts suggest that it will be a challenge to complete these projects according to FAA's current schedule and budget. Aggressively timed, additional investments in aviation infrastructure are fully justified on a cost-benefit basis. Accelerated investment in airport and airway capacity will produce compelling national economic paybacks. Every dollar invested will generate up to five dollars in return for the U.S. economy, a function of reduced congestion costs through the year 2020. If only the very brief stream of benefits through 2012 were considered, benefits would still exceed the required investment by a factor of 2.8.[9]

A long-term, sustained effort beyond the OEP is needed to eliminate congestion and delay. Even in the most aggressive scenario investigated in this study, annual passenger delay hours rise to unacceptable levels, largely a function of projected growth in demand. If these delays were greatly mitigated, personal and economic cost savings would stimulate U.S. economic growth and employment; businesses would realize greater efficiencies and thus compete more effectively in the global arena; the U.S. trade surplus from aviation manufacturing activity and air transport services would increase; the quality of life for U.S. citizens would improve; and environmental benefits would accrue from reduced aircraft emissions.

[7] Total delay costs include $4.7 billion to the economy and $4.7 billion to passengers.
[8] Since estimated delay costs include only scheduled commercial passenger aviation, they underestimate total U.S. delay costs.
[9] Since airport capacity enhancements typically last well beyond 20 years, these benefit-cost calculations are highly conservative.

# I. Civil Aviation and its Impact on the Economy

## Introduction

The United States possesses the largest, most extensive aviation system in the world with more than 18,000 landing facilities, ranging from large commercial airports serving millions of passengers annually to small grass strips accommodating only a few aircraft each year. Of the nation's more than 500 commercial service airports, over 400 enplane more than 10,000 passengers annually and are classified as primary airports. Of these, 50 are responsible for 70 percent of commercial traffic.

The FAA records 320,000 active civilian aircraft. Some 7,000 of these are owned by commercial air carriers and include aircraft ranging from small single-engine propeller craft to the largest commercial turbojets. Over 6,000 active civilian aircraft are large aircraft, defined as having a seating capacity of more than 30 seats or a maximum payload capacity of more than 7,500 pounds carrying passengers or cargo for hire or compensation. Over 240,000 aircraft are classed as general aviation aircraft. Nearly 182,000 of these are piston aircraft and 147,000 are personally owned for personal activity.

In 2000, U.S. airlines carried 666 million passengers and registered 24 billion ton miles of cargo on nine million scheduled departures. U.S. airlines also carried 11 million passengers and over six billion ton miles of cargo on 400,000 non-scheduled departures. Although scheduled airlines provide service to about 500 communities, some 3,000 communities of all sizes can access the air transportation system only via general aviation, including non-scheduled, on-demand, and charter flights. The industry estimates that more than 160 million passengers are carried annually aboard general aviation aircraft.

## Value to the U.S. Economy

Economic deregulation of airlines in the late 1970s stimulated competition from both existing firms and new entrants. Intensified competition spurred innovations in marketing, operations, technology, and governance that enabled firms to become more efficient, improve service quality, introduce new services, and become more responsive to consumers' preferences. Air travelers enjoyed a 38 percent decline in real average fares through 2000 and 79 percent greater service (as measured by departures), concurrent with an increase in revenue passenger miles of 200 percent.[10]

Fares fell rapidly and personal travel by air became the norm after deregulation. Airlines accelerated development of network route structures to increase flight frequency and to broaden the scope of services to include many previously unserved or underserved small and medium markets, while taking advantage of the efficiencies of the hub-and-spoke system.

With deregulation, air cargo networks were able to facilitate just-in-time shipping, providing expanded services at lower costs. Optimization of just-in-time shipping allows short production and development cycle times and eliminates excessive inventory in the logistics chain regardless of facility location. Without the availability of ubiquitous, reliable, efficient air express service, U.S. businesses would be unable to realize the competitive economies of just-in-time production. Air transportation offers many cost advantages—lower lead times, quicker customer response times, improved flexibility, and reduced inventory. Many high-tech, high-value industries have embraced air transport for its time and cost advantages in manufacturing and distribution, and because it improves delivery reliability by providing time-definite guarantees.

[10] Source: Air Transport Association.

One-stop shopping has become extremely important to businesses in their selection of logistics service providers and air cargo carriers. The ability to use a carrier that will provide door-to-door service with single-vendor control makes the entire logistics chain much less complicated than the traditional method of using several providers with different delivery functions. The major integrated carriers provide seamless trucking, warehousing, and distribution service functions in addition to air cargo. As a consequence, shippers are increasingly substituting blended air and surface transportation services provided by (or through) a single carrier.

**National Impacts**

For the purposes of this study, civil aviation and its impacts include:

- Scheduled and unscheduled commercial passenger and cargo operations (including cargo-only transportation)
- General aviation (including business aviation and air taxi)
- Their related manufacturers, servicing, and support (including pilot and maintenance technician training)
- Their supply chains (indirect impacts)
- The effects of income generated (induced impacts) directly and indirectly by civil aviation
- The direct, indirect, and induced impacts of related industries, such as travel and tourism, for which air transportation provides an enabling function

Civil aviation's total impact in 2000 amounted to about 9 percent of GDP, of which 40 percent arose directly from civil aviation and related industries (see Appendix A for information on the DRI•WEFA economic impact methodology). Table 1 presents the year 2000 impacts for each category of civil aviation and related activities. Specifically:

- **Direct Impact:** $343 billion and 4.2 million jobs were produced directly in civil aviation[11] or in industries related to civil aviation, such as travel and tourism (see Table 3).
- **Indirect Impact:** $255 billion and 3.2 million jobs arose indirectly in the other industries in the supply chain to civil aviation and related industries.
- **Induced Impact:** The remaining $305 billion and 3.8 million jobs were induced throughout the economy as the income generated by civil aviation is spent.
- **Total Impact:** Civil aviation generated a total impact of $904 billion in GDP and 11.2 million jobs. Of this, $102 billion in GDP and 1.3 million jobs were generated by general aviation. Of the 11.2 million jobs generated, roughly 60 percent arise in other industries (see Table 3).

Commercial aviation, as defined in this study, forms the major part – 88 percent – of the U.S. civil aviation sector. DRI•WEFA regularly estimates the output and employment in air transportation.[12] Similarly, DRI•WEFA estimates output and employment for aircraft and aircraft

[11] Note that, as shown in Table 1, civil aviation, excluding related industries, directly produced $181.8 billion in GDP ($169.6 billion from commercial aviation and $12.2 billion from general aviation) and 2.2 million jobs.

[12] Prior to 1997, U.S. industries were classified according to the *Standard Industrial Classification (SIC) Manual*, U.S. Office of Management and Budget (OMB). They are now classified according to the *North American Industry Classification System (NAICS)*, also published by OMB and jointly developed by OMB, Statistics Canada, and Instituto Nacional de Estadistica, Geografia e Informatica (INEGI) of Mexico. Air transportation as an industry generally refers to SIC45 and NAICS481.

parts. These estimates are based on the latest data available from the Bureau of the Census and Bureau of Economic Analysis, U.S. Department of Commerce, as of September 2001.

The air transportation industry includes non-factory maintenance and repair and flight training carried out by the commercial air carriers. The data also include commercial general aviation. For the purpose of separating commercial aviation as defined in this study from commercial general aviation, DRI•WEFA estimated the magnitude of commercial general aviation as described in the next section and removed it from the statistics for the air transportation industry, as shown in Table 1. General aviation is included in Table 3, which shows the impact of civil aviation activity on total national employment.

Travel and tourism data are based on Travel Industry Association surveys. The data for 2000 are shown in Table 2, which provides total expenditures in the United States by visitors[13] who travel by air. In Table 1, this expenditure is split in four parts: direct versus indirect impact and commercial versus general aviation. The sum of these four parts in Table 1 is the same as the bold-faced total in Table 2.

The direct/indirect split for travel and tourism in Table 1 is based on the ratio of value added (direct) to total output (direct plus indirect) for the component industries. The split between commercial aviation tourism and general aviation tourism is based on the number of general aviation trips that are overnight as compared to the number of all trips that are overnight. Freight forwarding, travel arrangement, and flight training data are based on the 1997 Economic Census.

[13] "Tourism is defined as the activities of persons traveling to and staying in places outside their usual environment for not more that one consecutive year for leisure, business, and other purposes not related to the exercise of an activity remunerated from within the place visited." *Tourism Satellite Account: Recommended Methodological Framework (Framework)*, Commission of the European Communities, Organization for Economic Cooperation and Development (OECD), United Nations (UN), and World Tourism Organization (WTO), Luxembourg, Madrid, New York, Paris, 2001, page 1. Visitors are defined as persons engaged in tourism; tourists are defined as overnight visitors (*Recommendations of Tourism Statistics*, WTO, as adopted by the UN Statistical Commission at its 27th session, 22 February-3 March 1993).

**Table 1. U.S. Civil Aviation Impacts, 2000**
**($Billion and Thousand Employees)**

| | Direct | | Indirect | | Induced | | Total Impact | | |
|---|---|---|---|---|---|---|---|---|---|
| | GDP | Employment | GDP | Employment | GDP | Employment | GDP | % GDP | Employment |
| **Commercial Aviation** | | | | | | | | | |
| Air Transport* | $100.1 | 1,172 | $67.9 | 858 | $85.7 | 1,035 | $253.6 | | 3,065 |
| Aircraft | 14.7 | 205 | 31.2 | 395 | 23.4 | 306 | 69.4 | | 906 |
| Aircraft Parts | 9.8 | 136 | 20.7 | 262 | 15.6 | 203 | 46.1 | | 601 |
| Airport Expenditures+ | 38.0 | 437 | na | na | 19.4 | 223 | 57.4 | | 660 |
| Federal (FAA & NASA) | 7.0 | 75 | na | na | 3.6 | 38 | 10.6 | | 113 |
| **Total** | **169.6** | **2,025** | **119.8** | **1,514** | **147.6** | **1,805** | **437.1** | **4.4%** | **5,345** |
| **Expenditure Related to Commercial Aviation** | | | | | | | | | |
| Tourism by Air | 132.9 | 1,680 | 96.5 | 1,219 | 117.0 | 1,478 | 346.4 | | 4,377 |
| Travel Arrangement | 3.3 | 47 | 7.8 | 98 | 5.7 | 74 | 16.8 | | 219 |
| Freight Forwarding | 0.5 | 7 | 0.6 | 8 | 0.6 | 8 | 1.7 | | 23 |
| **Total** | **136.8** | **1,734** | **104.9** | **1,326** | **123.2** | **1,560** | **364.9** | **3.7%** | **4,619** |
| | | | | | | | | | |
| **Commercial Aviation, Total** | **306.4** | **3,759** | **224.7** | **2,840** | **270.9** | **3,365** | **802.0** | **8.1%** | **9,964** |
| | | | | | | | | | |
| **General Aviation** | | | | | | | | | |
| Commercial Operations | 1.4 | 17 | 1.0 | 2 | 1.2 | 15 | 3.6 | | 34 |
| Private Operations | 8.9 | 104 | 6.0 | 76 | 7.6 | 92 | 22.6 | | 272 |
| General Aviation Aircraft | 2.7 | 38 | 5.8 | 74 | 4.4 | 57 | 12.9 | | 169 |
| Flight Training | 0.7 | 19 | 0.4 | 5 | 0.6 | 12 | 1.6 | | 36 |
| **Total** | **13.7** | **178** | **13.2** | **157** | **13.8** | **176** | **40.7** | **0.4%** | **511** |
| **Expenditure Related to General Aviation** | | | | | | | | | |
| Tourism by Air | 22.9 | 290 | 16.6 | 210 | 20.2 | 255 | 59.8 | | 755 |
| Publications | 0.6 | 7 | 0.4 | 5 | 0.5 | 6 | 1.5 | | 18 |
| **Total** | **23.5** | **297** | **17.1** | **215** | **20.7** | **261** | **61.3** | **0.6%** | **773** |
| | | | | | | | | | |
| **General Aviation, Total** | **37.3** | **475** | **30.3** | **372** | **34.5** | **437** | **102.0** | **1.0%** | **1,284** |
| | | | | | | | | | |
| **Grand Total** | **$343.7** | **4,234** | **$254.9** | **3,212** | **$305.1** | **3,802** | **$903.5** | **9.2%** | **11,248** |

Source: DRI-WEFA,Inc.

* Air transport consists of all expenditures make by commercial airlines, including both passenger and freight, scheduled and non-scheduled, maintenance, and pilot and technician training.

+ Airport expenditures consist of all expenditures made by airport authorities, including airport services.

Note: In 2000, total U.S. GDP was $9,873 billion.

Due to rounding, totals and subtotals may not add precisely.

| Table 2. Expenditures of Visitors by Air, 2000 ($Billion) | | | | | |
|---|---|---|---|---|---|
| | **Domestic** | | **International** | | **Total** |
| **Food Service** | $74.4 | 40% | $14.9 | 18% | **$89.3** |
| **Lodging** | 56.1 | 30% | 25.3 | 31% | **81.5** |
| **General Retail** | 25.1 | 13% | 21.1 | 26% | **46.3** |
| **Entertainment** | 31.3 | 17% | 8.7 | 11% | **40.1** |
| **Public Transportation** | na | na | 10.8 | 13% | **10.8** |
| **Auto Transportation** | na | na | 1.1 | 1% | **1.1** |
| **TOTAL** | $186.9 | 100% | $82.0 | 100% | $269.0 |

Source: Travel Industry Associaton; Tourism Industries.
U.S. Department of Commerce; DRI-WEFA, Inc.
* Due to rounding, not all percentages add precisely to 100%.

| Table 3. Employment Impact of Civil Aviation by Industry, 2000 (000s of Jobs) | | | | | |
|---|---|---|---|---|---|
| | **Direct** | **Indirect** | **Induced** | **Total** | Percent |
| Retail Employment | 1,022 | 586 | 669 | 2,277 | 20% |
| Transportation | 1,381 | 610 | 131 | 2,122 | 19% |
| Other Manufacturing | 0 | 310 | 925 | 1,235 | 11% |
| Mining and Construction | 393 | 117 | 218 | 728 | 6% |
| Wholesale Employment | 0 | 490 | 182 | 672 | 6% |
| Transportation Equipment | 380 | 65 | 122 | 567 | 5% |
| Finance, Insurance and Real Estate | 0 | 184 | 213 | 397 | 4% |
| Public Utilities and Communications | 0 | 61 | 167 | 229 | 2% |
| Other | 1,059 | 787 | 1,175 | 3,022 | 27% |
| Total | 4,234 | 3,212 | 3,802 | 11,248 | 100% |
| Percent of Total | 38% | 29% | 34% | 100% | |

Source: DRI-WEFA, Inc.
* Due to rounding, not all percentages add precisely to 100%.

## II. Congestion Delays and Costs for 2000, 2007, and 2012

Using FAA data, Campbell-Hill estimated total passenger and flight delays for scheduled commercial passenger airline services in the United States for the years 2000, 2007, and 2012 and, in careful consultation with the client group, developed five scenarios for analysis. (Appendix B contains a detailed discussion of the Campbell-Hill methodology. Appendix C portrays the results on a state-by-state basis. And the runway projects contained in these scenarios, along with their respective capital costs, are identified in Appendix D.) The five scenarios are as follows:

**1. Baseline**: No subsequent investment beyond 2000.

- 2000: Existing runways and ATC technology.
- 2007/2012: No new investment.

**2. Committed**: Current or fully committed airport infrastructure and air traffic control (ATC) technology.[14]

- 2007/2012 Airports: Currently scheduled runway expansion forecast by the FAA, as updated by the airports. The Committed case adds 16 new runways having completed environmental impact statements (EIS) as of October 2001.
- 2007/2012 ATC Technology: Increased delay due to increases in aircraft movements caused by limitations in existing ATC technology is implicit in this scenario (i.e., only the relative combined effects of changing aircraft traffic and ATC technology on system delay are measured).

**3. Moderate**: Moderate expansion of investment in airport infrastructure and ATC technology.

- 2007/2012 Airports: The Committed scenario plus runway extensions at Ft. Lauderdale (FLL) and Pittsburgh (PIT) result in a total of 18 new or extended runways in the Moderate scenario.
- 2007/2012 ATC: New technologies for all 55 large commercial passenger OPSNET[15] airports are available on their forecast dates by 2012.

**4. Aggressive**: Aggressive expansion of investment in airport infrastructure and ATC technology.

- 2007/2012 Airports: All runway projects in the Moderate scenario are finished, and the remaining 15 planned runways are fully implemented at their expected completion dates including, by 2012, runways that have not been assigned a forecast in-service date (i.e., “to be determined”).

[14] The assumptions for improved airport infrastructure and air traffic control in the Committed scenario are based on the FAA Operational Evolution Plan (OEP) Version 3. OEP Version 4 was published subsequent to the completion of the analysis in this study.

[15] OPSNET (Operations Net) is an FAA database for tracking aircraft operations and delays. For the purposes of this study, 54 airports are included when Andrews Air Force Base (AFB) is excluded. For Fairbanks (FAI), Teterboro (TEB), and Westchester County (HPN), for which runway improvement data was not readily available, Campbell-Hill assumed no runway improvements.

- 2007/2012 ATC: New ATC technologies available in the Moderate scenario for commercial passenger OPSNET airports by 2012, but after 2007, are now available by 2007.

**5. Accelerated**: Accelerated expansion of investment in airport infrastructure and ATC technology.

- 2007/2012 Airports: Incorporates the Moderate scenario plus full implementation of the additional 15 runways added by the Aggressive scenario accelerated to 2007 (e.g., a new runway added by the Aggressive scenario with a forecast completion date of 2010 would, under the Accelerated scenario, be completed in 2007).
- 2007/2012 ATC: All new technologies available for commercial passenger OPSNET airports by 2007 (same as the Aggressive scenario).

For the purposes of the analysis, all non-runway airport projects (i.e., terminals, airport-based ATC technology) were assumed neither to enhance nor constrain airport capacity.

The detailed methodology and assumptions are presented in Appendix B. All dollar figures are in 2000 constant dollars. The results of the Campbell-Hill analysis are shown in Table 4 and Figure 1. The full cost to the economy is shown in Table 5 and Figure 2. Findings are as follows:

- Year 2000 commercial airline passenger delays were 142 million hours annually—an average of 34 minutes per passenger per round trip—and caused $4.7 billion in annual costs to passengers and $4.7 billion in annual costs to the economy,[16] for a total of $9.4 billion in delay costs.[17]
- With no new investment, delays and related costs would rise to 205 million hours and $13.5 billion in 2007 and to 261 million hours and $17.2 billion in 2012.
- Given current investment plans, they would rise instead to 185 million hours and $12.2 billion annually in 2007, and to 231 million hours and $15.2 billion annually in 2012. Thus, current investment plans are insufficient to effect a material reduction in delays and their economic costs.
- Relative to no investment in infrastructure, the Moderate scenario would save an estimated $1.4 billion annually in 2007 and $3.3 billion annually in 2012. More aggressive investment would save an estimated $2.0 billion annually in 2007 and $4.2 billion annually in 2012. The Accelerated investment scenario would save the same annually in 2012, but would increase near-term (2007) savings to $3.0 billion annually.
- As described in Appendix B, the savings to passengers are based on the FAA's recommended value for "Air Carrier—All Purposes" ($26.70 per person-hour in 1995) adjusted to 2000 based on the 23.7 percent increase in median annual income to U.S. households from 1995 to 2000.

[16] The cost of delays to the economy equals 1.51 times the cost of delays to the air carriers. The air carrier delay costs in Table 4 and Appendix C include only the direct and indirect costs. This multiplier accounts for the induced income impact.
[17] FAA does not tabulate delays for general aviation. However, general aviation, whose GDP impact is approximately in a 1:9 ratio to commercial aviation, is estimated to be suffering hundreds of millions of dollars annually in congestion-related costs.

## Table 4. Commercial Passenger and Flight Delay Hours and Costs for 2000, 2007 and 2012

| | | | | Passenger Delay | | | Flight Delay | | |
|---|---|---|---|---|---|---|---|---|---|
| Scenario/Year | Annual Round-Trip Passengers | Annual Flight Segments | Annual Round-Trip Flights | Annual Delay Hours | Minutes per Passenger per Round Trip | Annual Costs (Mil. $) | Annual Delay Hours | Minutes per Flight Segment | Annual Costs (Mil. $) |
| **Baseline** | | | | | | | | | |
| 2000 Estimate | 250,312,781 | 8,455,848 | 3,017,380 | 141,624,638 | 34 | $4,676 | 1,688,057 | 12 | $3,128 |
| 2007 Estimate | 299,623,425 | 10,027,779 | 3,581,983 | 204,589,009 | 41 | $6,756 | 2,419,728 | 14 | $4,476 |
| Net Change from 2000 | 49,310,644 | 1,571,931 | 564,604 | 62,964,371 | 7 | $2,080 | 731,671 | 3 | $1,348 |
| Percent Change from Baseline 2000 | **20%** | **19%** | **19%** | **44%** | **21%** | **44%** | **43%** | **21%** | **43%** |
| 2012 Estimate | 333,681,121 | 11,112,504 | 3,971,191 | 260,565,623 | 47 | $8,604 | 3,062,650 | 17 | $5,665 |
| Net Change from 2000 | 83,368,340 | 2,656,655 | 953,812 | 118,940,985 | 13 | $3,928 | 1,374,593 | 5 | $2,537 |
| Percent Change from Baseline 2000 | **33%** | **31%** | **32%** | **84%** | **38%** | **84%** | **81%** | **38%** | **81%** |
| **Committed Investment** | | | | | | | | | |
| 2007 Estimate | 299,623,425 | 10,027,779 | 3,581,983 | 185,208,699 | 37 | $6,116 | 2,193,507 | 13 | $4,053 |
| Net Change from Baseline 2007 | - | - | - | (19,380,310) | (4) | ($640) | (226,221) | (1) | ($423) |
| Percent Change from Baseline 2007 | **0%** | **0%** | **0%** | **-9%** | **-9%** | **-9%** | **-9%** | **-9%** | **-9%** |
| 2012 Estimate | 333,681,121 | 11,112,504 | 3,971,191 | 231,124,775 | 42 | $7,632 | 2,721,718 | 15 | $5,026 |
| Net Change from Baseline 2012 | - | - | - | (29,440,848) | (5) | ($972) | (340,932) | (2) | ($639) |
| Percent Change from Baseline 2012 | **0%** | **0%** | **0%** | **-11%** | **-11%** | **-11%** | **-11%** | **-11%** | **-11%** |
| **Moderate Investment** | | | | | | | | | |
| 2007 Estimate | 299,623,425 | 10,027,779 | 3,581,983 | 183,919,557 | 37 | $6,073 | 2,176,071 | 13 | $4,020 |
| Net Change from Baseline 2007 | - | - | - | (20,669,452) | (4) | ($683) | (243,657) | (1) | ($456) |
| Percent Change from Baseline 2007 | **0%** | **0%** | **0%** | **-10%** | **-10%** | **-10%** | **-10%** | **-10%** | **-10%** |
| 2012 Estimate | 333,681,121 | 11,112,504 | 3,971,191 | 209,577,247 | 38 | $6,920 | 2,473,351 | 13 | $4,569 |
| Net Change from Baseline 2012 | - | - | - | (50,988,376) | (9) | ($1,684) | (589,299) | (3) | ($1,096) |
| Percent Change from Baseline 2012 | **0%** | **0%** | **0%** | **-20%** | **-20%** | **-20%** | **-19%** | **-19%** | **-19%** |
| **Aggressive Investment** | | | | | | | | | |
| 2007 Estimate | 299,623,425 | 10,027,779 | 3,581,983 | 174,681,594 | 35 | $5,768 | 2,070,110 | 12 | $3,825 |
| Net Change from Baseline 2007 | - | - | - | (29,907,415) | (6) | ($988) | (349,618) | (2) | ($651) |
| Percent Change from Baseline 2007 | **0%** | **0%** | **0%** | **-15%** | **-15%** | **-15%** | **-14%** | **-14%** | **-15%** |
| 2012 Estimate | 333,681,121 | 11,112,504 | 3,971,191 | 196,582,267 | 35 | $6,491 | 2,316,120 | 13 | $4,286 |
| Net Change from Baseline 2012 | - | - | - | (63,983,356) | (12) | ($2,113) | (746,530) | (4) | ($1,379) |
| Percent Change from Baseline 2012 | **0%** | **0%** | **0%** | **-25%** | **-25%** | **-25%** | **-24%** | **-24%** | **-24%** |
| **Accelerated Investment** | | | | | | | | | |
| 2007 Estimate | 299,623,425 | 10,027,779 | 3,581,983 | 158,407,170 | 32 | $5,231 | 1,880,520 | 11 | $3,483 |
| Net Change from Baseline 2007 | - | - | - | (46,181,839) | (9) | ($1,525) | (539,208) | (3) | ($993) |
| Percent Change from Baseline 2007 | **0%** | **0%** | **0%** | **-23%** | **-23%** | **-23%** | **-22%** | **-22%** | **-22%** |
| 2012 Estimate | 333,681,121 | 11,112,504 | 3,971,191 | 196,582,267 | 35 | $6,491 | 2,316,120 | 13 | $4,286 |
| Net Change from Baseline 2012 | - | - | - | (63,983,356) | (12) | ($2,113) | (746,530) | (4) | ($1,379) |
| Percent Change from Baseline 2012 | **0%** | **0%** | **0%** | **-25%** | **-25%** | **-25%** | **-24%** | **-24%** | **-24%** |

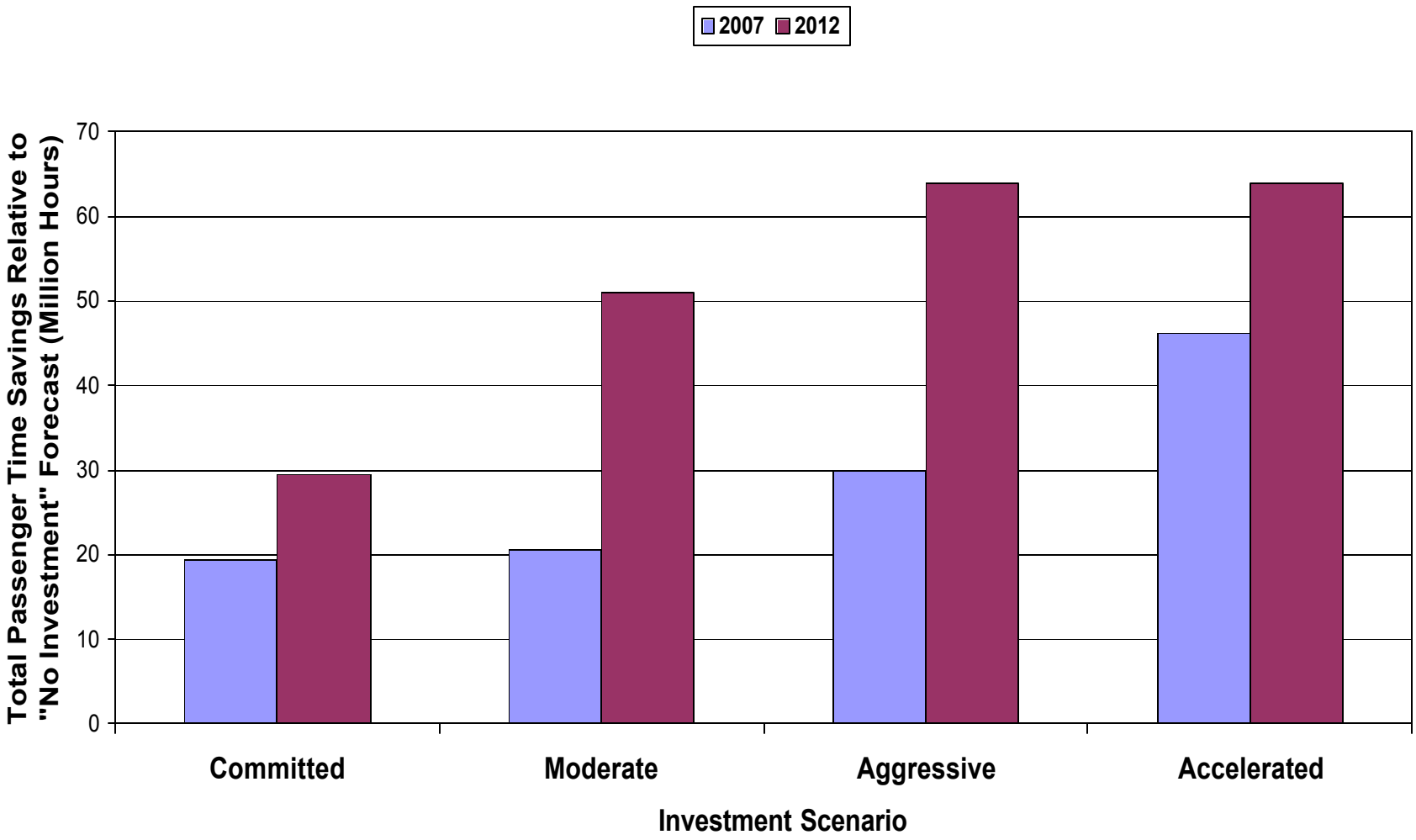
| Table 5. Total Economic Savings Relative to "No Investment" Forecast | | | | | | |
|---|---|---|---|---|---|---|
| (Million 2000 Constant Dollars) | | | | | | |
| Scenario/ Year | Passenger Delay Cost * | Flight Delay Cost | | | Full Cost | Savings Relative to No Investment |
| | | To Airlines * | Induced ** | Total | | |
| **No Investment** | | | | | | |
| **2000** | $4,676 | $3,128 | $1,595 | $4,723 | $9,399 | - |
| **2007** | 6,756 | 4,476 | 2,283 | 6,759 | 13,515 | - |
| **2012** | 8,604 | 5,665 | 2,889 | 8,554 | 17,158 | - |
| **Committed** | | | | | | |
| **2007** | 6,116 | 4,053 | 2,066 | 6,129 | 12,235 | 1,280 |
| **2012** | 7,632 | 5,026 | 2,563 | 7,589 | 15,221 | 1,937 |
| **Moderate** | | | | | | |
| **2007** | 6,073 | 4,020 | 2,050 | 6,070 | 12,143 | 1,372 |
| **2012** | 6,920 | 4,569 | 2,330 | 6,899 | 13,819 | 3,339 |
| **Aggressive** | | | | | | |
| **2007** | 5,768 | 3,825 | 1,951 | 5,776 | 11,544 | 1,971 |
| **2012** | 6,491 | 4,286 | 2,186 | 6,472 | 12,963 | 4,195 |
| **Accelerated** | | | | | | |
| **2007** | 5,231 | 3,483 | 1,776 | 5,259 | 10,490 | 3,024 |
| **2012** | 6,491 | 4,286 | 2,186 | 6,472 | 12,963 | 4,195 |

* Source: Table 4

** Induced = Flight Delay Cost to Airlines * 0.51

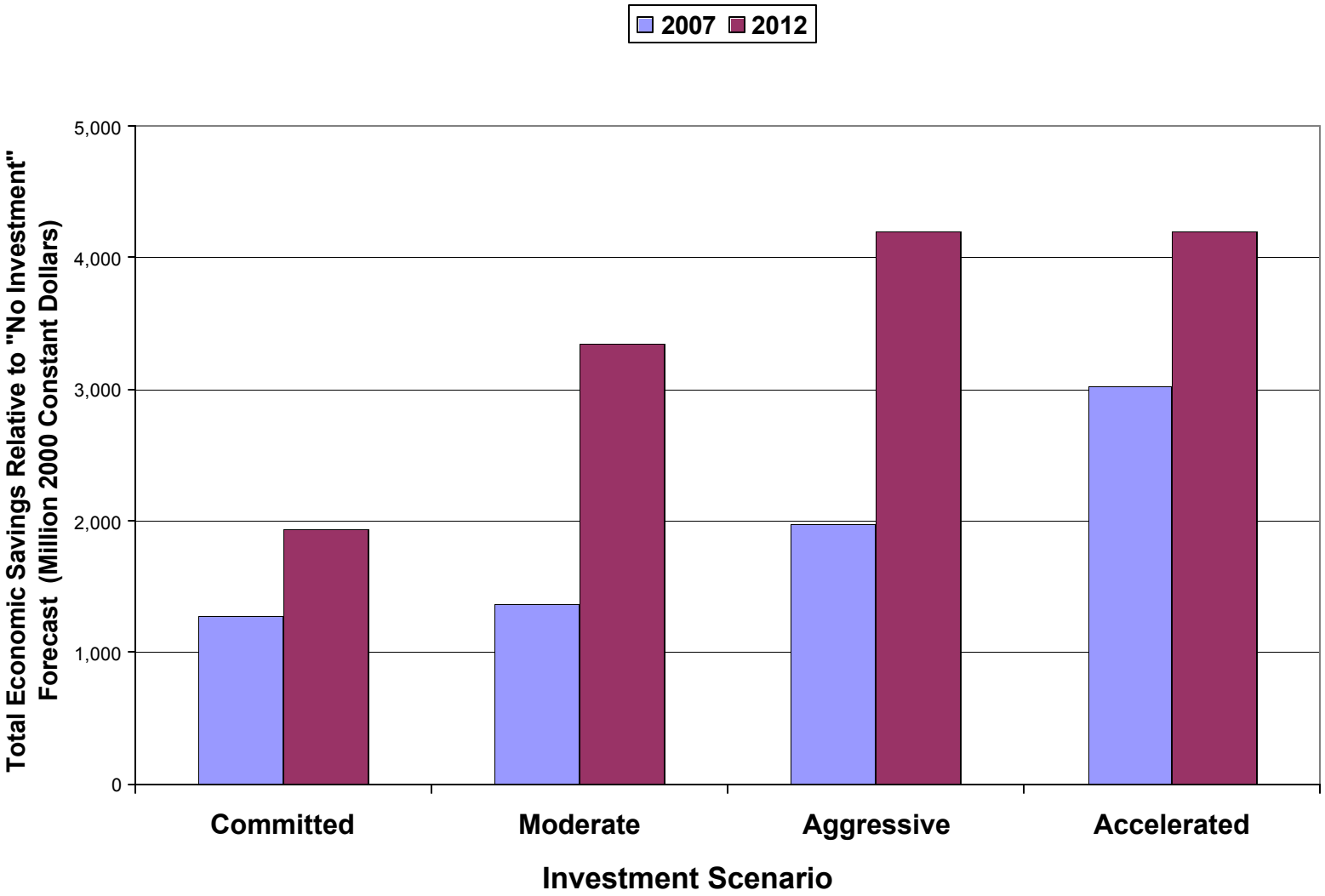
Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

## Figure 1. Total Passenger Time Savings Relative To "No Investment" Forecast




Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

## Figure 2. Total Economic Savings Relative to "No Investment" Forecast




Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

# III. Aviation Infrastructure Costs and Benefits

## Introduction

The key objective of the study was to quantify the economic costs of airspace and airport congestion and delay under different future infrastructure development assumptions. After establishing a Baseline scenario of zero airport and airspace improvement, using a base year of 2000, the authors evaluated the effects of differing rates of improvements beginning with completion of the FAA Operational Evolution Plan (OEP) for the years 2007 and 2012, producing a "snapshot" of each option and comparison to the Baseline scenario.

The snapshot approach is appropriate for analysis of long-term projects. It assumes any short-term impacts are negligible and allows sufficient time for supply and demand to return to an equilibrium state. It does not produce annual costs for the intervening years, however. Thus, total annual costs for the 2000 to 2012 period were assumed to lie on a straight line between the estimated years. The reduction in congestion costs derived from infrastructure investment, in turn, constitutes the public benefit. That public benefit is then compared to the infrastructure capital costs in each scenario, resulting in the computation of public returns on investment.

## Estimation Methodology

Airport and airspace improvement projects are "lumpy," as investment and implementation dates do not proceed evenly over time. Therefore, it cannot be assumed that congestion and delay costs change evenly over time. Rather, it is reasonable to expect congestion and delay to increase with growing demand for air transportation services, and to experience sudden, dramatic reductions once entire projects or project elements have been completed.

Accordingly, the study employed a minimum-maximum implementation schedule to estimate the range of best and worst cases for each scenario. The best case assumes the benefits of improvements are achieved early and are sustained due to projects being completed early in the period. In Table 6, this is the minimum column for each of the options where annual costs remain at their lowest level until reaching the next period.[18] By the same reasoning, the worst case assumes the benefits of projects are eroded because of late completion and airport and airspace saturation. These are the maximum columns in Table 6, where annual costs for any given period immediately increase to those of the next period.

The minimum and maximum schedules are highly unlikely extremes; thus, the actual total annual cost is expected to gravitate toward the mean with a large degree of confidence. It is unknown, however, how close to the mean it will be. As in the case of project improvements, the benefits derived from airport and airspace enhancements are also lumpy. Additionally, they are elastic. That is, they are analogous to a rubber band being stretched from a relaxed position. Early benefits are easier to achieve (little force is required to stretch the rubber band), thus reducing costs to a greater extent than the average over time. As the benefits of airport and airspace improvements approach their maximum, additional benefits are harder to achieve (as the rubber band becomes taut, more force is required to achieve any increase in length) and, thus, the costs increase at more than the long-term average rate, as the study shows.

[18] For the purposes of the analysis, periods are defined as point estimates modeled—namely 2000, 2007, and 2012.

## Benefit-Cost Analysis

Lacking precise knowledge of actual total delay costs, the study employs a range of the point estimate plus or minus 10 percent. For each scenario, the reduction in total annual costs of congestion and delay—the marginal benefit of the investment—is calculated in Table 6.

**Table 6: Annual Congestion and Delay Costs (in Millions of Constant Year 2000 Dollars) by Investment Scenario**

| | None | | | Committed | | |
|---|---|---|---|---|---|---|
| | Zero Min | Zero Max | Zero Mean | Cttd Min | Cttd Max | Cttd Mean |
| **2000** | 9,399 | 9,399 | | 9,399 | 9,399 | |
| 2001 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| 2002 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| 2003 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| 2004 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| 2005 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| 2006 | 9,399 | 13,515 | | 9,399 | 12,235 | |
| **2007** | 13,515 | 13,515 | | 12,235 | 12,235 | |
| 2008 | 13,515 | 17,158 | | 12,235 | 15,221 | |
| 2009 | 13,515 | 17,158 | | 12,235 | 15,221 | |
| 2010 | 13,515 | 17,158 | | 12,235 | 15,221 | |
| 2011 | 13,515 | 17,158 | | 12,235 | 15,221 | |
| **2012** | 17,158 | 17,158 | | 15,221 | 15,221 | |
| **Total Cost ($Billion)** | **150.5** | **189.8** | **170.2** | **142.2** | **171.1** | **156.7** |
| **Change from Base Case** | | **Base Case** | **n/a** | **8.3** | **18.6** | **13.5** |

| | Moderate | | | Aggressive | | |
|---|---|---|---|---|---|---|
| | Mod Min | Mod Max | Mod Mean | Aggr Min | Aggr Max | Aggr Mean |
| **2000** | 9,399 | 9,399 | | 9,399 | 9,399 | |
| 2001 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| 2002 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| 2003 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| 2004 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| 2005 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| 2006 | 9,399 | 12,143 | | 9,399 | 11,544 | |
| **2007** | 12,143 | 12,143 | | 11,544 | 11,544 | |
| 2008 | 12,143 | 13,819 | | 11,544 | 12,963 | |
| 2009 | 12,143 | 13,819 | | 11,544 | 12,963 | |
| 2010 | 12,143 | 13,819 | | 11,544 | 12,963 | |
| 2011 | 12,143 | 13,819 | | 11,544 | 12,963 | |
| **2012** | 13,819 | 13,819 | | 12,963 | 12,963 | |
| **Total Cost ($Billion)** | **140.3** | **163.5** | **151.9** | **136.5** | **155.0** | **145.7** |
| **Change from Base Case** | **10.2** | **26.3** | **18.2** | **14.1** | **34.8** | **24.4** |

**Accelerated**

| | Acc Min | Acc Max | Acc Mean |
|---|---|---|---|
| **2000** | 9,399 | 9,399 | |
| 2001 | 9,399 | 10,490 | |
| 2002 | 9,399 | 10,490 | |
| 2003 | 9,399 | 10,490 | |
| 2004 | 9,399 | 10,490 | |
| 2005 | 9,399 | 10,490 | |
| 2006 | 9,399 | 10,490 | |
| **2007** | 10,490 | 10,490 | |
| 2008 | 10,490 | 12,963 | |
| 2009 | 10,490 | 12,963 | |
| 2010 | 10,490 | 12,963 | |
| 2011 | 10,490 | 12,963 | |
| **2012** | 12,963 | 12,963 | |
| **Total Cost ($Billion)** | **131.2** | **147.6** | **139.4** |
| **Change from Base Case** | **19.3** | **42.2** | **30.7** |

Source: **Table 5** (Chapter II)
Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation. Also, figures may differ slightly from Table 7 due to rounding.

For each investment scenario considered in the study, these benefits were compared to the total published federal capital costs of implementing the associated projects.[19] This analysis is depicted in Table 7. The benefit-cost ratio for each scenario was calculated in year 2000 net present value (NPV) terms. First, the analysis discounted the minimum and maximum reduced-congestion benefit streams from Table 6 and computed the mean of those discounted streams. Next, the net benefit for each scenario was computed by subtracting the present value of the mean benefit for that scenario from that of the zero-investment case. Separately for each scenario, the FAA forecast capital cost of each runway was then discounted to the year 2000 from each runway project's scenario-specific completion date.[20] All present value calculations applied the OMB/FAA-recommended discount rate of seven percent for public investment.

[19] Whereas federal expenditures may be accelerated, the total cost is anticipated to remain constant.
[20] For those runways with no published forecast capital cost, the average of $284 million over all costed projects in the Accelerated scenario was used.

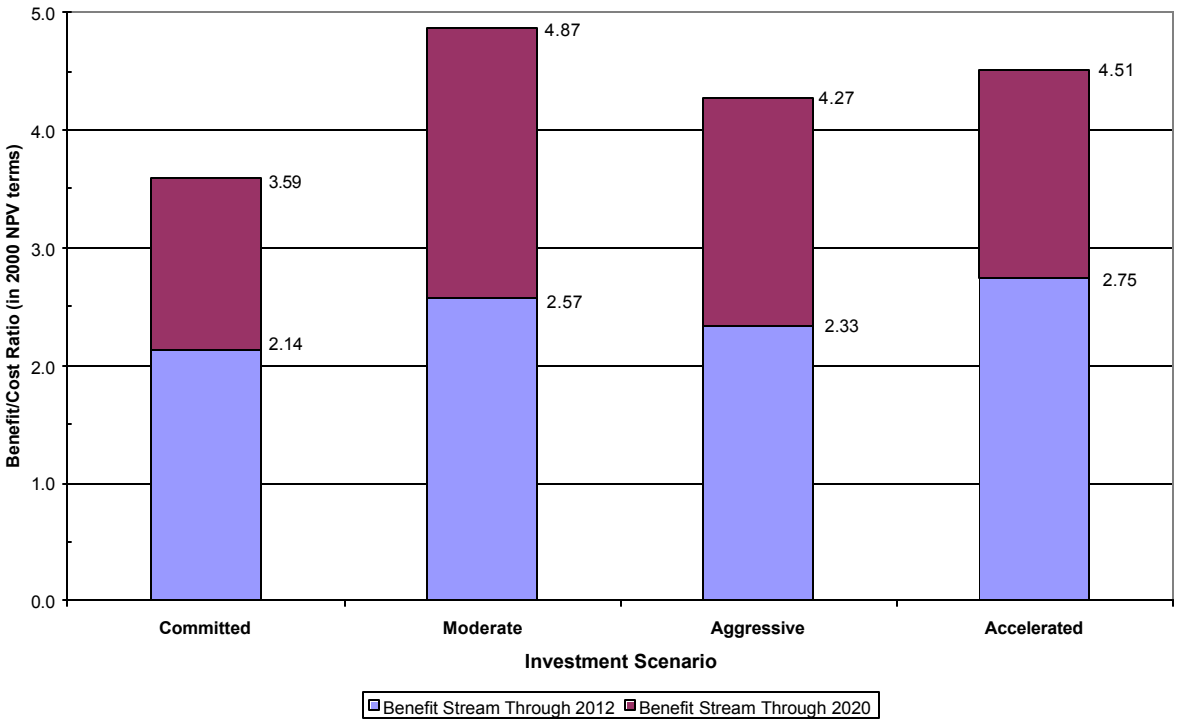
## Table 7: Benefit-Cost Analysis Relative to Zero-Investment Scenario

**Discount Rate** **7%**

| | No Investment | | | Committed | | | Moderate | | | Aggressive | | | Accelerated | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Min** | **Max** | **Mean** | **Min** | **Max** | **Mean** | **Min** | **Max** | **Mean** | **Min** | **Max** | **Mean** | **Min** | **Max** | **Mean** |
| **2000** | 9,399 | 9,399 | | 9,399 | 9,399 | | 9,399 | 9,399 | | 9,399 | 9,399 | | 9,399 | 9,399 | |
| 2001 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| 2002 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| 2003 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| 2004 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| 2005 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| 2006 | 9,399 | 13,515 | | 9,399 | 12,235 | | 9,399 | 12,143 | | 9,399 | 11,544 | | 9,399 | 10,490 | |
| **2007** | 13,515 | 13,515 | | 12,235 | 12,235 | | 12,143 | 12,143 | | 11,544 | 11,544 | | 10,490 | 10,490 | |
| 2008 | 13,515 | 17,158 | | 12,235 | 15,221 | | 12,143 | 13,819 | | 11,544 | 12,963 | | 10,490 | 12,963 | |
| 2009 | 13,515 | 17,158 | | 12,235 | 15,221 | | 12,143 | 13,819 | | 11,544 | 12,963 | | 10,490 | 12,963 | |
| 2010 | 13,515 | 17,158 | | 12,235 | 15,221 | | 12,143 | 13,819 | | 11,544 | 12,963 | | 10,490 | 12,963 | |
| 2011 | 13,515 | 17,158 | | 12,235 | 15,221 | | 12,143 | 13,819 | | 11,544 | 12,963 | | 10,490 | 12,963 | |
| **2012** | 17,158 | 17,158 | | 15,221 | 15,221 | | 13,819 | 13,819 | | 12,963 | 12,963 | | 12,963 | 12,963 | |
| Total ($ Billion) | 150.5 | 189.8 | 170.2 | 142.2 | 171.1 | 156.7 | 140.3 | 163.5 | 151.9 | 136.5 | 155.0 | 145.7 | 131.2 | 147.6 | 139.4 |
| Change from Base | | | | 8.3 | 18.6 | 13.5 | 10.2 | 26.3 | 18.2 | 14.1 | 34.8 | 24.4 | 19.3 | 42.2 | 30.7 |
| NPV Total | 92.3 | 117.8 | 105.0 | 88.2 | 106.7 | 97.5 | 87.4 | 102.9 | 95.2 | 85.5 | 97.9 | 91.7 | 82.8 | 92.6 | 87.7 |
| **NPV Change** | | | | 4.1 | 11.1 | 7.6 | 4.9 | 14.9 | 9.9 | 6.8 | 19.9 | 13.4 | 9.5 | 25.2 | 17.4 |
| **Capital Cost** | | | | 3.5 | 3.5 | 3.5 | 3.8 | 3.8 | 3.8 | 5.7 | 5.7 | 5.7 | 6.3 | 6.3 | 6.3 |
| **Benefit/Cost Ratio** | | | | **1.2** | **3.1** | **2.1** | **1.3** | **3.9** | **2.6** | **1.2** | **3.5** | **2.3** | **1.5** | **4.0** | **2.8** |
| NPV Level Benefits 2013-2020 | 45.5 | 45.5 | 45.5 | 40.4 | 40.4 | 40.4 | 36.6 | 36.6 | 36.6 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 | 34.4 |
| NPV Extended Stream of Benefits | 137.8 | 163.3 | 150.5 | 128.6 | 147.1 | 137.8 | 124.0 | 139.6 | 131.8 | 119.9 | 132.2 | 126.1 | 117.2 | 126.9 | 122.1 |
| | | | | 9.2 | 16.2 | 12.7 | 13.7 | 23.7 | 18.7 | 17.9 | 31.1 | 24.5 | 20.6 | 36.4 | 28.5 |
| Benefit/Cost Ratio | | | | 2.6 | 4.6 | 3.6 | 3.6 | 6.2 | 4.9 | 3.1 | 5.4 | 4.3 | 3.3 | 5.8 | 4.5 |

The benefit-cost ratios depict the returns on public investment in aviation infrastructure for each dollar invested. These returns are shown in Figure 3, which reveals that accelerated investment in airport and airway capacity will produce compelling national economic paybacks.

**Figure 3. Benefit/Cost Ratios of Investment in Aviation Infrastructure**



If only the very brief stream of benefits through 2012 were considered, benefits under the Accelerated scenario would still exceed the required investment by a factor of 2.75. Considering reduced congestion costs through 2020, the analysis shows that every dollar invested will generate more than $4.50 in benefits for the U.S. economy. Since airport capacity projects typically have lifetimes far in excess of 20 years, these calculated benefit-cost ratios are highly conservative. Considering the benefit stream through 2020 is thus a better indicator of return on investment than using the shorter period analyzed explicitly in the study because the benefits of invested capital will continue well beyond the 12-year investment period.

# IV. Other Direct and Indirect Impacts

## Introduction

Civil aviation is so integrally involved in our living patterns that its impact on the economy through evolving business models, international competitiveness, and quality of life is not possible to measure.

The following sections nonetheless address these issues:

- The evolution of business models in response to emerging options in air transportation
- The impact of air transportation on trade and international competitiveness
- The impact of air transportation on quality of life and the environment

## Evolving Business Models

Airport and airspace congestion is an added expense for companies that rely on air transportation for the day-to-day conduct of their business. The long-term capacity enhancements required to allow business air travel to grow to its full potential have fallen short in recent years. Flight delays or cancellations result in lost productive work and personal time for the business traveler. Companies incur losses due to missed sales opportunities, added travel expenses, and unproductive employee hours.

The increases in demand for air travel and air cargo have not been met with an adequate level of infrastructure and capacity investment, resulting in more frequent and extended flight delays and traffic congestion. According to the FAA OPSNET database, 450,000 flights were delayed by air traffic control in the United States in 2000—approximately 393,000 delays were recorded in 1990, the previous record.

Flight delays are a source of frustration and an added financial burden—according to this study $9.4 billion in 2000. The financial cost impacts the bottom line of all participants, from aircraft operators to shippers, passengers, manufacturers and suppliers. In particular, there is a significant financial impact on business operations as business passenger travel and air cargo shipments are directly affected. How businesses cope with these issues will depend on economic conditions and the actions taken by government and aviation operators.

### Passenger Traffic

Business travel includes all individuals who travel for the purpose of work. Business travel is the most profitable market segment for airlines, and the erosion of this segment has significant implications on the bottom line for the entire civil aviation sector, as well as for industries related to travel, such as hotels and rental car companies.

In 2000, business travel accounted for 14 percent (139.6 million) of total domestic U.S. person-trips as recorded by the Travel Industry Association. Air travel was the mode of transportation used by 41 percent of all business travelers that year. In 1999, 8.4 million Americans traveled overseas for business, including conventions.

### Business Travel Alternatives

Corporations seeking to minimize their business travel costs associated with air traffic congestion and delays are finding alternative ways to stay in touch with their customers by using technology instead of flying. In addition, many corporations choose to consolidate satellite offices geographically to minimize travel expense.

Within civil aviation, business aircraft are now becoming more common, especially for

transporting sales and management teams from both large and mid-size corporations. Corporations also use these planes to transport other company personnel and to deliver time-critical parts and products. In addition, customers and clients are brought to company facilities for factory tours and product demonstrations. In most cases, companies fully own their business aircraft. However, a trend toward alternative arrangements between different companies is on the rise. Chartering, leasing, fractional ownership, time-sharing agreements, interchange agreements, and partnerships all reduce the overall costs to a corporation—fractional ownership is one of the faster growing segments.

In addition, corporations are increasingly using private "shuttle" operations that service frequent business travelers on a "regular and frequent" basis. Among the benefits of owning their own fleets, flight crews, maintenance technicians, and other support personnel, large multinationals and other corporations see the following:

- Time-saving, through fewer unscheduled delays
- Increased productivity, as employees can work in complete privacy
- Control of all aspects of the travel plan
- Access to more destinations than served by airlines
- Full control of fleets and maintenance
- Enhanced corporate image

Airlines are trying actively to attract business travelers despite troubles with airport and air traffic congestion. Technology has been used to help customers cope with the congestion (e.g., adding automated check-in machines to avoid long lines), and some airlines have installed paging services that will notify the customer of delays in advance. However, these are only short-term solutions that improve service, but do not tackle the core of the problem.

Air Cargo

According to the United Nations, 40 percent of the world's manufactured exports by value are transported by air. Aircraft are used to transport 19 billion ton miles of freight and nearly 2.3 billion ton miles of mail each year. This transportation is provided by various types of operations, including freight carried in the bellies of passenger aircraft, all-cargo aircraft operated by the traditional heavy-freight companies, and the so-called integrated express carriers who are responsible for the door-to-door transportation of all types of cargo. The large aircraft utilized in these operations are supported by a fleet of regional aircraft designed to ensure time-definite service to all points in the United States and virtually all points around the globe. In addition, those companies responsible for the totality of the freight movement employ extensive trucking networks.

The key elements in all types of air cargo service are speed and reliability. Without both of these characteristics, there is little to separate air transportation from service by other modes. Indeed, many industry members promote these characteristics by offering money-back guarantees if delivery schedules are not met. Therefore, delays and cancellations have a significant and direct impact on both the air cargo industry and the shipping public that this industry serves. Major bottlenecks at airports add to the time in transit of shipments and jeopardize the industry's carefully programmed time-definite service. In turn, shippers are denied the certainty they need to retain their just-in-time inventory management.

Just-in-time inventory management is central to maintaining competitiveness in the global marketplace. Especially in the transportation of high-value goods, there is simply no substitute for air. Moreover, many of the high-tech, high-value, industries are embracing air transport not

only for the time advantage, but also because such transportation lowers overall transportation costs by reducing their value-to-weight ratio. An example of the type of business dependent upon such transportation is the computer manufacturing industry, which uses air carriers to deliver assembly components that have been sourced from another location. Other businesses that have become dependent on the services offered by the air cargo industry include other electronics firms, pharmaceutical companies, automobile parts suppliers, and suppliers of various medical devices.

**International Trade and Competitiveness**

The disadvantages associated with the baseline future case examined in this study will detrimentally affect economic activity within the United States; they also will constrain the ability of the United States to compete in global markets. This section identifies the degree of global competition among nations, explores the key ways that this competition can be affected, illustrates how the United States currently competes globally, and suggests how the U.S. global competitive stance could be affected by the disadvantages associated with increasing air traffic congestion.

*Air Transportation and Economic Growth: From Economic Nationalism to a Global Economy*

Since World War II, a key direction of global commerce has been the increasing integration of national economic activity. Industrial nations came together to form the OECD. The General Agreement on Tariffs and Trade (GATT) was formed and then superseded by the World Trade Organization (WTO) to help facilitate a new era of accelerated global trade.

These trends reflect the global integration of economies as businesses increasingly sought not only to sell their products into wider markets, but also to coordinate production and distribution across national borders. Every region of the world has participated in these trends except for the Middle East, whose export statistics are distorted by the region's huge exports of petroleum and related products.

This steady increase in trade activity has been enhanced by the growth of global air transportation. Clearly, air transportation has facilitated business' ability to move its products around the world. But it has played a far more important role in bringing business managers together, enabling them to build the links, communications, and personal relationships necessary to achieve such a level of international business activity. Despite continuous advances in telecommunication technologies, the growth in global business over the past 50 years could not have been achieved without the personal contact enabled by the world's civil aviation system.

Not only is air transportation important to the global economy; it is also an important enabler of economic growth for individual economies. By developing its air transportation system, a country can better link itself to the global economy and provide an environment for its businesses that facilitates global activity. Conversely, there are distinct disadvantages for regions or communities that are beyond the reaches of efficient air transportation. In these regions, business remains more isolated and less able to reap the benefits offered by being connected to global economic activity.

Both adequate airport capacity and the efficiency with which the aviation system works are critical to generating economic benefits. The main body of this report examines the impacts that a constrained system in the United States would have on the U.S. economy later in the decade. But it is also true that these constraints would inhibit the ability of the United States to compete in global markets, damaging its international competitiveness in general and the international competitiveness of U.S. civil aviation specifically. This chapter examines some of the elements of such potential damage.

## Competitiveness by Industry

*Air Cargo*

During the past three years, several analyses have shown that, in macroeconomic terms, U.S. integrated air express companies have created billions of dollars annually in reduced business-inventory carrying costs, over $50 billion per year in logistics cost savings, and tens of billions of dollars of final demand and export sales that would not occur in the absence of their services.

The air express industry itself, including its ground transportation and logistics services divisions, generates approximately $60 billion a year in revenue and employs approximately 600,000 workers. In addition, a significant portion of the world's freight is still carried either in the bellies of passenger aircraft or by all-cargo aircraft specializing in traditional "heavy freight." These segments of the marketplace allow those shippers not necessarily demanding express service to enjoy the relative speed of movements by aircraft and to permit the transportation by air of oversized cargo to remote regions of the nation and world.

Global economic integration is characteristic of most of the world. Exports of goods and services in 2000 represented almost a quarter of the world's GDP, up from just 10 percent in 1970. In turn, U.S. merchandise trade amounts to 22 percent of the world total. This steady increase in trade activity has been irrefutably enhanced by the growth of global air transport.

*Air Transportation and Tourism*

In 1999, almost 48.5 million international visitors came to the United States, spending a total of $74.9 billion on travel-related expenses, such as lodging, gifts/souvenirs, food and beverages, and entertainment. They spent another $19.8 billion on U.S. air carriers in traveling to and from the United States. The total of air travel and travel-related spending, $94.7 billion in 1999, has grown 62 percent since 1990, when international visitors spent about $58.3 billion in travel and travel-related expenses to visit the United States.[21]

**Table 8. U.S. International Travel and Tourism Balance of Trade, 1999 ($Millions)**

| | Exports | | Imports | | Surplus |
|---|---|---|---|---|---|
| Air Fares* | $19,776 | 21% | $21,405 | 27% | ($1,629) |
| Air Travel-Related Expenditures+ | $74,881 | 79% | $59,351 | 73% | $15,530 |
| Total | $94,657 | 100% | $80,756 | 100% | $13,901 |

* Exports of air fares are foreign residents' spending on U.S. airlines; imports are U.S. residents' spending on foreign airlines.

\+ Exports of air travel-related expenditures are the spending in the U.S. of foreign visitors; imports are the spending of U.S. travelers abroad.

Source: International Trade Administration, U.S. Department of Commerce

Due to rounding, totals and subtotals may not add precisely.

This amount of spending is significant (the International Trade Administration—the source of these figures—estimates that foreign travel in the United States in 1999 supported over 1.1 million U.S. jobs), and exceeds the amount spent by Americans visiting other countries by $13.9 billion. In other words, the United States runs a significant surplus in its travel trade balance.

[21] Source: Tourism Industries, International Trade Administration, U.S. Department of Commerce, and the Travel Industry Association of America.

Anything adversely affecting this surplus, such as constrained infrastructure or regulatory barriers to adapting to market forces, would imply a decrease in the United States' global competitiveness.

*Other Industries*

The increase in production costs added to American business by aviation congestion affects the U.S. global competitiveness of all industries. In this case, the increased air transportation costs implied by congestion delays raises the costs of production and distribution across the U.S. economy, resulting in a decrease in global competitiveness. An increase in air transportation costs impacts U.S. industries principally in two ways: higher air passenger transportation costs increase business travel and entertainment expenses, and higher air cargo costs affect those industries that utilize this form of transportation in their logistics.

Improved air transport infrastructure not only increases U.S. competitiveness in general, but also allows U.S. aviation *itself* to compete more effectively with foreign entities. Constraints in the U.S. air transport system first affect the economic well being of the aviation sector.

**Quality of Life and Environmental Impact**

Cancellations and delays in air service impose costs on society that may not be captured in GDP or may actually appear as *increased* GDP depending on where the costs appear. For example, spending on un-reimbursed overnights or higher-cost transportation may be required due to cancellations or delays.

There are direct costs to passengers as a result of congestion. This category of costs includes such things as additional meals away from home or, in the case of severe delays, hotel accommodations not reimbursed by the airlines or by an individual's employer.

Indirect costs to the individual are incurred as a result of the opportunity cost of time. Given a choice, most passengers would prefer to spend their time engaged in some other activity than waiting either in an airport or aboard a plane. The value of their time in some other activity is the opportunity cost of time. For example, there is value associated with the time an individual spends with family or in some personal activity. For personal travelers, delays may disrupt vacation plans and lower the quality of the vacation experience. If personal travelers are visiting friends or family, a delay in arrival imposes costs on those being visited. If personal travelers curtail their travels, then friends and family also will not be able to enjoy their visits.

Aviation congestion imposes costs on society. If travelers avoid delays by departing from a less convenient airport, it may increase congestion on roadways and add to air pollution. Choosing less efficient modes of transportation also may contribute to congestion and increased pollution on intercity/interstate highways. Congestion causes departing flights to burn more fuel than required, which contributes to air pollution. Further, arriving aircraft that are required to remain in a holding pattern due to congestion burn additional fuel and contribute to local air pollution. The International Civil Aviation Organization (ICAO), an arm of the United Nations, considers air traffic system modernization an important policy to reduce aircraft emissions, and the resulting reduction in fuel burn also would positively affect the U.S. trade balance.[22] Finally, delays increase the cost of doing business, and these costs are passed on to customers in the form of higher prices, which leads to a decrease in general economic activity and real GDP.

[22] A study produced by The MITRE Corporation Center for Advanced Aviation System Development (CAASD), a federally funded research and development center, estimated that reduced aviation emissions realized from communications, navigation, surveillance and air traffic management enhancements planned to be in place by 2010, but assuming 1997 air traffic levels, would result in a 12 percent reduction in fuel burn worldwide or 300,000 barrels of jet fuel annually in North America alone.

# V. Conclusions

Civil aviation has become an essential part of the U.S. economy. The analysis contained in this study, based on constant year 2000 dollars, indicates that:

- The total national economic impact of civil aviation exceeded more than $900 billion and 11 million jobs in the year 2000, roughly nine percent of the total U.S. GDP;
- Of this, one dollar in nine is contributed by general aviation;
- Aggressive investment in air transportation infrastructure would reduce projected 2012 passenger delays by 64 million hours or 25 percent. Critically, every dollar of investment would generate as much as $5 in economic benefits to the U.S. economy;
- For the period 2000 to 2012, timely, robust investment in airports and airways could mean an additional $30.7 billion for the U.S. economy—benefits that would accrue at a higher annual rate as volumes grow beyond 2012;
- As a result, business operations would become more efficient, costs would be reduced, and U.S. international competitiveness would increase, particularly in aviation, including air cargo, and tourism, increasing economic development;
- Further, with quicker, more robust investment in infrastructure, business and personal travel would rise, and the agony of delays and cancelled flights would be greatly mitigated; and
- The increased connectedness of friends and family and more efficient use of the environment would lead to a greater quality of life for all of American society.

Few dispute that civil aviation delays in 2000 were unacceptable. The magnitude of the damage caused by delays is not limited to mere passenger inconvenience; it imposes considerable costs on the entire U.S. economy.

FAA's Operational Evolution Plan cannot keep pace with the forecast growth in scheduled airline passengers. Therefore, it is an insufficient response to the delay problem because it merely reduces the increase in delay experienced by passengers through 2012 without attacking the base delay itself.

The earlier the airport and airway investment program addresses congestion at large, critical choke points, the more successful it will be in attacking overall system congestion. But even in the most aggressive scenario investigated in this study, annual passenger delay hours in 2012 increase 39 percent from unacceptable 2000 levels.

More aggressive investment in civil aviation infrastructure is not only justified by benefit/cost analysis—it is also essential to the well being of the U.S. economy and its citizens.

# APPENDIX A

## The DRI·WEFA Industry and Macro Analysis Approach

### The Approach

The basic methodology of the study was an iterative approach using two econometric models.

- First, civil aviation's direct GDP and output were removed from the DRI•WEFA Industrial Analysis Model to estimate the indirect feed-through into other industry sectors.
- Second, these direct and indirect impacts were input into the DRI•WEFA Macroeconomic Model to simulate the impact on the economy overall and on demand, GDP and employment by industry.

### The DRI·WEFA Industrial Analysis Model

The Industrial Analysis model is a combination input-output/stochastic model of activity in 117 U.S. industries.

- The model forecasts demand, industrial production indexes, shipments, value of production, inventories, prices, man-hours, productivity, average hourly earnings, material cost, and operating margin for each manufacturing industry.
- Value of production, prices, man-hours, and productivity are forecast for non-manufacturing sectors.

The industry aggregation follows the 73 manufacturing industries reported by the Department of Commerce in its monthly Shipments, Orders, and Inventories release.

The input-output (I-O) block in the core of the model translates macroeconomic forecasts from The DRI•WEFA Group's short- and long-term macroeconomic models into demand by industry. The I-O tables are also used for calculations of input costs by industry, used in forecasting prices. All other model concepts are forecast by statistical equations and identities.

The model produces quarterly-frequency industry indicators. DRI•WEFA uses its U.S. Industry model to produce a new forecast each month. Historical data for the most part are monthly series released by various government agencies, which typically lag the forecast base by two months. All data, unless otherwise specified, are seasonally adjusted annual rates.

### The DRI·WEFA U.S. Macroeconomic Model

The DRI•WEFA U.S. Macroeconomic Model combines the latest econometric and economic research with traditional Keynesian macroeconomics. The model is best described as a complete, detailed version of the model found in intermediate-level macroeconomics textbooks and is as close to a consensus model as is currently possible. The model has Keynesian properties in the short run.

Over the medium term, however, policy shifts or economic shocks will affect prices, while output and employment return to the long-run growth path. A neo-classical growth model based on a Cobb-Douglas production function determines this long-run growth path.

Despite its size and complexity, the core model's basic structure is similar to those usually described in intermediate-level macroeconomics textbooks. Aggregate demand is determined by a real sector and a financial sector (IS and LM curves). Prices adjust slowly,

so shocks to demand affect production and gross domestic product (GDP) in the short run. The economy adjusts to medium-run full employment through a Phillips curve that consists of two parts: an expectations-augmented equation for labor costs and a price-capacity equation. In the price-capacity equation, firms set a mark-up over labor and import costs depending on capacity utilization.

Long-run growth is determined through a Cobb-Douglas production function that calculates an estimate of potential GDP. Capital investment and labor force growth raise potential GDP and capacity and (through the mark-up equation) reduce prices. A lower overall price level increases real incomes, creating, in the long run, sufficient aggregate demand to absorb the additional capacity and raise production. Note that the impact of investment on the economy in the short run will mainly be through the traditional Keynesian channels because the capital stock is very large relative to new investment. Higher rates of capital growth or technical change may take a decade or more to affect economic performance.

## The Approach Applied to Civil Aviation

*Measuring Economic Impact*

The broadest measure of the U.S. economy is gross domestic product (GDP). GDP is the *value* of the domestic *production* of goods and services *for final use.* GDP can be measured on the demand side or the supply side, but industries can only be measured on the latter. This study examines the supply side of economic accounts—the income generated in the production of goods and services for final use. These goods and services fall into three categories:

- **Direct goods and services** provided by the civil aviation industry such as:
    - *Scheduled and unscheduled commercial passenger and cargo operations, and general aviation (including business aviation and air taxi) operations*
    - *Manufacturing, servicing, and support including pilot and maintenance technician training*
    - *Services carried out at airports and flying fields, including maintenance and storage of aircraft, handling of air cargo and passengers, and air traffic control. Also included are all other government operations related to civil aviation*
- **Indirect goods and services** bought from the rest of the economy by the civil aviation industry
- **Induced goods and services**, which include:
    - *Those purchased from the income provided to employees in the direct and indirect provision of goods and service*
    - *Direct (from the industry itself), indirect (from supporting industries) and induced impacts (from the spending of income generated) of industries for which air transportation provides an enabling function (e.g., travel and tourism and, broadly, economic development)*

## Economic Multipliers

The multiplier concept provides an excellent method of summarizing economic impacts. It is an effective way of relating one impact analysis to another.

The **production multiplier** is straightforward, and there is little controversy concerning its magnitude. For most industries, the **indirect** impact is generally about the same as the **direct** impact, giving a **production multiplier**—the ratio of the combined direct and indirect impacts to the direct impact alone [(Direct + Indirect)/Direct]—of about 2.0. However, both the aviation and tourism industries are characterized by high labor costs. As a result, the direct impact is higher than for most other industries, which reduces the production multiplier for civil aviation to **1.7** in this study.

The **income multiplier** is more controversial. It was once thought that the **induced** impact was about the same size, or even larger than, the combined direct and indirect impacts. The relation of these concepts is summarized in the **income multiplier**—the ratio of the combined direct, indirect, and induced impacts to the combined direct and indirect impacts [(Direct + Indirect + Induced)/(Direct + Indirect)]. Economists once thought that only savings and imports limited the income multiplier. This was one of the important results of Keynesian economics for public policy.

More recently, economists have recognized that supply-side limitations are more important. Thus, income multipliers, thought to be close to 2.0 or even higher in the past, have been found to be considerably lower. The DRI•WEFA U.S. macro model indicates an income multiplier of **1.5** for this industry.

As a result, the combined multipliers for this study give **1.5 x 1.7 = 2.6** rather than close to **4.0** found in other studies. Brief descriptions of the models and methodology are provided in **Appendix A**

Section II of this report describes the application of these measures to civil aviation and the results of the analysis.

## General Aviation

General aviation accounted for approximately 12 percent of total civil aviation spending in 2000. The small share in no way reflects the overall importance of general aviation. All private aviation is classified under general aviation, including business aviation.

The General Aviation Manufacturers Association (GAMA) gathered or estimated the data supporting the estimates of general aviation spending in this study. GAMA assembled these data from a range of sources, including the GAMA yearbook, FAA, and other private sources.[23]

The supporting data utilized in the model of general aviation spending for 2000 include, but are not limited to:

Fixed Costs (calculated per aircraft)

- Hull insurance
- Liability insurance
- Facilities

[23] Primarily, the Operations Planning Guide: 2002, which appeared in *Business and Commercial Aviation*, August 2001.

Variable Costs (calculated by flight hour)

- Pilot salaries
- Recurrent flight training
- Labor (other than pilots)
- Fuel
- Replacement parts
- Miscellaneous trip spending

At each level, costs were calculated by aircraft type and then aggregated by class. In this way, the accuracy of the estimates is improved.

These results were then allocated to detailed general aviation user categories, according to hours flown by aircraft type, and aggregated to the two categories shown in **Table 1**, namely, commercial operations[24] and private operations. The general aviation commercial operations are then shown under general aviation and removed from the statistics for the air transportation industry to arrive at this study's definition of commercial aviation.

DRI•WEFA's economic impact analysis considers additional general aviation impacts including general aviation's share of tourism and the revenue generated by publications relating to general aviation.

[24] Defined as the total of instructional, aerial application, aerial observation, aerial other, sightseeing, external load, air tours, air taxi, medical, and other commercial.

# APPENDIX B

# Effect of Congestion-Related Delay on the Value of Scheduled Commercial Passenger Air Transportation to the U.S. Economy: Methodology and Assumptions

## Introduction

A Microsoft Access-based model was developed to estimate total passenger and flight delays for scheduled commercial passenger airline services in the United States for the years 2000, 2007, and 2012.

## "Measured" Delay Factors by Airport and Time of Day

Baseline 2000: FAA Consolidated Operations and Delay Analysis System (CODAS) delay data for 99 airports in Calendar Year (CY) 2000 were used to develop average delays per departure and arrival by hour of day (0-23) as follows:

- Departure Delays: Gate Delays (excluding Estimated Departure Clearance Time holds caused by the destination airport) plus Taxi-Out Delays
- Arrival Delays: Estimated Departure Clearance Time (EDCT) Gate Delays at Origin Airport plus Airborne Delays plus Taxi-In Delays
- Arrival Delays (Airborne): Airborne Delays

2007/2012: Airport delay factors were modified for each scenario/year based on the following:

- Base-year average delays per operation were correlated to average hourly operations (Enhanced Traffic Management System-based) for each hour over 12 months in CY 2000 (24 x 12 = 288 data points). Regression coefficients were derived for 47 of the 55 OPSNET airports[25] using the following formula:

$$AvgDelay = e^{a+b \cdot AvgOpsHour}$$

Projected average delay factors by hour of day were estimated using a modified "Average Operations" value for the forecast period based on:

- Projected traffic growth for each airport by type of operation (commercial, general aviation, military and other) from Terminal Area Forecasts (TAF).[26]
- Capacity adjustment factors relative to year 2000 capacity levels (based on FAA benchmark capacity estimates where available and FAA-based runway modeling when not).
- "Adjusted Average Operations" = "Base Average Operations" x "Weighted Traffic Growth" / "Capacity Adjustment Factor".[27]

[25] The eight airports excluded were the general aviation airports (Teterboro, NY; and Westchester County, NY), military airports (Andrews Air Force Base, MD), and airports with incomplete data or low volumes (Fairbanks, AK; Honolulu, HI; Maui, HI; Portland, OR; and San Juan, PR).

[26] The TAF forecasts provide growth rates for commercial (passenger and cargo), general aviation and military operations. The combined total growth rate was used for "other" traffic as identified in the ETMS data.

[27] The calibrated delay functions correlate delays to operations relative to the capacity available in CY 2000. It is assumed that any change in capacity will have a comparable effect to the same percentage change in traffic based on TAF growth rates.

### "Total" Delay Factors by Airport and Time of Day Including Delays Incorporated in Scheduled Flight Time

DOT Bureau of Transportation Statistics (BTS) Flight Time data for 1995 and 2001 were used to derive an adjustment function that reflects the reality that carriers have adjusted their schedules to incorporate congestion-related delays over time. Analysis indicates that the level of this adjustment was based on measured delay time as a proportion of total flight time,[28] including delay (i.e., scheduled flight time plus measured delays) for specific origin/destination pairs. The derived function (with assumed limitations) was as follows:

- "Scheduled Delay Time Share of Total Flight Time" = 0.0146 * exp (8.883 * "Measured Delay Time Share of Total Flight Time")
- The "schedule" delay adjustment cannot exceed the average measured delay.
- Total "adjusted" delay cannot exceed half of total travel time.
- There was no schedule adjustment when measured delay was less than 10 percent of total travel time.

Baseline 2000: "Average measured delay" for each Origin and Destination (O/D) segment was compared to average scheduled flight time (derived from OAG data) to estimate "average total delay." (O/D segments with no match to OAG flights utilize averages for the origin and destination airports.)

2007/2012: The projected "average measured delay" factor for each O/D segment in the forecast period was compared to the same average scheduled time to derive projected adjustments. (This assumes that average scheduled flight times will remain constant over time.)

### "Total" Delay Factors by O/D Segment and Origin or Destination Airport

The average delays by airport and time of day were compared to the non-stop flight data from OAG to derive weighted averages for all non-stop segments.

Average departure and arrival delays were also derived for each airport for use when a segment match to the OAG data was not available.

No delays were estimated for international airports, but arrival and departure delays at U.S. gateways were included.

No delays were estimated for airports not included in the CODAS database.

### U.S. Passenger Traffic

Baseline 2000: Passenger traffic flows by flight segment and airport of origin were derived from calendar year (CY) 2000 DOT Origin and Destination Survey data via Data Base Products O&D Plus and International Gateway products for all U.S. airports using the following assumptions:

- Traffic routings were limited to a single intermediate point, the first stop for connecting domestic passengers and the U.S. gateway (if different from the U.S. O/D) for international passengers.
- Outbound passenger traffic was used to represent all round-trip flows.
- In order to assign delay impacts to the presumed point of "residence" for scheduled commercial passengers, O/D traffic between airports A and B was designated to "A-

[28] Total Flight Time = Scheduled Flight Time + Measured Delay; Scheduled Flight Time = "Scheduled" Delay + Flight Time Assuming No Delay.

resident" passengers and "B-resident" passengers traveling in both directions. The "first point of travel" designation for traffic between origin and destination airports was based on the average of inbound and outbound segments.[29] The domestic O/D data indicate where a passenger originated a particular itinerary, while the international data identifies the original point of sale for a ticketed itinerary. It was assumed that the "point of sale" reflects the "first point of travel" for international traffic.

- "Single coupon" traffic was divided between non-stop and single-plane direct routings using the relative capacity for one-stop and non-stop services as presented in the OAG data. (The one-stop capacity was weighted by 55 percent in the calculation in order to correspond to the relative level of service.)[30]
- Average segment passenger load per flight was based on weighted capacity from the OAG data and standard domestic (71.2 percent) and international (76.0 percent) load factors.

2007/2012: Passenger traffic for each O/D routing (i.e., origin airport, destination airport and intermediate U.S. airport if appropriate) was expanded based on an average of the TAF commercial traffic growth rate for the origin and destination airports. It was assumed that there is no change in the distribution of patterns for "point of first travel" or intermediate routings (i.e., the weighted growth rate applies to all categories of traffic for a particular routing).

## Total Delay Estimates

Total passenger and flight delays were generated by matching traffic for each O/D routing with delay factors for each segment of that routing (i.e., A-B and B-C for A-C traffic, via B and D-E for non-stop D-E traffic) for a particular scenario and year.

Routing segments were first matched to delay factors specific to that O/D routing. If no match was available, averages were used for the origin and destination airports.

Total delay for an A-B-C routing with a direct match to OAG routings would include the following:

- Average Departure Delay at A + Average Arrival Delay at B (based on time-of-day arrival patterns for services between A and B)
- Average Departure Delay at B + Average Arrival Delay at C (based on time-of-day arrival patterns for services between B and C)

Total delay for a D-E routing with no direct match to an OAG routing would include the following:

- Average Departure Delay at D (over all commercial passenger flights originating at D)
- Average Arrival Delay at E (over all commercial passenger flights terminating at E).

Total delays assigned to each O/D routing were then summarized based on the "point of origin" for the traffic deriving the following:

- Total Passenger Delay Hours: Total Passengers x Average Delay per Passenger[31]

[29] The available O/D traffic data does not indicate the true originating point (or point of sale) by direction, but rather identifies the total for both directions combined.

[30] The domestic O/D data includes passengers on single-plane one-stop services (e.g., A to B, via C) with non-stop passengers between the origin and destination (e.g., A to B direct) in the "Single Coupon" traffic category. This traffic was re-allocated to accurately assign delays at the intermediate airports to the one-stop passengers.

[31] Weighted averages were determined based on both total seat capacity and total flights, and used in assigning averages at the passenger or flight level.

- Total Passenger Travel Delay Costs (in constant 2000 dollars): Total Passenger Delay Hours x Hourly Value of Passenger Travel Time ($33.02)[32]
- Total Flight Delay Hours: Total Flight Segments x Average Delay per Flight Segment
- Total Flight Delay Costs (in constant 2000 dollars): Total Flight Hours of Delay x Average Non-Fuel Operating Costs per Hour + Total Airborne Flight Hours of Delay x Average Fuel Costs per Hour (with separate cost factors for Domestic and International).

"Impacts Based On Origin Airport" assigns these delay estimates based on the state or airport where passengers originated their journeys (and presumably reside). "International" estimates reflect delays affecting non-U.S. passengers (assuming overseas "point of sale" passengers are not U.S. citizens and vice versa).

"Impacts Based On Destination Airport" assigns these delay estimates based on the state or airport of destination for passengers (i.e., "visiting" point). "International" estimates reflect delays affecting U.S. passengers on international journeys.

[32] The "Hourly Value of Air Passenger Travel Time" was based on the FAA's recommended value for "Air Carrier – All Purposes" ($26.70 per person-hour in 1995) adjusted to 2000 based on the 23.7 percent increase in median annual income to U.S. households from 1995 to 2000. (Source: http://api.hq.faa.gov/economic/742SECT1.PDF)

# APPENDIX C

## Baseline/Forecast Delay Estimates for Scheduled U.S. Commercial Airline Passengers: State Results

**Impact by State on Commercial Passenger Service, Baseline, 2000**

**Estimated Delay Impacts for Commercial Air Passenger Activity, Baseline, 2007**

**Estimated Delay Impacts for Commercial Air Passenger Activity, Baseline, 2012**

**Impact by State on Commercial Passenger Service, Committed Investment, 2007**

**Impact by State on Commercial Passenger Service, Committed Investment, 2012**

**Impact by State on Commercial Passenger Service, Moderate Investment, 2007**

**Impact by State on Commercial Passenger Service, Moderate Investment, 2012**

**Impact by State on Commercial Passenger Service, Aggressive Investment, 2007**

**Impact by State on Commercial Passenger Service, Aggressive Investment, 2012**

**Impact by State on Commercial Passenger Service, Accelerated Investment, 2007**

**Impact by State on Commercial Passenger Service, Accelerated Investment, 2012**

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, BASELINE, 2000**

| State | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,591,499 | 391,027 | $12,911,709 | 6,118 | $11,218,625 | 1,691,060 | 440,830 | $14,556,215 | 6,872 | $12,539,641 |
| AL | 1,473,739 | 962,453 | $31,780,189 | 11,852 | $21,270,993 | 1,177,164 | 730,463 | $24,119,903 | 9,603 | $16,983,018 |
| AR | 895,962 | 538,190 | $17,771,023 | 7,488 | $13,183,650 | 815,938 | 465,324 | $15,365,009 | 6,847 | $11,811,565 |
| AZ | 6,044,450 | 2,999,995 | $99,059,837 | 33,134 | $58,125,862 | 7,085,028 | 3,682,994 | $121,612,476 | 40,803 | $71,198,333 |
| CA | 34,052,353 | 16,942,763 | $559,450,020 | 183,628 | $324,149,321 | 31,952,320 | 16,575,468 | $547,321,950 | 179,159 | $315,576,933 |
| CO | 5,601,835 | 2,921,298 | $96,461,252 | 32,138 | $57,632,354 | 5,936,198 | 3,162,984 | $104,441,719 | 36,310 | $64,074,591 |
| CT | 2,278,728 | 1,307,650 | $43,178,597 | 16,316 | $29,313,616 | 1,349,552 | 782,209 | $25,828,538 | 10,144 | $17,845,812 |
| DE | 1,415 | 80 | $2,657 | 2 | $3,353 | 1,425 | 84 | $2,778 | 2 | $3,486 |
| FL | 15,493,449 | 8,684,344 | $286,757,025 | 100,303 | $182,091,768 | 29,676,086 | 16,792,989 | $554,504,486 | 189,312 | $342,746,002 |
| GA | 8,374,095 | 5,479,613 | $180,936,828 | 56,562 | $101,182,315 | 7,574,039 | 5,181,423 | $171,090,581 | 55,434 | $98,161,831 |
| HI | 4,780,944 | 824,884 | $27,237,660 | 8,598 | $14,437,741 | 8,165,246 | 2,227,495 | $73,551,888 | 20,468 | $35,715,085 |
| IA | 887,355 | 614,334 | $20,285,323 | 9,589 | $17,182,902 | 621,651 | 419,879 | $13,864,405 | 7,202 | $12,619,508 |
| ID | 881,134 | 341,447 | $11,274,594 | 4,949 | $8,977,954 | 806,088 | 297,330 | $9,817,828 | 4,523 | $8,089,687 |
| IL | 12,003,558 | 7,323,993 | $241,838,242 | 81,412 | $143,285,432 | 9,857,419 | 6,244,182 | $206,182,888 | 70,902 | $123,193,590 |
| IN | 2,799,847 | 1,717,253 | $56,703,682 | 24,798 | $44,376,225 | 1,896,402 | 1,227,432 | $40,529,808 | 18,404 | $32,443,515 |
| KS | 353,983 | 217,108 | $7,168,899 | 3,366 | $6,118,742 | 274,040 | 164,129 | $5,419,546 | 2,693 | $4,808,781 |
| KY | 3,064,342 | 1,746,578 | $57,672,018 | 22,561 | $40,913,603 | 2,274,779 | 1,297,372 | $42,839,225 | 17,870 | $31,773,921 |
| LA | 2,232,836 | 1,196,860 | $39,520,320 | 14,983 | $26,832,273 | 3,475,379 | 1,906,758 | $62,961,139 | 22,663 | $40,311,014 |
| MA | 6,446,016 | 5,071,744 | $167,468,988 | 63,978 | $116,985,373 | 5,206,307 | 4,213,970 | $139,145,298 | 56,290 | $100,558,389 |
| MD | 4,670,138 | 2,223,698 | $73,426,520 | 26,519 | $48,173,343 | 3,478,034 | 1,604,047 | $52,965,623 | 18,977 | $33,628,429 |
| ME | 427,977 | 275,865 | $9,109,053 | 5,538 | $9,643,302 | 465,803 | 310,510 | $10,253,049 | 6,818 | $11,751,709 |
| MI | 6,681,997 | 4,225,107 | $139,513,045 | 50,862 | $89,970,730 | 4,181,770 | 2,809,983 | $92,785,649 | 35,441 | $61,997,085 |
| MN | 4,851,599 | 2,762,177 | $91,207,070 | 30,059 | $54,119,749 | 3,387,125 | 2,085,090 | $68,849,684 | 23,738 | $41,873,063 |
| MO | 6,224,403 | 3,459,344 | $114,227,529 | 39,345 | $70,435,016 | 4,890,335 | 2,797,249 | $92,365,177 | 33,001 | $57,788,919 |
| MS | 569,741 | 284,475 | $9,393,371 | 4,086 | $7,275,281 | 591,524 | 269,577 | $8,901,430 | 4,105 | $7,191,777 |
| MT | 556,447 | 235,931 | $7,790,426 | 3,257 | $5,932,538 | 648,111 | 290,001 | $9,575,824 | 3,950 | $7,067,418 |
| NC | 5,216,917 | 3,269,176 | $107,948,182 | 43,679 | $79,885,974 | 4,253,055 | 2,686,440 | $88,706,254 | 37,021 | $66,360,591 |
| ND | 294,582 | 163,946 | $5,413,488 | 2,223 | $3,898,767 | 235,878 | 126,944 | $4,191,696 | 1,841 | $3,195,680 |
| NE | 1,273,808 | 734,191 | $24,243,002 | 8,864 | $15,815,683 | 858,017 | 484,529 | $15,999,154 | 6,163 | $10,789,912 |
| NH | 949,258 | 495,886 | $16,374,142 | 7,395 | $12,655,552 | 659,553 | 319,488 | $10,549,482 | 5,117 | $8,695,011 |
| NJ | 7,666,040 | 5,656,247 | $186,769,284 | 61,866 | $110,760,010 | 4,528,232 | 3,571,098 | $117,917,658 | 40,361 | $71,614,576 |
| NM | 1,382,812 | 639,382 | $21,112,383 | 7,500 | $13,360,827 | 1,543,487 | 746,144 | $24,637,667 | 8,879 | $15,535,290 |
| NV | 3,175,145 | 1,350,471 | $44,592,554 | 14,381 | $25,182,883 | 13,319,532 | 6,196,707 | $204,615,252 | 63,456 | $112,174,666 |
| NY | 15,126,290 | 11,705,083 | $386,501,836 | 144,400 | $255,451,393 | 11,988,884 | 9,912,504 | $327,310,866 | 124,617 | $216,890,041 |
| OH | 5,696,726 | 3,465,539 | $114,432,102 | 49,223 | $89,445,719 | 3,694,371 | 2,298,575 | $75,898,937 | 34,328 | $61,139,129 |
| OK | 1,875,583 | 1,079,466 | $35,643,960 | 14,077 | $25,323,793 | 1,450,810 | 785,595 | $25,940,338 | 10,365 | $18,260,994 |
| OR | 3,739,505 | 1,609,261 | $53,137,814 | 19,869 | $36,710,039 | 2,786,508 | 1,166,866 | $38,529,906 | 15,010 | $27,074,984 |
| PA | 7,701,318 | 5,441,676 | $179,684,130 | 71,969 | $131,908,524 | 5,135,569 | 3,806,118 | $125,678,020 | 51,842 | $92,413,616 |
| PR | 1,286,203 | 495,412 | $16,358,501 | 5,566 | $10,609,204 | 2,096,232 | 1,042,365 | $34,418,903 | 10,435 | $18,602,433 |
| RI | 1,541,874 | 910,933 | $30,079,007 | 12,858 | $22,802,265 | 1,130,306 | 654,779 | $21,620,807 | 9,759 | $17,058,276 |
| SC | 1,311,986 | 992,276 | $32,764,951 | 14,534 | $26,421,725 | 1,722,054 | 1,218,873 | $40,247,195 | 18,702 | $33,276,470 |
| SD | 305,727 | 170,053 | $5,615,146 | 2,529 | $4,448,284 | 273,433 | 149,310 | $4,930,232 | 2,307 | $4,025,211 |
| TN | 3,651,264 | 2,054,434 | $67,837,415 | 26,287 | $47,516,045 | 3,344,827 | 1,847,084 | $60,990,722 | 24,417 | $43,402,375 |
| TX | 19,055,183 | 9,054,052 | $298,964,782 | 109,611 | $195,154,439 | 16,322,970 | 8,066,006 | $266,339,534 | 98,873 | $173,955,787 |
| UT | 2,470,153 | 1,209,263 | $39,929,879 | 12,646 | $23,115,823 | 2,487,949 | 1,269,408 | $41,915,838 | 13,553 | $24,285,720 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, BASELINE, 2000 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 7,992,824 | 5,259,202 | $173,658,862 | 71,016 | $131,618,809 | 7,523,376 | 4,978,672 | $164,395,738 | 66,933 | $120,861,309 |
| VI | 225,995 | 51,176 | $1,689,832 | 1,087 | $1,969,223 | 522,100 | 231,963 | $7,659,433 | 3,454 | $5,914,804 |
| VT | 228,202 | 158,427 | $5,231,248 | 3,040 | $5,327,821 | 211,522 | 149,278 | $4,929,154 | 3,136 | $5,430,514 |
| WA | 6,857,856 | 3,111,399 | $102,738,380 | 36,805 | $67,858,481 | 5,518,149 | 2,536,205 | $83,745,478 | 30,646 | $55,655,108 |
| WI | 2,613,124 | 1,691,461 | $55,852,044 | 24,240 | $43,240,512 | 1,573,397 | 1,054,449 | $34,817,895 | 16,388 | $28,783,105 |
| WV | 211,573 | 115,647 | $3,818,670 | 2,757 | $4,987,207 | 172,866 | 92,735 | $3,062,108 | 2,302 | $4,084,380 |
| WY | 114,476 | 49,462 | $1,633,242 | 1,289 | $2,315,496 | 230,480 | 110,602 | $3,652,090 | 2,208 | $3,920,093 |
| Domestic Total | 235,204,255 | 133,681,730 | $4,414,170,714 | 1,611,150 | $2,890,616,559 | 231,062,369 | 131,482,510 | $4,341,552,471 | 1,583,644 | $2,805,153,177 |
| International 3/ | 15,108,527 | 7,942,908 | $262,274,838 | 76,906 | $237,198,282 | 19,250,413 | 10,142,128 | $334,893,080 | 104,413 | $322,661,664 |
| Grand Total | 250,312,781 | 141,624,638 | $4,676,445,552 | 1,688,057 | $3,127,814,841 | 250,312,781 | 141,624,638 | $4,676,445,552 | 1,688,057 | $3,127,814,841 |

Total One-Way Flights

| | |
|---|---|
| Domestic | 2,885,634 |
| International | 131,746 |
| Total | 3,017,380 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passengers by routing multiplied by the average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000.
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

ESTIMATED DELAY IMPACTS FOR COMMERCIAL AIR PASSENGER ACTIVITY, BASELINE, 2007

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,822,551 | 518,991 | $17,137,080 | 7,825 | $14,314,719 | 1,938,078 | 586,932 | $19,380,491 | 8,845 | $16,100,469 |
| AL | 1,701,800 | 1,389,826 | $45,892,061 | 16,961 | $30,427,082 | 1,356,821 | 1,047,057 | $34,573,810 | 13,613 | $24,065,560 |
| AR | 1,017,447 | 751,685 | $24,820,655 | 10,795 | $18,941,136 | 926,636 | 647,264 | $21,372,672 | 9,851 | $16,959,214 |
| AZ | 7,529,856 | 4,817,281 | $159,066,623 | 53,188 | $93,231,014 | 8,792,023 | 5,847,982 | $193,100,362 | 64,752 | $112,934,155 |
| CA | 41,244,868 | 24,119,367 | $796,421,513 | 261,484 | $460,910,826 | 38,589,441 | 23,476,687 | $775,200,211 | 253,668 | $446,227,999 |
| CO | 6,700,960 | 4,383,567 | $144,745,367 | 47,918 | $85,811,562 | 7,059,017 | 4,697,405 | $155,108,306 | 53,679 | $94,628,040 |
| CT | 2,771,607 | 1,981,006 | $65,412,831 | 24,160 | $43,382,225 | 1,631,168 | 1,180,890 | $38,993,000 | 14,905 | $26,231,264 |
| DE | 1,851 | 113 | $3,718 | 3 | $4,676 | 1,864 | 118 | $3,887 | 3 | $4,857 |
| FL | 18,673,151 | 13,062,933 | $431,338,055 | 150,159 | $272,760,937 | 36,185,903 | 25,649,435 | $846,944,333 | 287,162 | $521,249,018 |
| GA | 10,128,145 | 8,580,131 | $283,315,913 | 88,571 | $158,586,768 | 9,136,387 | 8,074,624 | $266,624,074 | 86,132 | $152,649,756 |
| HI | 5,747,292 | 1,071,367 | $35,376,528 | 11,037 | $18,555,552 | 9,822,714 | 2,975,356 | $98,246,265 | 27,354 | $47,705,135 |
| IA | 1,012,980 | 860,701 | $28,420,350 | 13,419 | $23,923,948 | 709,612 | 581,846 | $19,212,561 | 9,995 | $17,445,960 |
| ID | 1,036,430 | 477,367 | $15,762,658 | 6,745 | $12,212,459 | 946,258 | 412,613 | $13,624,481 | 6,130 | $10,954,801 |
| IL | 14,146,844 | 10,219,608 | $337,451,463 | 113,645 | $199,651,875 | 11,588,703 | 8,668,735 | $286,241,618 | 98,490 | $170,849,923 |
| IN | 3,283,789 | 2,406,557 | $79,464,510 | 34,887 | $62,330,297 | 2,213,051 | 1,704,937 | $56,297,033 | 25,648 | $45,157,302 |
| KS | 405,215 | 308,095 | $10,173,300 | 4,815 | $8,716,830 | 312,671 | 229,231 | $7,569,217 | 3,801 | $6,767,022 |
| KY | 3,777,001 | 2,584,856 | $85,351,946 | 33,258 | $60,379,360 | 2,794,601 | 1,906,799 | $62,962,512 | 26,201 | $46,590,089 |
| LA | 2,649,657 | 1,764,456 | $58,262,327 | 22,058 | $39,504,283 | 4,142,065 | 2,805,754 | $92,646,013 | 33,381 | $59,363,154 |
| MA | 7,169,386 | 6,463,262 | $213,416,927 | 80,324 | $145,973,251 | 5,785,436 | 5,369,247 | $177,292,529 | 70,521 | $125,419,068 |
| MD | 5,696,682 | 3,287,621 | $108,557,237 | 38,901 | $70,534,154 | 4,227,076 | 2,364,233 | $78,066,987 | 27,769 | $49,125,129 |
| ME | 493,663 | 379,108 | $12,518,130 | 7,291 | $12,681,246 | 534,198 | 416,440 | $13,750,858 | 8,822 | $15,189,686 |
| MI | 8,237,619 | 6,416,464 | $211,871,652 | 76,561 | $135,277,867 | 5,125,496 | 4,233,002 | $139,773,735 | 52,954 | $92,509,092 |
| MN | 6,060,894 | 4,262,083 | $140,733,966 | 46,074 | $83,023,345 | 4,202,210 | 3,211,741 | $106,051,684 | 36,251 | $63,959,207 |
| MO | 7,528,728 | 5,227,583 | $172,614,777 | 59,261 | $106,013,522 | 5,894,751 | 4,215,169 | $139,184,882 | 49,545 | $86,676,446 |
| MS | 666,608 | 434,182 | $14,336,674 | 6,276 | $11,145,968 | 695,246 | 417,838 | $13,796,998 | 6,487 | $11,341,850 |
| MT | 651,220 | 328,707 | $10,853,919 | 4,462 | $8,104,329 | 756,811 | 403,215 | $13,314,159 | 5,413 | $9,661,820 |
| NC | 6,272,773 | 4,754,405 | $156,990,451 | 63,115 | $115,430,102 | 5,087,526 | 3,874,045 | $127,920,960 | 53,131 | $95,216,883 |
| ND | 328,903 | 226,713 | $7,486,050 | 3,064 | $5,380,441 | 263,347 | 175,055 | $5,780,323 | 2,527 | $4,393,381 |
| NE | 1,532,332 | 1,085,734 | $35,850,935 | 13,057 | $23,263,010 | 1,027,135 | 706,247 | $23,320,267 | 8,961 | $15,668,315 |
| NH | 1,134,838 | 707,228 | $23,352,667 | 10,498 | $17,967,347 | 783,903 | 450,134 | $14,863,426 | 7,186 | $12,212,370 |
| NJ | 9,040,201 | 8,238,611 | $272,038,935 | 88,962 | $159,005,925 | 5,320,754 | 5,114,553 | $168,882,526 | 57,124 | $101,213,760 |
| NM | 1,732,876 | 1,014,648 | $33,503,663 | 11,722 | $20,892,001 | 1,926,203 | 1,173,864 | $38,760,999 | 13,755 | $24,066,835 |
| NV | 3,939,993 | 2,053,497 | $67,806,475 | 21,786 | $38,041,223 | 16,536,334 | 9,406,871 | $310,614,867 | 95,987 | $169,481,065 |
| NY | 17,687,970 | 16,333,664 | $539,337,588 | 199,468 | $351,720,728 | 13,964,272 | 13,770,212 | $454,692,411 | 171,552 | $297,853,452 |

ESTIMATED DELAY IMPACTS FOR COMMERCIAL AIR PASSENGER ACTIVITY, BASELINE, 2007 (continued)

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| OH | 6,887,318 | 5,053,424 | $166,864,067 | 71,226 | $129,307,527 | 4,441,139 | 3,310,509 | $109,312,992 | 49,181 | $87,527,888 |
| OK | 2,155,719 | 1,490,200 | $49,206,389 | 19,171 | $34,305,579 | 1,671,031 | 1,085,161 | $35,832,004 | 14,139 | $24,807,182 |
| OR | 4,565,856 | 2,259,810 | $74,618,935 | 27,595 | $50,804,757 | 3,391,249 | 1,627,382 | $53,736,159 | 20,682 | $37,179,214 |
| PA | 9,090,169 | 7,827,747 | $258,472,201 | 102,140 | $186,920,119 | 6,028,215 | 5,398,050 | $178,243,599 | 72,699 | $129,485,639 |
| PR | 1,457,092 | 644,322 | $21,275,527 | 7,045 | $13,301,361 | 2,372,226 | 1,365,466 | $45,087,691 | 13,546 | $24,091,055 |
| RI | 1,923,335 | 1,332,772 | $44,008,148 | 18,674 | $33,053,467 | 1,399,739 | 944,508 | $31,187,650 | 14,009 | $24,430,248 |
| SC | 1,524,230 | 1,409,932 | $46,555,953 | 20,277 | $36,824,257 | 2,003,635 | 1,708,299 | $56,408,032 | 25,878 | $45,971,982 |
| SD | 353,597 | 250,795 | $8,281,251 | 3,695 | $6,504,304 | 313,500 | 215,486 | $7,115,350 | 3,305 | $5,764,469 |
| TN | 4,333,286 | 3,001,662 | $99,114,884 | 38,294 | $69,208,544 | 3,969,102 | 2,692,776 | $88,915,476 | 35,425 | $62,967,564 |
| TX | 22,938,715 | 13,163,549 | $434,660,384 | 158,592 | $282,419,197 | 19,566,742 | 11,692,875 | $386,098,723 | 142,643 | $250,981,727 |
| UT | 3,122,469 | 1,881,278 | $62,119,804 | 19,571 | $35,779,096 | 3,130,996 | 1,961,517 | $64,769,281 | 20,845 | $37,332,026 |
| VA | 9,232,215 | 7,238,347 | $239,010,234 | 97,382 | $179,818,909 | 8,641,146 | 6,790,636 | $224,226,791 | 91,093 | $164,167,985 |
| VI | 235,922 | 62,858 | $2,075,562 | 1,239 | $2,230,282 | 557,893 | 298,173 | $9,845,674 | 4,244 | $7,284,455 |
| VT | 269,155 | 223,375 | $7,375,831 | 4,160 | $7,282,486 | 248,179 | 207,191 | $6,841,448 | 4,227 | $7,309,310 |
| WA | 8,040,084 | 4,203,149 | $138,787,984 | 49,224 | $90,432,492 | 6,457,207 | 3,409,993 | $112,597,980 | 40,830 | $73,925,782 |
| WI | 3,128,490 | 2,405,345 | $79,424,482 | 34,092 | $60,641,781 | 1,871,504 | 1,487,268 | $49,109,583 | 22,903 | $40,121,588 |
| WV | 239,042 | 163,118 | $5,386,163 | 4,025 | $7,270,101 | 194,571 | 130,492 | $4,308,852 | 3,355 | $5,947,192 |
| WY | 130,683 | 68,649 | $2,266,784 | 1,746 | $3,123,731 | 267,334 | 154,111 | $5,088,753 | 3,009 | $5,327,213 |
| Domestic Total | 281,453,495 | 193,191,748 | $6,379,191,528 | 2,309,896 | $4,137,327,998 | 276,803,106 | 190,275,424 | $6,282,894,494 | 2,273,607 | $4,024,494,600 |
| International 3/ | 18,169,930 | 11,397,261 | $376,337,559 | 109,832 | $338,776,825 | 22,820,320 | 14,313,585 | $472,634,593 | 146,121 | $451,610,223 |
| Grand Total | 299,623,425 | 204,589,009 | $6,755,529,087 | 2,419,728 | $4,476,104,823 | 299,623,425 | 204,589,009 | $6,755,529,087 | 2,419,728 | $4,476,104,823 |
| Percent Change | 20% | 44% | | 43% | 43% | 20% | 44% | | 43% | 43% |

| Total Round-Trip Flights | |
|---|---|
| Domestic | 3,370,933 |
| Internation | 211,051 |
| Total | 3,581,983 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".

2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".

3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes

(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).

(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.

(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 based on median household income growth in current dollars).

(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.

(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

ESTIMATED DELAY IMPACTS FOR COMMERCIAL AIR PASSENGER ACTIVITY, BASELINE, 2012

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 2,013,401 | 643,972 | $21,263,967 | 9,588 | $17,486,898 | 2,141,832 | 728,574 | $24,057,526 | 10,869 | $19,735,278 |
| AL | 1,861,051 | 1,799,891 | $59,432,410 | 21,783 | $39,131,918 | 1,482,118 | 1,349,345 | $44,555,372 | 17,378 | $30,756,615 |
| AR | 1,100,160 | 949,012 | $31,336,376 | 13,484 | $23,644,310 | 1,001,459 | 813,059 | $26,847,194 | 12,259 | $21,107,937 |
| AZ | 8,586,146 | 6,720,591 | $221,913,920 | 73,902 | $129,508,403 | 10,004,452 | 8,132,794 | $268,544,874 | 89,528 | $156,081,688 |
| CA | 46,364,085 | 30,658,764 | $1,012,352,399 | 332,567 | $585,460,264 | 43,310,143 | 29,737,735 | $981,940,014 | 321,626 | $565,146,178 |
| CO | 7,477,348 | 5,695,512 | $188,065,809 | 61,447 | $110,025,361 | 7,849,870 | 6,089,211 | $201,065,735 | 68,532 | $120,770,942 |
| CT | 3,121,147 | 2,614,950 | $86,345,648 | 31,529 | $56,517,292 | 1,830,352 | 1,554,120 | $51,317,058 | 19,371 | $34,054,709 |
| DE | 1,898 | 121 | $4,004 | 3 | $4,999 | 1,911 | 126 | $4,172 | 3 | $5,180 |
| FL | 20,873,342 | 17,076,306 | $563,859,629 | 195,076 | $354,807,227 | 40,702,670 | 33,973,629 | ########### | 377,478 | $686,997,411 |
| GA | 11,347,412 | 11,564,844 | $381,871,155 | 119,128 | $213,587,934 | 10,219,788 | 10,844,372 | $358,081,150 | 115,281 | $204,586,822 |
| HI | 6,437,025 | 1,273,140 | $42,039,098 | 13,018 | $21,900,920 | 11,004,499 | 3,613,915 | $119,331,479 | 33,243 | $57,950,190 |
| IA | 1,100,975 | 1,088,752 | $35,950,590 | 16,861 | $29,954,258 | 771,117 | 727,088 | $24,008,449 | 12,487 | $21,731,277 |
| ID | 1,147,190 | 589,400 | $19,461,989 | 8,261 | $14,950,419 | 1,046,236 | 506,803 | $16,734,627 | 7,465 | $13,342,647 |
| IL | 15,641,082 | 12,949,700 | $427,599,102 | 143,249 | $251,560,488 | 12,791,674 | 10,851,594 | $358,319,631 | 122,925 | $213,157,513 |
| IN | 3,625,038 | 3,037,558 | $100,300,155 | 43,876 | $78,334,958 | 2,434,744 | 2,134,810 | $70,491,432 | 32,057 | $56,422,274 |
| KS | 441,268 | 386,670 | $12,767,840 | 5,990 | $10,800,898 | 339,906 | 283,130 | $9,348,940 | 4,670 | $8,292,352 |
| KY | 4,279,220 | 3,363,472 | $111,061,854 | 43,088 | $78,362,431 | 3,160,211 | 2,461,252 | $81,270,539 | 33,711 | $59,997,708 |
| LA | 2,940,142 | 2,275,185 | $75,126,599 | 28,472 | $51,001,846 | 4,605,240 | 3,605,281 | $119,046,372 | 42,865 | $76,257,852 |
| MA | 7,650,924 | 7,492,735 | $247,410,123 | 92,461 | $167,852,689 | 6,167,843 | 6,185,337 | $204,239,844 | 80,628 | $143,293,488 |
| MD | 6,425,300 | 4,280,645 | $141,346,899 | 50,099 | $90,750,697 | 4,757,961 | 3,080,441 | $101,716,158 | 35,778 | $63,254,777 |
| ME | 539,212 | 474,486 | $15,667,526 | 8,695 | $15,150,574 | 581,327 | 508,636 | $16,795,159 | 10,341 | $17,831,385 |
| MI | 9,335,095 | 8,604,165 | $284,109,534 | 101,718 | $179,665,169 | 5,789,307 | 5,619,634 | $185,560,321 | 69,726 | $121,719,077 |
| MN | 6,917,561 | 5,617,324 | $185,484,033 | 60,976 | $110,069,068 | 4,778,527 | 4,209,715 | $139,004,788 | 47,785 | $84,409,998 |
| MO | 8,450,690 | 7,058,307 | $233,065,307 | 79,382 | $141,827,913 | 6,604,378 | 5,641,298 | $186,275,675 | 65,866 | $115,099,642 |
| MS | 732,961 | 565,394 | $18,669,326 | 8,157 | $14,493,595 | 765,508 | 545,145 | $18,000,693 | 8,475 | $14,817,554 |
| MT | 717,168 | 407,707 | $13,462,489 | 5,488 | $9,969,183 | 832,422 | 498,689 | $16,466,696 | 6,654 | $11,874,729 |
| NC | 6,934,829 | 6,018,259 | $198,722,906 | 79,311 | $145,180,014 | 5,612,739 | 4,889,665 | $161,456,735 | 66,582 | $119,395,823 |
| ND | 353,133 | 283,070 | $9,346,963 | 3,854 | $6,734,865 | 282,763 | 218,363 | $7,210,359 | 3,174 | $5,495,980 |
| NE | 1,715,474 | 1,420,554 | $46,906,695 | 16,923 | $30,083,113 | 1,146,962 | 911,087 | $30,084,086 | 11,463 | $20,003,647 |
| NH | 1,260,942 | 881,697 | $29,113,638 | 12,822 | $21,974,713 | 868,003 | 554,826 | $18,320,371 | 8,664 | $14,747,845 |
| NJ | 10,012,053 | 10,530,408 | $347,714,080 | 113,819 | $203,124,537 | 5,879,664 | 6,492,767 | $214,391,152 | 72,596 | $128,477,223 |
| NM | 1,978,580 | 1,362,299 | $44,983,102 | 15,656 | $27,894,198 | 2,193,598 | 1,564,246 | $51,651,400 | 18,235 | $31,894,306 |
| NV | 4,485,093 | 2,720,762 | $89,839,558 | 28,809 | $50,211,398 | 18,825,925 | 12,447,505 | $411,016,625 | 126,878 | $223,662,204 |
| NY | 19,072,936 | 18,782,981 | $620,214,030 | 229,463 | $404,927,567 | 14,983,837 | 15,694,581 | $518,235,062 | 195,924 | $340,592,748 |

ESTIMATED DELAY IMPACTS FOR COMMERCIAL AIR PASSENGER ACTIVITY, BASELINE, 2012 (continued)

| State | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| OH | 7,706,315 | 6,478,809 | $213,930,267 | 90,409 | $164,114,807 | 4,952,797 | 4,202,857 | $138,778,336 | 61,876 | $110,134,268 |
| OK | 2,348,490 | 1,867,448 | $61,663,148 | 23,767 | $42,393,987 | 1,820,950 | 1,357,146 | $44,812,964 | 17,514 | $30,656,310 |
| OR | 5,154,827 | 2,831,895 | $93,509,161 | 34,315 | $63,068,122 | 3,822,460 | 2,031,876 | $67,092,555 | 25,608 | $45,953,955 |
| PA | 10,074,097 | 9,978,315 | $329,483,950 | 129,433 | $236,825,197 | 6,657,533 | 6,845,835 | $226,049,481 | 91,628 | $163,158,461 |
| PR | 1,578,398 | 777,075 | $25,659,021 | 8,352 | $15,668,511 | 2,567,437 | 1,652,903 | $54,578,845 | 16,295 | $28,939,238 |
| RI | 2,193,512 | 1,753,508 | $57,900,847 | 23,952 | $42,417,706 | 1,590,285 | 1,233,357 | $40,725,449 | 17,796 | $31,051,586 |
| SC | 1,673,135 | 1,799,770 | $59,428,415 | 25,446 | $46,247,018 | 2,197,610 | 2,152,275 | $71,068,128 | 32,146 | $57,148,696 |
| SD | 387,393 | 323,363 | $10,677,430 | 4,741 | $8,316,585 | 341,803 | 272,676 | $9,003,770 | 4,179 | $7,268,414 |
| TN | 4,812,384 | 3,869,107 | $127,757,899 | 49,009 | $88,630,736 | 4,407,419 | 3,454,479 | $114,066,898 | 45,149 | $80,298,564 |
| TX | 25,544,645 | 16,908,299 | $558,312,040 | 203,500 | $362,399,827 | 21,727,708 | 15,022,047 | $496,027,983 | 183,110 | $322,112,581 |
| UT | 3,587,193 | 2,479,875 | $81,885,462 | 25,682 | $46,963,987 | 3,588,622 | 2,563,779 | $84,655,995 | 27,142 | $48,618,935 |
| VA | 10,046,966 | 8,883,043 | $293,318,078 | 118,871 | $219,378,446 | 9,363,928 | 8,232,962 | $271,852,409 | 110,306 | $198,843,264 |
| VI | 242,958 | 73,581 | $2,429,656 | 1,372 | $2,459,052 | 582,960 | 362,791 | $11,979,357 | 4,973 | $8,549,497 |
| VT | 297,562 | 276,771 | $9,138,987 | 5,011 | $8,816,447 | 273,443 | 252,738 | $8,345,404 | 5,014 | $8,703,797 |
| WA | 8,883,441 | 5,215,862 | $172,227,750 | 60,504 | $110,949,916 | 7,126,987 | 4,216,248 | $139,220,494 | 49,966 | $90,350,207 |
| WI | 3,491,105 | 3,043,424 | $100,493,860 | 42,822 | $76,097,414 | 2,080,418 | 1,860,016 | $61,417,743 | 28,514 | $49,912,371 |
| WV | 258,215 | 202,565 | $6,688,698 | 4,978 | $8,965,214 | 209,618 | 161,336 | $5,327,300 | 4,140 | $7,319,032 |
| WY | 142,334 | 84,452 | $2,788,604 | 2,119 | $3,790,405 | 293,274 | 190,638 | $6,294,874 | 3,663 | $6,488,977 |
| Domestic Total | 313,362,838 | 246,035,797 | $8,124,102,024 | 2,923,236 | $5,234,453,498 | 308,374,226 | 242,534,733 | $8,008,496,890 | 2,879,536 | $5,098,473,151 |
| International 3/ | 20,318,283 | 14,529,826 | $479,774,842 | 139,414 | $430,214,094 | 25,306,895 | 18,030,890 | $595,379,977 | 183,114 | $566,194,441 |
| Grand Total | 333,681,121 | 260,565,623 | $8,603,876,866 | 3,062,650 | $5,664,667,592 | 333,681,121 | 260,565,623 | $8,603,876,866 | 3,062,650 | $5,664,667,592 |
| Percent Change 2000 | 33% | 84% | | 81% | 81% | 33% | 84% | | 81% | 81% |

Total Round-Trip Flights

| | |
|---|---|
| Domestic | 3,737,778 |
| International | 233,413 |
| Total | 3,971,191 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes

(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 based on median household income growth in current dollars).
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, COMMITTED INVESTMENT, 2007**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,822,551 | 470,014 | $15,519,852 | 7,230 | $13,214,338 | 1,938,078 | 529,802 | $17,494,055 | 8,130 | $14,784,351 |
| AL | 1,701,800 | 1,113,200 | $36,757,873 | 13,811 | $24,700,576 | 1,356,821 | 845,715 | $27,925,512 | 11,209 | $19,778,444 |
| AR | 1,017,447 | 650,875 | $21,491,890 | 9,313 | $16,321,551 | 926,636 | 562,997 | $18,590,170 | 8,477 | $14,579,419 |
| AZ | 7,529,856 | 4,628,404 | $152,829,905 | 51,057 | $89,400,679 | 8,792,023 | 5,586,825 | $184,476,973 | 61,774 | $107,624,920 |
| CA | 41,244,868 | 23,167,350 | $764,985,892 | 251,288 | $442,389,005 | 38,589,441 | 22,459,012 | $741,596,590 | 242,908 | $426,818,008 |
| CO | 6,700,960 | 3,837,795 | $126,724,007 | 41,898 | $74,948,833 | 7,059,017 | 4,086,736 | $134,944,030 | 46,532 | $81,951,635 |
| CT | 2,771,607 | 1,784,800 | $58,934,098 | 22,021 | $39,543,260 | 1,631,168 | 1,065,042 | $35,167,697 | 13,614 | $23,946,371 |
| DE | 1,851 | 113 | $3,718 | 3 | $4,676 | 1,864 | 118 | $3,887 | 3 | $4,857 |
| FL | 18,673,151 | 11,212,914 | $370,250,409 | 130,146 | $236,247,549 | 36,185,903 | 22,150,190 | $731,399,266 | 250,092 | $453,234,999 |
| GA | 10,128,145 | 6,540,303 | $215,960,814 | 67,630 | $120,705,520 | 9,136,387 | 6,195,708 | $204,582,277 | 66,400 | $117,342,716 |
| HI | 5,747,292 | 1,051,052 | $34,705,745 | 10,825 | $18,171,969 | 9,822,714 | 2,866,867 | $94,663,962 | 26,230 | $45,680,679 |
| IA | 1,012,980 | 760,754 | $25,120,102 | 11,766 | $20,990,903 | 709,612 | 516,290 | $17,047,891 | 8,779 | $15,339,222 |
| ID | 1,036,430 | 450,969 | $14,890,995 | 6,362 | $11,490,456 | 946,258 | 388,497 | $12,828,170 | 5,769 | $10,290,467 |
| IL | 14,146,844 | 9,653,125 | $318,746,180 | 106,864 | $187,546,115 | 11,588,703 | 8,198,124 | $270,702,054 | 92,831 | $160,957,580 |
| IN | 3,283,789 | 2,162,859 | $71,417,597 | 31,247 | $55,743,942 | 2,213,051 | 1,541,431 | $50,898,054 | 23,163 | $40,753,517 |
| KS | 405,215 | 277,904 | $9,176,381 | 4,340 | $7,840,660 | 312,671 | 207,570 | $6,853,948 | 3,439 | $6,115,685 |
| KY | 3,777,001 | 2,251,494 | $74,344,328 | 28,967 | $52,505,294 | 2,794,601 | 1,686,893 | $55,701,194 | 23,137 | $41,136,559 |
| LA | 2,649,657 | 1,503,226 | $49,636,519 | 18,886 | $33,719,407 | 4,142,065 | 2,432,712 | $80,328,137 | 29,056 | $51,556,829 |
| MA | 7,169,386 | 6,105,310 | $201,597,334 | 76,539 | $139,106,941 | 5,785,436 | 5,080,669 | $167,763,694 | 67,461 | $119,960,342 |
| MD | 5,696,682 | 3,023,448 | $99,834,267 | 36,026 | $65,353,050 | 4,227,076 | 2,166,663 | $71,543,205 | 25,633 | $45,374,451 |
| ME | 493,663 | 347,590 | $11,477,410 | 6,914 | $12,015,500 | 534,198 | 389,571 | $12,863,620 | 8,475 | $14,581,100 |
| MI | 8,237,619 | 5,536,021 | $182,799,430 | 65,979 | $116,686,847 | 5,125,496 | 3,680,727 | $121,537,607 | 45,931 | $80,369,490 |
| MN | 6,060,894 | 3,552,449 | $117,301,857 | 38,276 | $68,932,163 | 4,202,210 | 2,675,840 | $88,356,223 | 30,178 | $53,256,923 |
| MO | 7,528,728 | 4,543,442 | $150,024,462 | 51,409 | $91,875,546 | 5,894,751 | 3,663,998 | $120,985,220 | 42,993 | $75,201,252 |
| MS | 666,608 | 338,586 | $11,180,125 | 4,814 | $8,539,889 | 695,246 | 322,120 | $10,636,401 | 4,841 | $8,460,996 |
| MT | 651,220 | 295,063 | $9,742,967 | 3,988 | $7,225,084 | 756,811 | 355,354 | $11,733,775 | 4,746 | $8,460,979 |
| NC | 6,272,773 | 4,146,196 | $136,907,402 | 55,194 | $100,748,068 | 5,087,526 | 3,384,126 | $111,743,824 | 46,387 | $83,007,155 |
| ND | 328,903 | 185,088 | $6,111,608 | 2,505 | $4,381,097 | 263,347 | 143,546 | $4,739,896 | 2,085 | $3,613,972 |
| NE | 1,532,332 | 963,604 | $31,818,200 | 11,487 | $20,438,410 | 1,027,135 | 626,778 | $20,696,226 | 7,858 | $13,727,026 |
| NH | 1,134,838 | 674,982 | $22,287,917 | 10,044 | $17,187,148 | 783,903 | 429,776 | $14,191,198 | 6,887 | $11,698,826 |
| NJ | 9,040,201 | 7,811,620 | $257,939,684 | 84,868 | $151,634,743 | 5,320,754 | 4,835,486 | $159,667,749 | 54,396 | $96,379,841 |
| NM | 1,732,876 | 932,415 | $30,788,346 | 10,800 | $19,222,592 | 1,926,203 | 1,067,619 | $35,252,767 | 12,531 | $21,906,349 |
| NV | 3,939,993 | 1,979,376 | $65,359,001 | 20,964 | $36,555,742 | 16,536,334 | 9,000,373 | $297,192,317 | 91,567 | $161,554,697 |
| NY | 17,687,970 | 15,593,031 | $514,881,891 | 190,463 | $335,272,105 | 13,964,272 | 13,164,158 | $434,680,508 | 163,989 | $284,212,249 |
| OH | 6,887,318 | 4,539,931 | $149,908,529 | 64,493 | $117,134,486 | 4,441,139 | 3,010,432 | $99,404,453 | 44,951 | $80,028,940 |
| OK | 2,155,719 | 1,308,128 | $43,194,390 | 17,102 | $30,599,126 | 1,671,031 | 945,138 | $31,208,454 | 12,514 | $21,962,918 |
| OR | 4,565,856 | 2,126,051 | $70,202,206 | 25,840 | $47,470,260 | 3,391,249 | 1,525,262 | $50,364,159 | 19,289 | $34,612,095 |
| PA | 9,090,169 | 7,302,434 | $241,126,386 | 95,424 | $174,734,314 | 6,028,215 | 5,047,833 | $166,679,444 | 68,040 | $121,184,024 |
| PR | 1,457,092 | 597,175 | $19,718,727 | 6,606 | $12,511,653 | 2,372,226 | 1,250,914 | $41,305,164 | 12,482 | $22,195,375 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, COMMITTED INVESTMENT, 2007 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| RI | 1,923,335 | 1,245,783 | $41,135,742 | 17,760 | $31,426,505 | 1,399,739 | 888,482 | $29,337,674 | 13,407 | $23,373,634 |
| SC | 1,524,230 | 1,159,055 | $38,272,007 | 17,230 | $31,183,101 | 2,003,635 | 1,440,699 | $47,571,878 | 22,370 | $39,639,941 |
| SD | 353,597 | 207,841 | $6,862,915 | 3,008 | $5,280,585 | 313,500 | 180,563 | $5,962,185 | 2,732 | $4,757,320 |
| TN | 4,333,286 | 2,581,616 | $85,244,976 | 33,040 | $59,614,732 | 3,969,102 | 2,344,970 | $77,430,900 | 30,958 | $54,985,225 |
| TX | 22,938,715 | 11,779,717 | $388,966,247 | 141,878 | $252,222,360 | 19,566,742 | 10,411,292 | $343,780,863 | 127,055 | $223,282,518 |
| UT | 3,122,469 | 1,768,217 | $58,386,536 | 18,439 | $33,706,745 | 3,130,996 | 1,838,087 | $60,693,633 | 19,564 | $35,055,024 |
| VA | 9,232,215 | 6,254,294 | $206,516,792 | 84,109 | $154,938,709 | 8,641,146 | 5,932,125 | $195,878,761 | 79,243 | $142,330,734 |
| VI | 235,922 | 57,732 | $1,906,296 | 1,190 | $2,142,190 | 557,893 | 266,881 | $8,812,395 | 3,939 | $6,747,372 |
| VT | 269,155 | 215,458 | $7,114,411 | 4,037 | $7,048,258 | 248,179 | 201,082 | $6,639,720 | 4,134 | $7,135,642 |
| WA | 8,040,084 | 3,728,469 | $123,114,033 | 43,357 | $79,251,199 | 6,457,207 | 3,010,242 | $99,398,190 | 35,836 | $64,628,502 |
| WI | 3,128,490 | 2,152,238 | $71,066,915 | 30,732 | $54,698,862 | 1,871,504 | 1,339,992 | $44,246,521 | 20,832 | $36,530,569 |
| WV | 239,042 | 139,130 | $4,594,059 | 3,304 | $5,954,615 | 194,571 | 111,352 | $3,676,854 | 2,748 | $4,863,976 |
| WY | 130,683 | 61,301 | $2,024,174 | 1,544 | $2,766,936 | 267,334 | 141,249 | $4,664,045 | 2,746 | $4,863,642 |
| Domestic Total | 281,453,495 | 174,769,944 | $5,770,903,548 | 2,093,015 | $3,743,344,298 | 276,803,106 | 172,193,925 | $5,685,843,389 | 2,060,342 | $3,641,839,360 |
| International 3/ | 18,169,930 | 10,438,755 | $344,687,683 | 100,493 | $309,223,227 | 22,820,320 | 13,014,774 | $429,747,842 | 133,166 | $410,728,164 |
| Grand Total | 299,623,425 | 185,208,699 | $6,115,591,231 | 2,193,507 | $4,052,567,525 | 299,623,425 | 185,208,699 | $6,115,591,231 | 2,193,507 | $4,052,567,525 |
| Percent Change 2000 Baseline | 20% | 31% | | 30% | 30% | 20% | 31% | | 30% | 30% |

| Total One-Way Flights | |
|---|---|
| Domestic | 3,370,933 |
| International | 211,051 |
| Total | 3,581,983 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000.
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, COMMITTED INVESTMENT, 2012**

| State | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 2,013,401 | 573,142 | $18,925,158 | 8,735 | $15,908,469 | 2,141,832 | 645,953 | $21,329,376 | 9,834 | $17,828,313 |
| AL | 1,861,051 | 1,385,104 | $45,736,126 | 17,064 | $30,501,671 | 1,482,118 | 1,048,180 | $34,610,918 | 13,781 | $24,307,472 |
| AR | 1,100,160 | 803,135 | $26,519,532 | 11,600 | $20,279,850 | 1,001,459 | 691,858 | $22,845,156 | 10,533 | $18,090,806 |
| AZ | 8,586,146 | 6,370,798 | $210,363,742 | 70,124 | $122,667,689 | 10,004,452 | 7,662,147 | $253,004,096 | 84,391 | $146,891,088 |
| CA | 46,364,085 | 29,183,577 | $963,641,711 | 317,104 | $557,432,535 | 43,310,143 | 28,167,884 | $930,103,533 | 305,294 | $535,729,680 |
| CO | 7,477,348 | 4,906,438 | $162,010,588 | 53,452 | $95,515,225 | 7,849,870 | 5,199,883 | $171,700,140 | 59,048 | $103,910,066 |
| CT | 3,121,147 | 2,319,514 | $76,590,352 | 28,433 | $51,013,144 | 1,830,352 | 1,382,501 | $45,650,180 | 17,554 | $30,868,449 |
| DE | 1,898 | 121 | $4,004 | 3 | $4,999 | 1,911 | 126 | $4,172 | 3 | $5,180 |
| FL | 20,873,342 | 14,251,600 | $470,587,834 | 164,171 | $298,379,545 | 40,702,670 | 28,466,100 | $939,950,610 | 318,951 | $579,343,239 |
| GA | 11,347,412 | 8,505,484 | $280,851,084 | 87,301 | $155,983,942 | 10,219,788 | 8,016,910 | $264,718,380 | 85,308 | $150,906,678 |
| HI | 6,437,025 | 1,242,325 | $41,021,564 | 12,696 | $21,320,062 | 11,004,499 | 3,448,640 | $113,874,096 | 31,530 | $54,864,956 |
| IA | 1,100,975 | 940,350 | $31,050,365 | 14,428 | $25,667,418 | 771,117 | 630,804 | $20,829,140 | 10,669 | $18,611,197 |
| ID | 1,147,190 | 552,517 | $18,244,122 | 7,744 | $13,975,558 | 1,046,236 | 473,165 | $15,623,901 | 6,983 | $12,454,465 |
| IL | 15,641,082 | 11,978,376 | $395,525,978 | 132,264 | $231,874,900 | 12,791,674 | 10,078,247 | $332,783,702 | 114,017 | $197,553,196 |
| IN | 3,625,038 | 2,673,294 | $88,272,179 | 38,427 | $68,523,199 | 2,434,744 | 1,892,283 | $62,483,201 | 28,303 | $49,806,800 |
| KS | 441,268 | 343,322 | $11,336,503 | 5,321 | $9,592,646 | 339,906 | 253,089 | $8,356,995 | 4,169 | $7,402,071 |
| KY | 4,279,220 | 2,831,269 | $93,488,495 | 36,372 | $66,029,943 | 3,160,211 | 2,111,774 | $69,730,782 | 28,904 | $51,437,982 |
| LA | 2,940,142 | 1,894,072 | $62,542,246 | 23,797 | $42,491,708 | 4,605,240 | 3,069,587 | $101,357,775 | 36,582 | $64,917,218 |
| MA | 7,650,924 | 6,963,239 | $229,926,163 | 86,951 | $157,721,635 | 6,167,843 | 5,779,132 | $190,826,929 | 76,360 | $135,625,656 |
| MD | 6,425,300 | 3,866,305 | $127,665,389 | 45,657 | $82,769,328 | 4,757,961 | 2,761,606 | $91,188,231 | 32,391 | $57,314,892 |
| ME | 539,212 | 419,944 | $13,866,560 | 8,066 | $14,027,938 | 581,327 | 462,833 | $15,282,759 | 9,777 | $16,833,734 |
| MI | 9,335,095 | 7,076,806 | $233,676,131 | 84,066 | $148,610,885 | 5,789,307 | 4,681,589 | $154,586,053 | 58,325 | $101,993,969 |
| MN | 6,917,561 | 4,535,503 | $149,762,314 | 48,926 | $88,216,668 | 4,778,527 | 3,405,982 | $112,465,530 | 38,485 | $67,950,732 |
| MO | 8,450,690 | 5,888,027 | $194,422,644 | 66,539 | $118,901,057 | 6,604,378 | 4,730,357 | $156,196,390 | 55,422 | $96,908,960 |
| MS | 732,961 | 439,994 | $14,528,603 | 6,018 | $10,668,494 | 765,508 | 422,472 | $13,950,012 | 6,055 | $10,577,493 |
| MT | 717,168 | 360,623 | $11,907,759 | 4,828 | $8,733,775 | 832,422 | 430,881 | $14,227,707 | 5,719 | $10,183,697 |
| NC | 6,934,829 | 5,101,776 | $168,460,652 | 67,432 | $123,210,807 | 5,612,739 | 4,145,181 | $136,873,882 | 56,447 | $101,091,318 |
| ND | 353,133 | 220,100 | $7,267,696 | 2,969 | $5,184,913 | 282,763 | 170,267 | $5,622,221 | 2,468 | $4,272,339 |
| NE | 1,715,474 | 1,231,024 | $40,648,428 | 14,694 | $26,149,142 | 1,146,962 | 791,373 | $26,131,152 | 9,951 | $17,389,153 |
| NH | 1,260,942 | 831,945 | $27,470,840 | 12,126 | $20,778,579 | 868,003 | 523,394 | $17,282,455 | 8,206 | $13,963,905 |
| NJ | 10,012,053 | 9,995,600 | $330,054,703 | 107,972 | $192,607,124 | 5,879,664 | 6,133,367 | $202,523,780 | 68,572 | $121,354,246 |
| NM | 1,978,580 | 1,235,278 | $40,788,872 | 14,304 | $25,448,733 | 2,193,598 | 1,402,954 | $46,325,551 | 16,491 | $28,804,934 |
| NV | 4,485,093 | 2,615,127 | $86,351,507 | 27,654 | $48,113,567 | 18,825,925 | 11,869,438 | $391,928,844 | 120,664 | $212,475,671 |
| NY | 19,072,936 | 17,654,380 | $582,947,617 | 215,427 | $379,488,636 | 14,983,837 | 14,764,067 | $487,509,477 | 184,135 | $319,535,118 |
| OH | 7,706,315 | 5,725,247 | $189,047,671 | 80,763 | $146,621,684 | 4,952,797 | 3,760,857 | $124,183,499 | 55,863 | $99,445,949 |
| OK | 2,348,490 | 1,626,266 | $53,699,298 | 21,028 | $37,523,017 | 1,820,950 | 1,172,615 | $38,719,763 | 15,366 | $26,915,697 |
| OR | 5,154,827 | 2,633,546 | $86,959,695 | 31,815 | $58,324,374 | 3,822,460 | 1,881,486 | $62,126,679 | 23,635 | $42,319,646 |
| PA | 10,074,097 | 9,236,652 | $304,994,253 | 119,839 | $219,275,170 | 6,657,533 | 6,324,373 | $208,830,810 | 84,721 | $150,846,632 |
| PR | 1,578,398 | 706,961 | $23,343,860 | 7,701 | $14,500,427 | 2,567,437 | 1,483,412 | $48,982,275 | 14,727 | $26,150,826 |
| RI | 2,193,512 | 1,620,032 | $53,493,449 | 22,460 | $39,728,288 | 1,590,285 | 1,148,898 | $37,936,617 | 16,815 | $29,312,697 |
| SC | 1,673,135 | 1,420,190 | $46,894,670 | 20,822 | $37,697,262 | 2,197,610 | 1,748,751 | $57,743,760 | 26,865 | $47,605,126 |
| SD | 387,393 | 256,784 | $8,479,021 | 3,775 | $6,600,553 | 341,803 | 220,247 | $7,272,572 | 3,386 | $5,876,170 |
| TN | 4,812,384 | 3,243,792 | $107,110,013 | 41,333 | $74,586,357 | 4,407,419 | 2,935,372 | $96,925,972 | 38,678 | $68,708,947 |
| TX | 25,544,645 | 14,881,767 | $491,395,942 | 178,330 | $316,932,544 | 21,727,708 | 13,129,845 | $433,547,488 | 159,401 | $280,039,654 |
| UT | 3,587,193 | 2,302,852 | $76,040,159 | 23,912 | $43,712,687 | 3,588,622 | 2,371,105 | $78,293,874 | 25,145 | $45,056,824 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, COMMITTED INVESTMENT, 2012 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 10,046,966 | 7,452,927 | $246,095,635 | 100,000 | $184,108,995 | 9,363,928 | 7,004,677 | $231,294,439 | 93,620 | $168,186,525 |
| VI | 242,958 | 66,398 | $2,192,456 | 1,302 | $2,334,144 | 582,960 | 317,315 | $10,477,735 | 4,535 | $7,778,989 |
| VT | 297,562 | 263,717 | $8,707,934 | 4,796 | $8,387,021 | 273,443 | 242,837 | $8,018,470 | 4,852 | $8,389,774 |
| WA | 8,883,441 | 4,511,986 | $148,985,789 | 52,153 | $95,074,215 | 7,126,987 | 3,627,450 | $119,778,399 | 42,903 | $77,204,106 |
| WI | 3,491,105 | 2,678,522 | $88,444,790 | 38,011 | $67,569,277 | 2,080,418 | 1,656,270 | $54,690,030 | 25,638 | $44,909,911 |
| WV | 258,215 | 168,259 | $5,555,911 | 3,955 | $7,114,071 | 209,618 | 133,789 | $4,417,711 | 3,280 | $5,795,521 |
| WY | 142,334 | 74,875 | $2,472,386 | 1,869 | $3,342,241 | 293,274 | 172,222 | $5,686,780 | 3,315 | $5,866,907 |
| Domestic Total | 313,362,838 | 218,060,884 | $7,200,370,396 | 2,596,527 | $4,641,226,109 | 308,374,226 | 215,045,548 | $7,100,803,999 | 2,558,064 | $4,521,614,575 |
| International 3/ | 20,318,283 | 13,063,891 | $431,369,682 | 125,191 | $385,134,442 | 25,306,895 | 16,079,227 | $530,936,078 | 163,654 | $504,745,976 |
| Grand Total | 333,681,121 | 231,124,775 | $7,631,740,077 | 2,721,718 | $5,026,360,551 | 333,681,121 | 231,124,775 | $7,631,740,077 | 2,721,718 | $5,026,360,551 |
| Percent Change 2000 Baseline | 33% | 63% | | 61% | 61% | 33% | 63% | | 61% | 61% |

Total One-Way Flights

| | |
|---|---|
| Domestic | 3,737,778 |
| International | 233,413 |
| Total | 3,971,191 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes

(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).

(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival)

at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.

(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 dollars).
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, MODERATE INVESTMENT, 2007**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,822,551 | 469,775 | $15,511,967 | 7,227 | $13,208,295 | 1,938,078 | 529,500 | $17,484,091 | 8,125 | $14,776,802 |
| AL | 1,701,800 | 1,109,592 | $36,638,716 | 13,746 | $24,582,276 | 1,356,821 | 842,756 | $27,827,807 | 11,147 | $19,664,769 |
| AR | 1,017,447 | 649,791 | $21,456,105 | 9,300 | $16,296,565 | 926,636 | 562,152 | $18,562,247 | 8,466 | $14,558,721 |
| AZ | 7,529,856 | 4,621,040 | $152,586,738 | 50,963 | $89,230,718 | 8,792,023 | 5,575,419 | $184,100,347 | 61,628 | $107,361,458 |
| CA | 41,244,868 | 23,127,660 | $763,675,331 | 250,814 | $441,537,411 | 38,589,441 | 22,408,010 | $739,912,474 | 242,291 | $425,699,509 |
| CO | 6,700,960 | 3,830,362 | $126,478,538 | 41,799 | $74,771,762 | 7,059,017 | 4,075,854 | $134,584,713 | 46,381 | $81,684,636 |
| CT | 2,771,607 | 1,760,493 | $58,131,470 | 21,750 | $39,063,888 | 1,631,168 | 1,050,898 | $34,700,636 | 13,456 | $23,665,549 |
| DE | 1,851 | 113 | $3,718 | 3 | $4,676 | 1,864 | 118 | $3,887 | 3 | $4,857 |
| FL | 18,673,151 | 10,902,737 | $360,008,385 | 125,995 | $228,713,482 | 36,185,903 | 21,630,721 | $714,246,421 | 243,547 | $441,448,479 |
| GA | 10,128,145 | 6,506,804 | $214,854,666 | 67,203 | $119,953,376 | 9,136,387 | 6,164,501 | $203,551,807 | 65,994 | $116,622,536 |
| HI | 5,747,292 | 1,050,749 | $34,695,743 | 10,822 | $18,165,671 | 9,822,714 | 2,865,428 | $94,616,428 | 26,212 | $45,649,735 |
| IA | 1,012,980 | 759,909 | $25,092,191 | 11,756 | $20,971,671 | 709,612 | 515,699 | $17,028,384 | 8,771 | $15,325,373 |
| ID | 1,036,430 | 450,708 | $14,882,369 | 6,358 | $11,484,089 | 946,258 | 388,333 | $12,822,752 | 5,766 | $10,286,194 |
| IL | 14,146,844 | 9,623,469 | $317,766,946 | 106,527 | $186,935,111 | 11,588,703 | 8,176,207 | $269,978,340 | 92,550 | $160,461,894 |
| IN | 3,283,789 | 2,134,806 | $70,491,310 | 30,834 | $54,995,034 | 2,213,051 | 1,517,709 | $50,114,761 | 22,802 | $40,107,257 |
| KS | 405,215 | 277,474 | $9,162,178 | 4,333 | $7,828,981 | 312,671 | 207,230 | $6,842,737 | 3,434 | $6,106,361 |
| KY | 3,777,001 | 2,235,572 | $73,818,577 | 28,739 | $52,089,894 | 2,794,601 | 1,671,856 | $55,204,698 | 22,923 | $40,746,185 |
| LA | 2,649,657 | 1,498,221 | $49,471,258 | 18,807 | $33,578,935 | 4,142,065 | 2,423,328 | $80,018,304 | 28,915 | $51,302,468 |
| MA | 7,169,386 | 6,077,617 | $200,682,919 | 76,203 | $138,510,357 | 5,785,436 | 5,060,705 | $167,104,490 | 67,216 | $119,526,488 |
| MD | 5,696,682 | 2,996,600 | $98,947,739 | 35,665 | $64,704,575 | 4,227,076 | 2,151,304 | $71,036,070 | 25,423 | $45,001,487 |
| ME | 493,663 | 344,430 | $11,373,078 | 6,872 | $11,940,669 | 534,198 | 386,340 | $12,756,962 | 8,430 | $14,501,674 |
| MI | 8,237,619 | 5,513,943 | $182,070,403 | 65,642 | $116,080,450 | 5,125,496 | 3,664,481 | $121,001,152 | 45,659 | $79,880,891 |
| MN | 6,060,894 | 3,546,601 | $117,108,769 | 38,190 | $68,777,608 | 4,202,210 | 2,669,263 | $88,139,052 | 30,083 | $53,082,215 |
| MO | 7,528,728 | 4,526,414 | $149,462,203 | 51,175 | $91,453,846 | 5,894,751 | 3,647,164 | $120,429,350 | 42,757 | $74,782,089 |
| MS | 666,608 | 337,414 | $11,141,409 | 4,798 | $8,512,753 | 695,246 | 320,888 | $10,595,736 | 4,824 | $8,433,400 |
| MT | 651,220 | 294,819 | $9,734,921 | 3,984 | $7,218,885 | 756,811 | 355,013 | $11,722,518 | 4,742 | $8,452,979 |
| NC | 6,272,773 | 4,117,476 | $135,959,048 | 54,787 | $100,002,390 | 5,087,526 | 3,361,431 | $110,994,461 | 46,059 | $82,410,756 |
| ND | 328,903 | 184,987 | $6,108,258 | 2,503 | $4,377,943 | 263,347 | 143,489 | $4,738,008 | 2,084 | $3,612,381 |
| NE | 1,532,332 | 962,520 | $31,782,396 | 11,473 | $20,413,192 | 1,027,135 | 626,132 | $20,674,882 | 7,850 | $13,711,108 |
| NH | 1,134,838 | 667,330 | $22,035,242 | 9,945 | $17,010,697 | 783,903 | 425,361 | $14,045,436 | 6,828 | $11,594,558 |
| NJ | 9,040,201 | 7,670,303 | $253,273,401 | 83,463 | $149,183,217 | 5,320,754 | 4,762,691 | $157,264,066 | 53,654 | $95,105,863 |
| NM | 1,732,876 | 931,448 | $30,756,421 | 10,786 | $19,197,956 | 1,926,203 | 1,066,658 | $35,221,061 | 12,518 | $21,883,729 |
| NV | 3,939,993 | 1,977,218 | $65,287,730 | 20,937 | $36,507,604 | 16,536,334 | 8,986,198 | $296,724,264 | 91,391 | $161,245,169 |
| NY | 17,687,970 | 15,486,063 | $511,349,789 | 189,138 | $332,924,119 | 13,964,272 | 13,093,160 | $432,336,130 | 163,079 | $282,603,773 |
| OH | 6,887,318 | 4,499,509 | $148,573,786 | 63,812 | $115,895,127 | 4,441,139 | 2,984,297 | $98,541,479 | 44,492 | $79,199,451 |
| OK | 2,155,719 | 1,306,570 | $43,142,927 | 17,082 | $30,562,318 | 1,671,031 | 944,125 | $31,175,007 | 12,501 | $21,940,880 |
| OR | 4,565,856 | 2,124,313 | $70,144,830 | 25,817 | $47,428,051 | 3,391,249 | 1,524,245 | $50,330,577 | 19,276 | $34,589,014 |
| PA | 9,090,169 | 7,108,187 | $234,712,339 | 92,544 | $169,419,364 | 6,028,215 | 4,915,538 | $162,311,058 | 66,028 | $117,538,813 |
| PR | 1,457,092 | 593,615 | $19,601,153 | 6,574 | $12,454,444 | 2,372,226 | 1,243,679 | $41,066,284 | 12,410 | $22,063,414 |
| RI | 1,923,335 | 1,234,411 | $40,760,251 | 17,606 | $31,156,473 | 1,399,739 | 881,271 | $29,099,582 | 13,306 | $23,196,824 |
| SC | 1,524,230 | 1,154,457 | $38,120,173 | 17,120 | $30,984,906 | 2,003,635 | 1,433,610 | $47,337,799 | 22,203 | $39,337,213 |
| SD | 353,597 | 207,674 | $6,857,382 | 3,006 | $5,276,424 | 313,500 | 180,437 | $5,958,021 | 2,730 | $4,754,438 |
| TN | 4,333,286 | 2,570,138 | $84,865,967 | 32,842 | $59,258,239 | 3,969,102 | 2,333,593 | $77,055,255 | 30,754 | $54,619,480 |
| TX | 22,938,715 | 11,758,598 | $388,268,907 | 141,596 | $251,696,812 | 19,566,742 | 10,390,030 | $343,078,775 | 126,765 | $222,755,549 |
| UT | 3,122,469 | 1,766,218 | $58,320,506 | 18,415 | $33,663,584 | 3,130,996 | 1,836,331 | $60,635,659 | 19,542 | $35,017,345 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, MODERATE INVESTMENT, 2007**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 9,232,215 | 6,215,032 | $205,220,356 | 83,488 | $153,811,886 | 8,641,146 | 5,903,037 | $194,918,291 | 78,783 | $141,502,744 |
| VI | 235,922 | 57,582 | $1,901,351 | 1,188 | $2,139,580 | 557,893 | 266,487 | $8,799,386 | 3,935 | $6,740,030 |
| VT | 269,155 | 212,957 | $7,031,855 | 4,007 | $6,995,296 | 248,179 | 199,235 | $6,578,747 | 4,111 | $7,095,616 |
| WA | 8,040,084 | 3,720,590 | $122,853,885 | 43,259 | $79,076,127 | 6,457,207 | 3,001,202 | $99,099,696 | 35,722 | $64,423,839 |
| WI | 3,128,490 | 2,146,370 | $70,873,135 | 30,646 | $54,541,749 | 1,871,504 | 1,334,418 | $44,062,470 | 20,747 | $36,379,295 |
| WV | 239,042 | 131,352 | $4,337,248 | 3,044 | $5,477,763 | 194,571 | 105,395 | $3,480,146 | 2,547 | $4,496,756 |
| WY | 130,683 | 61,256 | $2,022,669 | 1,544 | $2,765,861 | 267,334 | 141,113 | $4,659,539 | 2,744 | $4,860,423 |
| Domestic Total | 281,453,495 | 173,513,284 | $5,729,408,651 | 2,076,127 | $3,712,832,100 | 276,803,106 | 170,944,041 | $5,644,572,242 | 2,043,605 | $3,611,812,469 |
| International 3/ | 18,169,930 | 10,406,272 | $343,615,111 | 99,945 | $307,467,997 | 22,820,320 | 12,975,515 | $428,451,520 | 132,466 | $408,487,628 |
| Grand Total | 299,623,425 | 183,919,557 | $6,073,023,762 | 2,176,071 | $4,020,300,097 | 299,623,425 | 183,919,557 | $6,073,023,762 | 2,176,071 | $4,020,300,097 |
| Percent Change 2000 Baseline | 20% | 30% | | 29% | 29% | 20% | 30% | | 29% | 29% |

Total One-Way Flights

| | |
|---|---|
| Domestic | 3,370,933 |
| International | 211,051 |
| Total | 3,581,983 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes

(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).

(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.

(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 dollars.

(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.

(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, MODERATE INVESTMENT, 2012**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 2,013,401 | 548,823 | $18,122,127 | 8,300 | $15,167,770 | 2,141,832 | 614,981 | $20,306,671 | 9,300 | $16,916,433 |
| AL | 1,861,051 | 1,298,217 | $42,867,118 | 16,011 | $28,612,044 | 1,482,118 | 979,828 | $32,353,907 | 12,887 | $22,717,927 |
| AR | 1,100,160 | 746,050 | $24,634,585 | 10,902 | $19,049,433 | 1,001,459 | 641,562 | $21,184,385 | 9,888 | $16,973,703 |
| AZ | 8,586,146 | 5,763,125 | $190,298,383 | 63,486 | $111,114,848 | 10,004,452 | 6,893,554 | $227,625,146 | 76,089 | $132,497,795 |
| CA | 46,364,085 | 25,552,917 | $843,757,330 | 277,258 | $487,783,375 | 43,310,143 | 24,606,762 | $812,515,290 | 266,518 | $468,078,336 |
| CO | 7,477,348 | 4,442,830 | $146,702,253 | 48,912 | $87,426,283 | 7,849,870 | 4,727,015 | $156,086,051 | 54,196 | $95,336,199 |
| CT | 3,121,147 | 2,068,744 | $68,309,932 | 25,485 | $45,775,004 | 1,830,352 | 1,229,891 | $40,610,990 | 15,695 | $27,602,786 |
| DE | 1,898 | 118 | $3,905 | 3 | $4,930 | 1,911 | 123 | $4,071 | 3 | $5,107 |
| FL | 20,873,342 | 12,941,741 | $427,336,288 | 149,391 | $271,331,199 | 40,702,670 | 25,874,464 | $854,374,807 | 290,309 | $526,979,738 |
| GA | 11,347,412 | 7,864,822 | $259,696,438 | 80,964 | $144,711,204 | 10,219,788 | 7,410,716 | $244,701,839 | 79,047 | $139,856,744 |
| HI | 6,437,025 | 1,166,284 | $38,510,693 | 12,061 | $20,247,155 | 11,004,499 | 3,140,099 | $103,686,063 | 28,915 | $50,371,222 |
| IA | 1,100,975 | 830,262 | $27,415,264 | 12,831 | $22,872,101 | 771,117 | 562,137 | $18,561,767 | 9,567 | $16,710,447 |
| ID | 1,147,190 | 496,151 | $16,382,917 | 7,050 | $12,760,681 | 1,046,236 | 430,026 | $14,199,462 | 6,425 | $11,484,519 |
| IL | 15,641,082 | 10,230,236 | $337,802,392 | 113,255 | $198,804,167 | 12,791,674 | 8,674,734 | $286,439,710 | 98,349 | $170,617,608 |
| IN | 3,625,038 | 2,430,390 | $80,251,478 | 34,740 | $61,966,075 | 2,434,744 | 1,710,141 | $56,468,868 | 25,479 | $44,819,728 |
| KS | 441,268 | 314,489 | $10,384,438 | 4,968 | $8,960,198 | 339,906 | 231,480 | $7,643,463 | 3,895 | $6,911,449 |
| KY | 4,279,220 | 2,642,365 | $87,250,904 | 34,073 | $61,902,421 | 3,160,211 | 1,957,050 | $64,621,796 | 26,936 | $47,947,481 |
| LA | 2,940,142 | 1,773,790 | $58,570,540 | 22,369 | $39,913,476 | 4,605,240 | 2,845,860 | $93,970,288 | 34,000 | $60,264,091 |
| MA | 7,650,924 | 6,480,797 | $213,995,914 | 81,238 | $147,534,686 | 6,167,843 | 5,364,295 | $177,129,017 | 71,277 | $126,698,535 |
| MD | 6,425,300 | 3,437,675 | $113,512,017 | 40,858 | $74,195,257 | 4,757,961 | 2,449,780 | $80,891,751 | 28,931 | $51,264,704 |
| ME | 539,212 | 388,966 | $12,843,651 | 7,552 | $13,137,332 | 581,327 | 428,451 | $14,147,460 | 9,160 | $15,777,503 |
| MI | 9,335,095 | 6,550,391 | $216,293,915 | 77,568 | $137,257,151 | 5,789,307 | 4,308,011 | $142,250,520 | 53,473 | $93,583,035 |
| MN | 6,917,561 | 4,230,308 | $139,684,783 | 45,529 | $82,132,322 | 4,778,527 | 3,152,491 | $104,095,251 | 35,516 | $62,728,372 |
| MO | 8,450,690 | 5,287,331 | $174,587,669 | 59,827 | $106,996,836 | 6,604,378 | 4,238,887 | $139,968,065 | 49,719 | $86,984,961 |
| MS | 732,961 | 399,178 | $13,180,872 | 5,691 | $10,084,446 | 765,508 | 378,731 | $12,505,695 | 5,714 | $9,981,024 |
| MT | 717,168 | 339,951 | $11,225,186 | 4,585 | $8,310,140 | 832,422 | 407,758 | $13,464,157 | 5,445 | $9,709,158 |
| NC | 6,934,829 | 4,701,516 | $155,244,047 | 62,204 | $113,668,196 | 5,612,739 | 3,816,558 | $126,022,747 | 52,076 | $93,253,683 |
| ND | 353,133 | 209,370 | $6,913,388 | 2,821 | $4,930,426 | 282,763 | 161,026 | $5,317,087 | 2,327 | $4,032,642 |
| NE | 1,715,474 | 1,108,027 | $36,587,065 | 13,191 | $23,454,539 | 1,146,962 | 714,302 | $23,586,253 | 8,953 | $15,628,439 |
| NH | 1,260,942 | 752,328 | $24,841,876 | 11,073 | $18,976,900 | 868,003 | 474,990 | $15,684,166 | 7,516 | $12,787,343 |
| NJ | 10,012,053 | 9,151,431 | $302,180,263 | 98,932 | $176,499,071 | 5,879,664 | 5,613,304 | $185,351,294 | 62,778 | $111,153,624 |
| NM | 1,978,580 | 1,147,980 | $37,906,308 | 13,270 | $23,624,104 | 2,193,598 | 1,302,888 | $43,021,347 | 15,265 | $26,675,113 |
| NV | 4,485,093 | 2,391,652 | $78,972,340 | 25,233 | $43,954,518 | 18,825,925 | 10,861,138 | $358,634,793 | 110,308 | $194,110,294 |
| NY | 19,072,936 | 16,228,408 | $535,862,044 | 198,109 | $349,221,128 | 14,983,837 | 13,569,374 | $448,060,732 | 169,387 | $294,004,554 |
| OH | 7,706,315 | 5,267,406 | $173,929,760 | 74,259 | $134,929,952 | 4,952,797 | 3,449,767 | $113,911,293 | 51,196 | $91,169,585 |
| OK | 2,348,490 | 1,501,359 | $49,574,888 | 19,600 | $35,001,147 | 1,820,950 | 1,081,555 | $35,712,932 | 14,308 | $25,083,433 |
| OR | 5,154,827 | 2,366,788 | $78,151,327 | 28,583 | $52,573,181 | 3,822,460 | 1,696,527 | $56,019,321 | 21,275 | $38,214,060 |
| PA | 10,074,097 | 8,326,710 | $274,947,980 | 107,712 | $197,030,960 | 6,657,533 | 5,694,092 | $188,018,910 | 76,164 | $135,536,927 |
| PR | 1,578,398 | 666,164 | $21,996,745 | 7,293 | $13,769,979 | 2,567,437 | 1,393,098 | $46,000,106 | 13,831 | $24,565,525 |
| RI | 2,193,512 | 1,449,365 | $47,858,022 | 20,337 | $36,055,331 | 1,590,285 | 1,021,682 | $33,735,943 | 15,186 | $26,515,477 |
| SC | 1,673,135 | 1,327,450 | $43,832,384 | 19,411 | $35,161,463 | 2,197,610 | 1,628,991 | $53,789,290 | 24,961 | $44,257,298 |
| SD | 387,393 | 235,593 | $7,779,279 | 3,445 | $6,039,617 | 341,803 | 202,063 | $6,672,127 | 3,080 | $5,356,898 |
| TN | 4,812,384 | 3,022,274 | $99,795,473 | 38,339 | $69,193,007 | 4,407,419 | 2,725,969 | $90,011,486 | 35,685 | $63,386,212 |
| TX | 25,544,645 | 13,927,956 | $459,901,109 | 167,603 | $297,696,438 | 21,727,708 | 12,247,925 | $404,426,473 | 149,386 | $262,287,172 |
| UT | 3,587,193 | 2,110,090 | $69,675,186 | 21,900 | $40,101,201 | 3,588,622 | 2,168,453 | $71,602,329 | 22,992 | $41,217,892 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, MODERATE INVESTMENT, 2012 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 10,046,966 | 6,709,339 | $221,542,378 | 89,735 | $165,157,953 | 9,363,928 | 6,312,481 | $208,438,138 | 84,107 | $150,941,691 |
| VI | 242,958 | 62,169 | $2,052,828 | 1,257 | $2,253,731 | 582,960 | 291,532 | $9,626,396 | 4,247 | $7,271,335 |
| VT | 297,562 | 238,550 | $7,876,932 | 4,396 | $7,691,784 | 273,443 | 221,601 | $7,317,258 | 4,485 | $7,756,556 |
| WA | 8,883,441 | 4,110,288 | $135,721,724 | 47,680 | $87,221,149 | 7,126,987 | 3,319,421 | $109,607,296 | 39,369 | $71,048,384 |
| WI | 3,491,105 | 2,428,325 | $80,183,290 | 34,491 | $61,422,001 | 2,080,418 | 1,488,443 | $49,148,402 | 23,068 | $40,472,792 |
| WV | 258,215 | 145,726 | $4,811,878 | 3,361 | $6,040,313 | 209,618 | 116,337 | $3,841,451 | 2,807 | $4,949,769 |
| WY | 142,334 | 69,096 | $2,281,555 | 1,744 | $3,125,578 | 293,274 | 157,486 | $5,200,182 | 3,086 | $5,469,227 |
| Domestic Total | 313,362,838 | 197,881,316 | $6,534,041,063 | 2,360,883 | $4,222,844,201 | 308,374,226 | 194,989,832 | $6,438,564,238 | 2,324,579 | $4,109,964,530 |
| International 3/ | 20,318,283 | 11,695,931 | $386,199,626 | 112,468 | $346,249,620 | 25,306,895 | 14,587,415 | $481,676,451 | 148,772 | $459,129,292 |
| Grand Total | 333,681,121 | 209,577,247 | $6,920,240,688 | 2,473,351 | $4,569,093,821 | 333,681,121 | 209,577,247 | $6,920,240,688 | 2,473,351 | $4,569,093,821 |
| Percent Change 2000 Baseline | 33% | 48% | | 47% | 46% | 33% | 48% | | 47% | 46% |

| Total One-Way Flights | |
|---|---|
| Domestic | 3,737,778 |
| International | 233,413 |
| Total | 3,971,191 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of th edestination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 dollars),
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, AGGRESSIVE INVESTMENT, 2007**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,822,551 | 458,907 | $15,153,124 | 7,083 | $12,960,265 | 1,938,078 | 516,271 | $17,047,284 | 7,952 | $14,478,137 |
| AL | 1,701,800 | 1,060,258 | $35,009,703 | 13,170 | $23,549,149 | 1,356,821 | 804,777 | $26,573,746 | 10,681 | $18,840,008 |
| AR | 1,017,447 | 620,953 | $20,503,884 | 8,801 | $15,405,760 | 926,636 | 536,827 | $17,726,036 | 8,027 | $13,790,543 |
| AZ | 7,529,856 | 4,338,387 | $143,253,540 | 47,909 | $83,921,487 | 8,792,023 | 5,237,785 | $172,951,677 | 57,976 | $101,048,170 |
| CA | 41,244,868 | 22,053,867 | $728,218,685 | 239,401 | $421,484,562 | 38,589,441 | 21,369,194 | $705,610,797 | 231,316 | $406,459,104 |
| CO | 6,700,960 | 3,600,783 | $118,897,846 | 39,460 | $70,579,384 | 7,059,017 | 3,851,318 | $127,170,516 | 43,989 | $77,464,178 |
| CT | 2,771,607 | 1,678,807 | $55,434,216 | 20,722 | $37,214,498 | 1,631,168 | 1,002,319 | $33,096,573 | 12,822 | $22,544,907 |
| DE | 1,851 | 111 | $3,656 | 3 | $4,628 | 1,864 | 116 | $3,821 | 3 | $4,806 |
| FL | 18,673,151 | 10,269,621 | $339,102,897 | 118,734 | $215,294,757 | 36,185,903 | 20,417,199 | $674,175,923 | 229,657 | $416,088,260 |
| GA | 10,128,145 | 6,136,161 | $202,616,036 | 63,427 | $113,193,725 | 9,136,387 | 5,809,588 | $191,832,605 | 62,340 | $110,143,773 |
| HI | 5,747,292 | 1,030,126 | $34,014,776 | 10,639 | $17,854,002 | 9,822,714 | 2,782,184 | $91,867,704 | 25,459 | $44,342,938 |
| IA | 1,012,980 | 717,648 | $23,696,750 | 11,167 | $19,947,647 | 709,612 | 489,483 | $16,162,721 | 8,368 | $14,636,187 |
| ID | 1,036,430 | 435,570 | $14,382,512 | 6,176 | $11,166,849 | 946,258 | 375,995 | $12,415,349 | 5,609 | $10,017,090 |
| IL | 14,146,844 | 9,089,902 | $300,148,575 | 100,635 | $176,638,205 | 11,588,703 | 7,729,870 | $255,240,292 | 87,580 | $151,901,971 |
| IN | 3,283,789 | 2,033,530 | $67,147,173 | 29,415 | $52,483,001 | 2,213,051 | 1,445,122 | $47,717,913 | 21,748 | $38,271,042 |
| KS | 405,215 | 260,132 | $8,589,559 | 4,122 | $7,457,893 | 312,671 | 195,343 | $6,450,219 | 3,284 | $5,844,720 |
| KY | 3,777,001 | 2,136,174 | $70,536,461 | 27,580 | $50,040,297 | 2,794,601 | 1,601,147 | $52,869,862 | 22,009 | $39,154,423 |
| LA | 2,649,657 | 1,425,236 | $47,061,295 | 17,979 | $32,067,264 | 4,142,065 | 2,301,509 | $75,995,828 | 27,562 | $48,871,569 |
| MA | 7,169,386 | 5,796,108 | $191,387,499 | 72,643 | $132,120,116 | 5,785,436 | 4,823,428 | $159,269,586 | 64,073 | $113,987,875 |
| MD | 5,696,682 | 2,834,139 | $93,583,282 | 33,846 | $61,404,316 | 4,227,076 | 2,035,774 | $67,221,258 | 24,152 | $42,747,624 |
| ME | 493,663 | 327,906 | $10,827,441 | 6,551 | $11,383,111 | 534,198 | 368,171 | $12,157,018 | 8,040 | $13,830,853 |
| MI | 8,237,619 | 5,261,570 | $173,737,051 | 62,802 | $111,084,613 | 5,125,496 | 3,492,510 | $115,322,664 | 43,658 | $76,398,941 |
| MN | 6,060,894 | 3,415,046 | $112,764,822 | 36,885 | $66,443,471 | 4,202,210 | 2,565,197 | $84,702,801 | 29,026 | $51,223,845 |
| MO | 7,528,728 | 4,212,454 | $139,095,240 | 47,790 | $85,453,519 | 5,894,751 | 3,391,722 | $111,994,671 | 39,906 | $69,825,445 |
| MS | 666,608 | 322,446 | $10,647,154 | 4,533 | $8,018,607 | 695,246 | 306,311 | $10,114,390 | 4,572 | $7,979,829 |
| MT | 651,220 | 284,989 | $9,410,334 | 3,869 | $7,016,269 | 756,811 | 343,232 | $11,333,507 | 4,607 | $8,216,809 |
| NC | 6,272,773 | 3,923,146 | $129,542,265 | 52,277 | $95,446,299 | 5,087,526 | 3,198,434 | $105,612,291 | 43,923 | $78,610,213 |
| ND | 328,903 | 179,414 | $5,924,240 | 2,430 | $4,253,069 | 263,347 | 138,898 | $4,586,399 | 2,020 | $3,503,406 |
| NE | 1,532,332 | 907,759 | $29,974,206 | 10,903 | $19,420,724 | 1,027,135 | 592,377 | $19,560,273 | 7,489 | $13,092,388 |
| NH | 1,134,838 | 633,350 | $20,913,229 | 9,397 | $16,073,575 | 783,903 | 403,855 | $13,335,277 | 6,451 | $10,956,100 |
| NJ | 9,040,201 | 7,259,191 | $239,698,490 | 78,842 | $140,966,005 | 5,320,754 | 4,512,491 | $149,002,446 | 50,791 | $90,044,243 |
| NM | 1,732,876 | 881,829 | $29,117,981 | 10,235 | $18,217,516 | 1,926,203 | 1,008,064 | $33,286,274 | 11,867 | $20,739,718 |
| NV | 3,939,993 | 1,871,897 | $61,810,027 | 19,853 | $34,643,494 | 16,536,334 | 8,558,547 | $282,603,215 | 87,187 | $153,879,516 |
| NY | 17,687,970 | 14,609,785 | $482,415,110 | 178,861 | $315,070,742 | 13,964,272 | 12,336,745 | $407,359,313 | 154,092 | $267,216,825 |
| OH | 6,887,318 | 4,276,396 | $141,206,584 | 60,934 | $110,723,807 | 4,441,139 | 2,836,446 | $93,659,432 | 42,498 | $75,686,972 |
| OK | 2,155,719 | 1,254,960 | $41,438,793 | 16,507 | $29,561,580 | 1,671,031 | 906,632 | $29,936,984 | 12,081 | $21,220,841 |
| OR | 4,565,856 | 2,045,769 | $67,551,287 | 24,909 | $45,811,110 | 3,391,249 | 1,469,807 | $48,533,024 | 18,627 | $33,459,749 |
| PA | 9,090,169 | 6,701,122 | $221,271,042 | 87,198 | $159,586,322 | 6,028,215 | 4,640,992 | $153,245,540 | 62,367 | $111,001,293 |
| PR | 1,457,092 | 573,217 | $18,927,635 | 6,364 | $12,073,746 | 2,372,226 | 1,197,691 | $39,547,757 | 11,946 | $21,238,833 |
| RI | 1,923,335 | 1,181,992 | $39,029,382 | 16,760 | $29,697,293 | 1,399,739 | 844,288 | $27,878,387 | 12,660 | $22,101,641 |
| SC | 1,524,230 | 1,105,170 | $36,492,728 | 16,366 | $29,656,070 | 2,003,635 | 1,371,619 | $45,290,861 | 21,150 | $37,527,898 |
| SD | 353,597 | 193,818 | $6,399,883 | 2,870 | $5,039,166 | 313,500 | 169,200 | $5,586,970 | 2,614 | $4,553,584 |
| TN | 4,333,286 | 2,444,306 | $80,710,994 | 31,327 | $56,525,095 | 3,969,102 | 2,215,595 | $73,158,937 | 29,309 | $52,054,564 |
| TX | 22,938,715 | 11,282,880 | $372,560,707 | 136,273 | $242,138,840 | 19,566,742 | 9,960,563 | $328,897,800 | 121,924 | $214,180,181 |
| UT | 3,122,469 | 1,685,546 | $55,656,721 | 17,590 | $32,169,665 | 3,130,996 | 1,746,291 | $57,662,522 | 18,602 | $33,339,257 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, AGGRESSIVE INVESTMENT, 2007 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 9,232,215 | 5,877,138 | $194,063,113 | 79,144 | $145,846,153 | 8,641,146 | 5,580,247 | $184,259,768 | 74,696 | $134,198,469 |
| VI | 235,922 | 55,037 | $1,817,319 | 1,160 | $2,089,955 | 557,893 | 252,890 | $8,350,431 | 3,769 | $6,441,993 |
| VT | 269,155 | 200,935 | $6,634,874 | 3,788 | $6,615,341 | 248,179 | 188,483 | $6,223,714 | 3,895 | $6,724,690 |
| WA | 8,040,084 | 3,594,727 | $118,697,901 | 41,856 | $76,576,649 | 6,457,207 | 2,901,977 | $95,823,269 | 34,589 | $62,422,219 |
| WI | 3,128,490 | 2,058,629 | $67,975,932 | 29,444 | $52,464,562 | 1,871,504 | 1,278,334 | $42,210,578 | 19,914 | $34,957,835 |
| WV | 239,042 | 125,541 | $4,145,363 | 2,914 | $5,247,269 | 194,571 | 100,702 | $3,325,178 | 2,437 | $4,305,989 |
| WY | 130,683 | 58,058 | $1,917,073 | 1,454 | $2,613,962 | 267,334 | 134,459 | $4,439,833 | 2,613 | $4,634,194 |
| Domestic Total | 281,453,495 | 164,782,447 | $5,441,116,393 | 1,975,000 | $3,532,715,402 | 276,803,106 | 162,338,014 | $5,360,401,232 | 1,943,926 | $3,436,205,659 |
| International 3/ | 18,169,930 | 9,899,147 | $326,869,825 | 95,110 | $292,635,637 | 22,820,320 | 12,343,579 | $407,584,986 | 126,184 | $389,145,380 |
| Grand Total | 299,623,425 | 174,681,594 | $5,767,986,218 | 2,070,110 | $3,825,351,040 | 299,623,425 | 174,681,594 | $5,767,986,218 | 2,070,110 | $3,825,351,040 |
| Percent Change 2000 Baseline | 20% | 23% | | 23% | 22% | 20% | 23% | | 23% | 22% |

Total One-Way Flights

| | |
|---|---|
| Domestic | 3,370,933 |
| International | 211,051 |
| Total | 3,581,983 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 dollars).
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, AGGRESSIVE INVESTMENT, 2012**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 2,013,401 | 542,109 | $17,900,452 | 8,220 | $15,026,049 | 2,141,832 | 606,705 | $20,033,413 | 9,204 | $16,752,511 |
| AL | 1,861,051 | 1,257,423 | $41,520,099 | 15,460 | $27,658,252 | 1,482,118 | 947,555 | $31,288,265 | 12,427 | $21,926,776 |
| AR | 1,100,160 | 732,061 | $24,172,639 | 10,717 | $18,723,956 | 1,001,459 | 628,224 | $20,743,953 | 9,704 | $16,655,931 |
| AZ | 8,586,146 | 5,611,094 | $185,278,337 | 61,805 | $108,186,370 | 10,004,452 | 6,724,001 | $222,026,510 | 74,178 | $129,204,537 |
| CA | 46,364,085 | 24,209,584 | $799,400,452 | 261,541 | $459,805,629 | 43,310,143 | 23,339,314 | $770,664,152 | 251,588 | $441,682,799 |
| CO | 7,477,348 | 4,296,201 | $141,860,548 | 47,415 | $84,803,489 | 7,849,870 | 4,567,424 | $150,816,332 | 52,527 | $92,472,204 |
| CT | 3,121,147 | 1,999,915 | $66,037,199 | 24,478 | $43,870,591 | 1,830,352 | 1,187,169 | $39,200,315 | 15,023 | $26,383,729 |
| DE | 1,898 | 118 | $3,905 | 3 | $4,930 | 1,911 | 123 | $4,071 | 3 | $5,107 |
| FL | 20,873,342 | 11,942,970 | $394,356,885 | 137,034 | $249,774,507 | 40,702,670 | 23,970,582 | $791,508,604 | 267,446 | $487,447,008 |
| GA | 11,347,412 | 7,582,393 | $250,370,622 | 77,902 | $139,564,948 | 10,219,788 | 7,139,506 | $235,746,473 | 75,915 | $134,632,012 |
| HI | 6,437,025 | 1,128,797 | $37,272,892 | 11,731 | $19,692,660 | 11,004,499 | 3,013,119 | $99,493,201 | 27,800 | $48,465,520 |
| IA | 1,100,975 | 813,552 | $26,863,496 | 12,657 | $22,576,047 | 771,117 | 550,539 | $18,178,791 | 9,445 | $16,504,865 |
| ID | 1,147,190 | 487,312 | $16,091,057 | 6,943 | $12,565,267 | 1,046,236 | 422,432 | $13,948,692 | 6,339 | $11,335,781 |
| IL | 15,641,082 | 9,891,255 | $326,609,236 | 109,710 | $192,823,554 | 12,791,674 | 8,374,111 | $276,513,150 | 95,160 | $165,235,911 |
| IN | 3,625,038 | 2,348,192 | $77,537,298 | 33,613 | $60,017,791 | 2,434,744 | 1,646,059 | $54,352,853 | 24,559 | $43,260,378 |
| KS | 441,268 | 308,164 | $10,175,580 | 4,891 | $8,819,560 | 339,906 | 226,757 | $7,487,511 | 3,834 | $6,805,223 |
| KY | 4,279,220 | 2,558,888 | $84,494,483 | 33,056 | $60,122,217 | 3,160,211 | 1,891,892 | $62,470,270 | 26,100 | $46,511,732 |
| LA | 2,940,142 | 1,604,353 | $52,975,723 | 20,416 | $36,458,834 | 4,605,240 | 2,534,471 | $83,688,236 | 30,550 | $54,258,451 |
| MA | 7,650,924 | 6,022,920 | $198,876,829 | 75,860 | $138,335,526 | 6,167,843 | 4,966,035 | $163,978,465 | 66,291 | $118,310,373 |
| MD | 6,425,300 | 3,334,063 | $110,090,759 | 39,081 | $70,936,924 | 4,757,961 | 2,389,712 | $78,908,293 | 27,859 | $49,367,860 |
| ME | 539,212 | 356,449 | $11,769,943 | 6,854 | $11,970,489 | 581,327 | 390,776 | $12,903,438 | 8,301 | $14,356,100 |
| MI | 9,335,095 | 6,373,986 | $210,469,025 | 75,709 | $134,025,878 | 5,789,307 | 4,181,827 | $138,083,940 | 52,125 | $91,262,828 |
| MN | 6,917,561 | 4,115,298 | $135,887,148 | 44,418 | $80,190,640 | 4,778,527 | 3,062,452 | $101,122,171 | 34,617 | $61,182,745 |
| MO | 8,450,690 | 5,144,440 | $169,869,422 | 58,267 | $104,263,247 | 6,604,378 | 4,132,217 | $136,445,797 | 48,517 | $84,919,500 |
| MS | 732,961 | 388,765 | $12,837,012 | 5,562 | $9,857,983 | 765,508 | 368,334 | $12,162,380 | 5,574 | $9,736,826 |
| MT | 717,168 | 333,979 | $11,027,991 | 4,524 | $8,200,622 | 832,422 | 399,583 | $13,194,226 | 5,364 | $9,570,088 |
| NC | 6,934,829 | 4,410,618 | $145,638,613 | 58,130 | $106,377,922 | 5,612,739 | 3,576,545 | $118,097,516 | 48,670 | $87,274,316 |
| ND | 353,133 | 205,789 | $6,795,142 | 2,785 | $4,869,773 | 282,763 | 158,344 | $5,228,514 | 2,300 | $3,987,402 |
| NE | 1,715,474 | 1,087,756 | $35,917,689 | 12,961 | $23,046,490 | 1,146,962 | 701,353 | $23,158,687 | 8,805 | $15,372,680 |
| NH | 1,260,942 | 677,362 | $22,366,497 | 9,492 | $16,337,296 | 868,003 | 424,733 | $14,024,675 | 6,337 | $10,839,979 |
| NJ | 10,012,053 | 9,047,674 | $298,754,195 | 97,920 | $174,715,275 | 5,879,664 | 5,544,253 | $183,071,244 | 62,092 | $109,943,507 |
| NM | 1,978,580 | 1,117,697 | $36,906,356 | 12,951 | $23,064,881 | 2,193,598 | 1,266,974 | $41,835,489 | 14,892 | $26,037,095 |
| NV | 4,485,093 | 2,315,559 | $76,459,764 | 24,425 | $42,515,540 | 18,825,925 | 10,552,871 | $348,455,811 | 107,114 | $188,317,362 |
| NY | 19,072,936 | 12,436,601 | $410,656,570 | 153,344 | $272,805,164 | 14,983,837 | 10,307,080 | $340,339,784 | 130,296 | $228,296,662 |
| OH | 7,706,315 | 5,082,475 | $167,823,327 | 71,452 | $130,007,161 | 4,952,797 | 3,317,945 | $109,558,537 | 49,135 | $87,646,283 |
| OK | 2,348,490 | 1,467,594 | $48,459,968 | 19,212 | $34,315,434 | 1,820,950 | 1,057,624 | $34,922,742 | 14,027 | $24,594,267 |
| OR | 5,154,827 | 2,308,448 | $76,224,962 | 27,878 | $51,316,094 | 3,822,460 | 1,660,692 | $54,836,058 | 20,841 | $37,468,869 |
| PA | 10,074,097 | 7,372,911 | $243,453,532 | 95,258 | $174,092,530 | 6,657,533 | 5,081,393 | $167,787,608 | 68,003 | $121,000,084 |
| PR | 1,578,398 | 644,152 | $21,269,915 | 7,063 | $13,359,652 | 2,567,437 | 1,340,431 | $44,261,017 | 13,290 | $23,616,198 |
| RI | 2,193,512 | 1,359,158 | $44,879,405 | 18,532 | $32,977,033 | 1,590,285 | 957,640 | $31,621,288 | 13,783 | $24,170,539 |
| SC | 1,673,135 | 1,268,943 | $41,900,491 | 18,399 | $33,451,240 | 2,197,610 | 1,542,610 | $50,936,981 | 23,485 | $41,801,629 |
| SD | 387,393 | 231,111 | $7,631,288 | 3,400 | $5,961,878 | 341,803 | 197,920 | $6,535,334 | 3,038 | $5,286,978 |
| TN | 4,812,384 | 2,840,669 | $93,798,884 | 36,124 | $65,259,126 | 4,407,419 | 2,560,264 | $84,539,919 | 33,599 | $59,719,899 |
| TX | 25,544,645 | 13,112,709 | $432,981,636 | 157,932 | $280,353,177 | 21,727,708 | 11,549,227 | $381,355,461 | 141,075 | $247,539,614 |
| UT | 3,587,193 | 2,042,423 | $67,440,822 | 21,283 | $38,949,024 | 3,588,622 | 2,108,585 | $69,625,485 | 22,423 | $40,201,511 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, AGGRESSIVE INVESTMENT, 2012 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 10,046,966 | 6,247,227 | $206,283,427 | 83,249 | $153,851,747 | 9,363,928 | 5,878,938 | $194,122,543 | 78,183 | $140,833,313 |
| VI | 242,958 | 60,272 | $1,990,172 | 1,231 | $2,208,018 | 582,960 | 278,162 | $9,184,918 | 4,046 | $6,911,816 |
| VT | 297,562 | 207,380 | $6,847,685 | 3,781 | $6,665,375 | 273,443 | 192,521 | $6,357,038 | 3,867 | $6,738,743 |
| WA | 8,883,441 | 4,018,735 | $132,698,641 | 46,661 | $85,401,857 | 7,126,987 | 3,245,509 | $107,166,693 | 38,521 | $69,565,088 |
| WI | 3,491,105 | 2,364,179 | $78,065,198 | 33,599 | $59,908,510 | 2,080,418 | 1,446,424 | $47,760,936 | 22,459 | $39,448,614 |
| WV | 258,215 | 139,763 | $4,614,963 | 3,264 | $5,867,509 | 209,618 | 110,675 | $3,654,485 | 2,713 | $4,789,124 |
| WY | 142,334 | 67,512 | $2,229,252 | 1,727 | $3,095,671 | 293,274 | 151,395 | $4,999,068 | 3,024 | $5,364,140 |
| Domestic Total | 313,362,838 | 185,519,001 | $6,125,837,427 | 2,209,918 | $3,959,049,340 | 308,374,226 | 182,871,028 | $6,038,401,333 | 2,176,464 | $3,855,012,507 |
| International 3/ | 20,318,283 | 11,063,265 | $365,309,022 | 106,201 | $327,128,463 | 25,306,895 | 13,711,239 | $452,745,115 | 139,656 | $431,165,296 |
| Grand Total | 333,681,121 | 196,582,267 | $6,491,146,448 | 2,316,120 | $4,286,177,803 | 333,681,121 | 196,582,267 | $6,491,146,448 | 2,316,120 | $4,286,177,803 |
| Percent Change 2000 Baseline | 33% | 39% | | 37% | 37% | 33% | 39% | | 37% | 37% |

| Total One-Way Flights | |
|---|---|
| Domestic | 3,737,778 |
| International | 233,413 |
| Total | 3,971,191 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of th edestination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes

(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).

(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution

(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 based on median household income growth in current dollars).

(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.

(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, ACCELERATED INVESTMENT, 2007**

| State | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 1,822,551 | 448,105 | $14,796,414 | 6,953 | $12,733,916 | 1,938,078 | 501,242 | $16,551,004 | 7,768 | $14,163,184 |
| AL | 1,701,800 | 1,013,699 | $33,472,339 | 12,589 | $22,544,902 | 1,356,821 | 767,348 | $25,337,817 | 10,184 | $17,985,960 |
| AR | 1,017,447 | 600,695 | $19,834,942 | 8,512 | $14,892,191 | 926,636 | 518,199 | $17,110,915 | 7,748 | $13,305,195 |
| AZ | 7,529,856 | 4,149,927 | $137,030,581 | 45,866 | $80,342,742 | 8,792,023 | 5,008,966 | $165,396,068 | 55,446 | $96,639,786 |
| CA | 41,244,868 | 19,491,385 | $643,605,549 | 210,801 | $371,124,024 | 38,589,441 | 18,870,463 | $623,102,679 | 203,664 | $358,003,561 |
| CO | 6,700,960 | 3,373,376 | $111,388,885 | 36,963 | $66,182,499 | 7,059,017 | 3,615,670 | $119,389,411 | 41,307 | $72,787,224 |
| CT | 2,771,607 | 1,554,297 | $51,322,893 | 19,341 | $34,714,642 | 1,631,168 | 923,290 | $30,487,035 | 11,915 | $20,939,513 |
| DE | 1,851 | 111 | $3,656 | 3 | $4,628 | 1,864 | 116 | $3,821 | 3 | $4,806 |
| FL | 18,673,151 | 9,306,339 | $307,295,316 | 108,043 | $196,832,915 | 36,185,903 | 18,583,519 | $613,627,781 | 209,653 | $381,599,729 |
| GA | 10,128,145 | 5,764,170 | $190,332,909 | 59,760 | $106,955,827 | 9,136,387 | 5,451,121 | $179,996,003 | 58,558 | $103,743,206 |
| HI | 5,747,292 | 968,388 | $31,976,166 | 10,119 | $16,977,766 | 9,822,714 | 2,543,442 | $83,984,459 | 23,467 | $40,934,791 |
| IA | 1,012,980 | 672,403 | $22,202,736 | 10,531 | $18,832,285 | 709,612 | 457,577 | $15,109,197 | 7,903 | $13,834,282 |
| ID | 1,036,430 | 405,975 | $13,405,287 | 5,819 | $10,538,320 | 946,258 | 353,192 | $11,662,388 | 5,328 | $9,529,612 |
| IL | 14,146,844 | 8,111,164 | $267,830,623 | 89,938 | $158,180,179 | 11,588,703 | 6,886,068 | $227,377,978 | 78,215 | $135,916,164 |
| IN | 3,283,789 | 1,917,128 | $63,303,558 | 27,629 | $49,360,726 | 2,213,051 | 1,354,701 | $44,732,230 | 20,317 | $35,796,590 |
| KS | 405,215 | 248,121 | $8,192,959 | 3,983 | $7,205,160 | 312,671 | 185,111 | $6,112,362 | 3,162 | $5,623,935 |
| KY | 3,777,001 | 2,026,755 | $66,923,458 | 26,348 | $47,888,470 | 2,794,601 | 1,512,628 | $49,946,976 | 20,948 | $37,318,402 |
| LA | 2,649,657 | 1,282,004 | $42,331,780 | 16,323 | $29,172,251 | 4,142,065 | 2,030,437 | $67,045,026 | 24,555 | $43,634,399 |
| MA | 7,169,386 | 5,299,002 | $174,973,040 | 67,051 | $122,567,128 | 5,785,436 | 4,382,557 | $144,712,029 | 58,809 | $105,112,141 |
| MD | 5,696,682 | 2,605,793 | $86,043,278 | 31,018 | $56,321,735 | 4,227,076 | 1,870,452 | $61,762,327 | 22,171 | $39,282,887 |
| ME | 493,663 | 294,130 | $9,712,183 | 5,877 | $10,248,257 | 534,198 | 328,466 | $10,845,933 | 7,199 | $12,432,089 |
| MI | 8,237,619 | 5,005,177 | $165,270,937 | 59,859 | $106,024,320 | 5,125,496 | 3,299,059 | $108,934,933 | 41,349 | $72,453,105 |
| MN | 6,060,894 | 3,260,387 | $107,657,964 | 35,381 | $63,812,789 | 4,202,210 | 2,434,937 | $80,401,628 | 27,671 | $48,875,663 |
| MO | 7,528,728 | 4,037,788 | $133,327,744 | 45,889 | $82,137,724 | 5,894,751 | 3,255,344 | $107,491,444 | 38,365 | $67,179,781 |
| MS | 666,608 | 309,998 | $10,236,133 | 4,392 | $7,774,685 | 695,246 | 294,031 | $9,708,903 | 4,422 | $7,721,813 |
| MT | 651,220 | 276,317 | $9,123,993 | 3,779 | $6,859,005 | 756,811 | 331,790 | $10,955,694 | 4,490 | $8,016,667 |
| NC | 6,272,773 | 3,608,732 | $119,160,329 | 48,044 | $87,937,910 | 5,087,526 | 2,937,207 | $96,986,567 | 40,346 | $72,354,428 |
| ND | 328,903 | 173,841 | $5,740,227 | 2,357 | $4,124,318 | 263,347 | 133,838 | $4,419,318 | 1,943 | $3,367,978 |
| NE | 1,532,332 | 866,695 | $28,618,282 | 10,329 | $18,406,114 | 1,027,135 | 565,117 | $18,660,158 | 7,095 | $12,412,804 |
| NH | 1,134,838 | 555,299 | $18,335,987 | 7,876 | $13,548,515 | 783,903 | 351,313 | $11,600,343 | 5,302 | $9,065,260 |
| NJ | 9,040,201 | 7,125,790 | $235,293,576 | 77,342 | $138,333,898 | 5,320,754 | 4,417,527 | $145,866,740 | 49,664 | $88,070,196 |
| NM | 1,732,876 | 849,135 | $28,038,437 | 9,885 | $17,603,874 | 1,926,203 | 968,378 | $31,975,835 | 11,433 | $19,994,851 |
| NV | 3,939,993 | 1,760,978 | $58,147,505 | 18,650 | $32,530,152 | 16,536,334 | 8,090,226 | $267,139,269 | 82,292 | $144,884,028 |
| NY | 17,687,970 | 10,886,119 | $359,459,651 | 135,012 | $240,167,933 | 13,964,272 | 9,099,842 | $300,476,771 | 115,532 | $202,294,568 |
| OH | 6,887,318 | 4,058,273 | $134,004,185 | 57,605 | $104,880,404 | 4,441,139 | 2,674,309 | $88,305,690 | 39,939 | $71,273,681 |
| OK | 2,155,719 | 1,208,527 | $39,905,578 | 15,976 | $28,614,143 | 1,671,031 | 874,958 | $28,891,105 | 11,702 | $20,557,523 |
| OR | 4,565,856 | 1,867,287 | $61,657,816 | 22,737 | $41,918,972 | 3,391,249 | 1,350,299 | $44,586,867 | 17,096 | $30,783,758 |
| PA | 9,090,169 | 5,955,470 | $196,649,632 | 77,801 | $142,347,835 | 6,028,215 | 4,141,818 | $136,762,815 | 55,789 | $99,325,558 |
| PR | 1,457,092 | 550,710 | $18,184,454 | 6,122 | $11,648,742 | 2,372,226 | 1,143,458 | $37,756,993 | 11,380 | $20,252,565 |
| RI | 1,923,335 | 1,085,345 | $35,838,089 | 15,004 | $26,720,023 | 1,399,739 | 772,833 | $25,518,961 | 11,251 | $19,748,676 |
| SC | 1,524,230 | 1,039,661 | $34,329,596 | 15,245 | $27,745,244 | 2,003,635 | 1,276,876 | $42,162,431 | 19,545 | $34,830,497 |
| SD | 353,597 | 185,389 | $6,121,529 | 2,741 | $4,823,767 | 313,500 | 160,826 | $5,310,482 | 2,479 | $4,328,671 |
| TN | 4,333,286 | 2,271,872 | $75,017,219 | 29,148 | $52,651,189 | 3,969,102 | 2,051,864 | $67,752,544 | 27,147 | $48,243,104 |
| TX | 22,938,715 | 10,508,372 | $346,986,460 | 127,234 | $226,088,170 | 19,566,742 | 9,288,907 | $306,719,724 | 114,050 | $200,294,202 |
| UT | 3,122,469 | 1,589,108 | $52,472,347 | 16,641 | $30,451,348 | 3,130,996 | 1,652,330 | $54,559,935 | 17,639 | $31,628,775 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, ACCELERATED INVESTMENT, 2007 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 9,232,215 | 5,190,700 | $171,396,903 | 70,118 | $129,789,928 | 8,641,146 | 4,933,604 | $162,907,605 | 66,286 | $119,461,204 |
| VI | 235,922 | 53,151 | $1,755,043 | 1,136 | $2,047,944 | 557,893 | 239,670 | $7,913,899 | 3,594 | $6,136,583 |
| VT | 269,155 | 171,629 | $5,667,206 | 3,213 | $5,657,957 | 248,179 | 161,109 | $5,319,832 | 3,314 | $5,768,535 |
| WA | 8,040,084 | 3,359,489 | $110,930,321 | 39,266 | $72,038,638 | 6,457,207 | 2,722,821 | $89,907,559 | 32,537 | $58,866,205 |
| WI | 3,128,490 | 1,934,458 | $63,875,800 | 27,701 | $49,471,124 | 1,871,504 | 1,192,200 | $39,366,459 | 18,643 | $32,791,483 |
| WV | 239,042 | 117,291 | $3,872,941 | 2,765 | $4,981,761 | 194,571 | 93,472 | $3,086,439 | 2,304 | $4,073,720 |
| WY | 130,683 | 55,420 | $1,829,975 | 1,423 | $2,559,480 | 267,334 | 124,963 | $4,126,280 | 2,502 | $4,443,934 |
| Domestic Total | 281,453,495 | 149,451,375 | $4,934,884,413 | 1,794,137 | $3,217,318,468 | 276,803,106 | 147,179,487 | $4,859,866,661 | 1,765,420 | $3,128,087,270 |
| International 3/ | 18,169,930 | 8,955,794 | $295,720,328 | 86,382 | $266,110,586 | 22,820,320 | 11,227,683 | $370,738,080 | 115,099 | $355,341,784 |
| Grand Total | 299,623,425 | 158,407,170 | $5,230,604,741 | 1,880,520 | $3,483,429,054 | 299,623,425 | 158,407,170 | $5,230,604,741 | 1,880,520 | $3,483,429,054 |
| Percent Change 2000 Baseline | 20% | 12% | | 11% | 11% | 20% | 12% | | 11% | 11% |

| Total One-Way Flights | |
|---|---|
| Domestic | 3,370,933 |
| International | 211,051 |
| Total | 3,581,983 |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of th edestination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day arrival/departure distribution patterns.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 based on median household income growth in current dollars).
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, ACCELERATED INVESTMENT, 2012**

| State | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| AK | 2,013,401 | 542,109 | $17,900,452 | 8,220 | $15,026,049 | 2,141,832 | 606,705 | $20,033,413 | 9,204 | $16,752,511 |
| AL | 1,861,051 | 1,257,423 | $41,520,099 | 15,460 | $27,658,252 | 1,482,118 | 947,555 | $31,288,265 | 12,427 | $21,926,776 |
| AR | 1,100,160 | 732,061 | $24,172,639 | 10,717 | $18,723,956 | 1,001,459 | 628,224 | $20,743,953 | 9,704 | $16,655,931 |
| AZ | 8,586,146 | 5,611,094 | $185,278,337 | 61,805 | $108,186,370 | 10,004,452 | 6,724,001 | $222,026,510 | 74,178 | $129,204,537 |
| CA | 46,364,085 | 24,209,584 | $799,400,452 | 261,541 | $459,805,629 | 43,310,143 | 23,339,314 | $770,664,152 | 251,588 | $441,682,799 |
| CO | 7,477,348 | 4,296,201 | $141,860,548 | 47,415 | $84,803,489 | 7,849,870 | 4,567,424 | $150,816,332 | 52,527 | $92,472,204 |
| CT | 3,121,147 | 1,999,915 | $66,037,199 | 24,478 | $43,870,591 | 1,830,352 | 1,187,169 | $39,200,315 | 15,023 | $26,383,729 |
| DE | 1,898 | 118 | $3,905 | 3 | $4,930 | 1,911 | 123 | $4,071 | 3 | $5,107 |
| FL | 20,873,342 | 11,942,970 | $394,356,885 | 137,034 | $249,774,507 | 40,702,670 | 23,970,582 | $791,508,604 | 267,446 | $487,447,008 |
| GA | 11,347,412 | 7,582,393 | $250,370,622 | 77,902 | $139,564,948 | 10,219,788 | 7,139,506 | $235,746,473 | 75,915 | $134,632,012 |
| HI | 6,437,025 | 1,128,797 | $37,272,892 | 11,731 | $19,692,660 | 11,004,499 | 3,013,119 | $99,493,201 | 27,800 | $48,465,520 |
| IA | 1,100,975 | 813,552 | $26,863,496 | 12,657 | $22,576,047 | 771,117 | 550,539 | $18,178,791 | 9,445 | $16,504,865 |
| ID | 1,147,190 | 487,312 | $16,091,057 | 6,943 | $12,565,267 | 1,046,236 | 422,432 | $13,948,692 | 6,339 | $11,335,781 |
| IL | 15,641,082 | 9,891,255 | $326,609,236 | 109,710 | $192,823,554 | 12,791,674 | 8,374,111 | $276,513,150 | 95,160 | $165,235,911 |
| IN | 3,625,038 | 2,348,192 | $77,537,298 | 33,613 | $60,017,791 | 2,434,744 | 1,646,059 | $54,352,853 | 24,559 | $43,260,378 |
| KS | 441,268 | 308,164 | $10,175,580 | 4,891 | $8,819,560 | 339,906 | 226,757 | $7,487,511 | 3,834 | $6,805,223 |
| KY | 4,279,220 | 2,558,888 | $84,494,483 | 33,056 | $60,122,217 | 3,160,211 | 1,891,892 | $62,470,270 | 26,100 | $46,511,732 |
| LA | 2,940,142 | 1,604,353 | $52,975,723 | 20,416 | $36,458,834 | 4,605,240 | 2,534,471 | $83,688,236 | 30,550 | $54,258,451 |
| MA | 7,650,924 | 6,022,920 | $198,876,829 | 75,860 | $138,335,526 | 6,167,843 | 4,966,035 | $163,978,465 | 66,291 | $118,310,373 |
| MD | 6,425,300 | 3,334,063 | $110,090,759 | 39,081 | $70,936,924 | 4,757,961 | 2,389,712 | $78,908,293 | 27,859 | $49,367,860 |
| ME | 539,212 | 356,449 | $11,769,943 | 6,854 | $11,970,489 | 581,327 | 390,776 | $12,903,438 | 8,301 | $14,356,100 |
| MI | 9,335,095 | 6,373,986 | $210,469,025 | 75,709 | $134,025,878 | 5,789,307 | 4,181,827 | $138,083,940 | 52,125 | $91,262,828 |
| MN | 6,917,561 | 4,115,298 | $135,887,148 | 44,418 | $80,190,640 | 4,778,527 | 3,062,452 | $101,122,171 | 34,617 | $61,182,745 |
| MO | 8,450,690 | 5,144,440 | $169,869,422 | 58,267 | $104,263,247 | 6,604,378 | 4,132,217 | $136,445,797 | 48,517 | $84,919,500 |
| MS | 732,961 | 388,765 | $12,837,012 | 5,562 | $9,857,983 | 765,508 | 368,334 | $12,162,380 | 5,574 | $9,736,826 |
| MT | 717,168 | 333,979 | $11,027,991 | 4,524 | $8,200,622 | 832,422 | 399,583 | $13,194,226 | 5,364 | $9,570,088 |
| NC | 6,934,829 | 4,410,618 | $145,638,613 | 58,130 | $106,377,922 | 5,612,739 | 3,576,545 | $118,097,516 | 48,670 | $87,274,316 |
| ND | 353,133 | 205,789 | $6,795,142 | 2,785 | $4,869,773 | 282,763 | 158,344 | $5,228,514 | 2,300 | $3,987,402 |
| NE | 1,715,474 | 1,087,756 | $35,917,689 | 12,961 | $23,046,490 | 1,146,962 | 701,353 | $23,158,687 | 8,805 | $15,372,680 |
| NH | 1,260,942 | 677,362 | $22,366,497 | 9,492 | $16,337,296 | 868,003 | 424,733 | $14,024,675 | 6,337 | $10,839,979 |
| NJ | 10,012,053 | 9,047,674 | $298,754,195 | 97,920 | $174,715,275 | 5,879,664 | 5,544,253 | $183,071,244 | 62,092 | $109,943,507 |
| NM | 1,978,580 | 1,117,697 | $36,906,356 | 12,951 | $23,064,881 | 2,193,598 | 1,266,974 | $41,835,489 | 14,892 | $26,037,095 |
| NV | 4,485,093 | 2,315,559 | $76,459,764 | 24,425 | $42,515,540 | 18,825,925 | 10,552,871 | $348,455,811 | 107,114 | $188,317,362 |
| NY | 19,072,936 | 12,436,601 | $410,656,570 | 153,344 | $272,805,164 | 14,983,837 | 10,307,080 | $340,339,784 | 130,296 | $228,296,662 |
| OH | 7,706,315 | 5,082,475 | $167,823,327 | 71,452 | $130,007,161 | 4,952,797 | 3,317,945 | $109,558,537 | 49,135 | $87,646,283 |
| OK | 2,348,490 | 1,467,594 | $48,459,968 | 19,212 | $34,315,434 | 1,820,950 | 1,057,624 | $34,922,742 | 14,027 | $24,594,267 |
| OR | 5,154,827 | 2,308,448 | $76,224,962 | 27,878 | $51,316,094 | 3,822,460 | 1,660,692 | $54,836,058 | 20,841 | $37,468,869 |
| PA | 10,074,097 | 7,372,911 | $243,453,532 | 95,258 | $174,092,530 | 6,657,533 | 5,081,393 | $167,787,608 | 68,003 | $121,000,084 |
| PR | 1,578,398 | 644,152 | $21,269,915 | 7,063 | $13,359,652 | 2,567,437 | 1,340,431 | $44,261,017 | 13,290 | $23,616,198 |
| RI | 2,193,512 | 1,359,158 | $44,879,405 | 18,532 | $32,977,033 | 1,590,285 | 957,640 | $31,621,288 | 13,783 | $24,170,539 |
| SC | 1,673,135 | 1,268,943 | $41,900,491 | 18,399 | $33,451,240 | 2,197,610 | 1,542,610 | $50,936,981 | 23,485 | $41,801,629 |
| SD | 387,393 | 231,111 | $7,631,288 | 3,400 | $5,961,878 | 341,803 | 197,920 | $6,535,334 | 3,038 | $5,286,978 |
| TN | 4,812,384 | 2,840,669 | $93,798,884 | 36,124 | $65,259,126 | 4,407,419 | 2,560,264 | $84,539,919 | 33,599 | $59,719,899 |
| TX | 25,544,645 | 13,112,709 | $432,981,636 | 157,932 | $280,353,177 | 21,727,708 | 11,549,227 | $381,355,461 | 141,075 | $247,539,614 |
| UT | 3,587,193 | 2,042,423 | $67,440,822 | 21,283 | $38,949,024 | 3,588,622 | 2,108,585 | $69,625,485 | 22,423 | $40,201,511 |

**IMPACT BY STATE ON COMMERCIAL PASSENGER SERVICE, ACCELERATED INVESTMENT, 2012 (continued)**

| | IMPACTS BASED ON ORIGIN AIRPORT 1/ | | | | | IMPACTS BASED ON DESTINATION AIRPORT 2/ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| State | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs | Annual Round-Trip Passengers | Annual Passenger Delay Hours | Annual Passenger Delay Costs | Annual Flight Delay Hours | Annual Flight Delay Costs |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| VA | 10,046,966 | 6,247,227 | $206,283,427 | 83,249 | $153,851,747 | 9,363,928 | 5,878,938 | $194,122,543 | 78,183 | $140,833,313 |
| VI | 242,958 | 60,272 | $1,990,172 | 1,231 | $2,208,018 | 582,960 | 278,162 | $9,184,918 | 4,046 | $6,911,816 |
| VT | 297,562 | 207,380 | $6,847,685 | 3,781 | $6,665,375 | 273,443 | 192,521 | $6,357,038 | 3,867 | $6,738,743 |
| WA | 8,883,441 | 4,018,735 | $132,698,641 | 46,661 | $85,401,857 | 7,126,987 | 3,245,509 | $107,166,693 | 38,521 | $69,565,088 |
| WI | 3,491,105 | 2,364,179 | $78,065,198 | 33,599 | $59,908,510 | 2,080,418 | 1,446,424 | $47,760,936 | 22,459 | $39,448,614 |
| WV | 258,215 | 139,763 | $4,614,963 | 3,264 | $5,867,509 | 209,618 | 110,675 | $3,654,485 | 2,713 | $4,789,124 |
| WY | 142,334 | 67,512 | $2,229,252 | 1,727 | $3,095,671 | 293,274 | 151,395 | $4,999,068 | 3,024 | $5,364,140 |
| Domestic Total | 313,362,838 | 185,519,001 | $6,125,837,427 | 2,209,918 | $3,959,049,340 | 308,374,226 | 182,871,028 | $6,038,401,333 | 2,176,464 | $3,855,012,507 |
| International 3/ | 20,318,283 | 11,063,265 | $365,309,022 | 106,201 | $327,128,463 | 25,306,895 | 13,711,239 | $452,745,115 | 139,656 | $431,165,296 |
| Grand Total | 333,681,121 | 196,582,267 | $6,491,146,448 | 2,316,120 | $4,286,177,803 | 333,681,121 | 196,582,267 | $6,491,146,448 | 2,316,120 | $4,286,177,803 |
| Percent Change 2000 Baseline | 33% | 39% | | 37% | 37% | 33% | 39% | | 37% | 37% |
| Total One-Way Flights | | | | | | | | | | |
| Domestic | 3,737,778 | | | | | | | | | |
| International | 233,413 | | | | | | | | | |
| Total | 3,971,191 | | | | | | | | | |

1/ Impacts are allocated based on the state of the origin airport for U.S. passengers with all foreign passengers combined as "International".
2/ Impacts are allocated based on the state of the destination airport for U.S. and foreign passengers with all U.S. passengers to foreign points combined as "International".
3/ "Origin" results are based on all foreign visitors to the U.S.; "Destination" results are based on U.S. visitors to international points.

Column Notes
(1) Round-trip Passengers = Average of Total Inbound and Outbound Passengers either Originating or Terminating at the State's airports (or international).
(2) Passenger Delay Hours = Average Passenger Delays based on total passenger by routing times average delay (departure and arrival) at 99 CODAS airports weighted by routing and time of day.
(3) Passenger Delay Costs = Passenger Delay Hours x FAA Hourly Value of Travel Time Savings per person (1995 value adjusted to 2000 based on median household income growth in current dollars).
(4) Flight Delay Hours = Conversion of Average Passenger Delays using weighted average of aircraft capacity and standard domestic and international load factors.
(5) Flight Delay Costs = Flight Delay Hours (Total and Airborne) x Average Fuel and Non-Fuel Aircraft Costs (in 2000 dollars ) by Hour (Domestic or International).

Note: Figures include only scheduled commercial passenger aviation. Among those not included are unscheduled commercial aviation and all-cargo, military and general aviation.

# APPENDIX D

## Investment Scenario Capital Costs: Airports and Runways

| | | | Estimated | Discount Rate 7% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Add'l/Extended | Length | Cost | Committed | | Moderate | | Aggressive | | Accelerated | |
| Code | Runway[1] | (Feet) | ($Million) | Completed | NPV | Completed | NPV | Completed | NPV | Completed | NPV |
| ABQ | | | | | | | | | | | |
| ANC | | | | | | | | | | | |
| ATL | 10S/28S | 6,000 | $450.0 | May 2005 | $313.7 | | $313.7 | | $313.7 | | $313.7 |
| BDL | | | | | | | | | | | |
| BNA | 2E/20E | 9,100 | $284.1 T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| BOS | 14/32 | 4,400 | $50.0 | 2005 | $34.7 | | $34.7 | | $34.7 | | $34.7 |
| BWI | 10R/28L | 7,800 | $150.0 | | | | | 2008 | $84.9 | 2007 | $90.8 |
| CLE | 5W/23W | 9,000 | $467.0 | 2002 | $396.6 | | $396.6 | | $396.6 | | $396.6 |
| CLT | 18W/36W | 9,000 | $140.0 | 2003 | $111.1 | | $111.1 | | $111.1 | | $111.1 |
| CVG | 18R/36L | 8,000 | $233.0 | Dec 2005 | $156.1 | | $156.1 | | $156.1 | | $156.1 |
| DAY | | | | | | | | | | | |
| DCA | | | | | | | | | | | |
| DEN | 16R/34L | 16,000 | $160.0 | 2003 | $127.0 | | $127.0 | | $127.0 | | $127.0 |
| DFW | 18R/36L | 10,100 | $367.3 | 2005 | $254.6 | | $254.6 | | $254.6 | | $254.6 |
| DTW | 4/22 | 10,000 | $116.5 | 2001 | $105.9 | | $105.9 | | $105.9 | | $105.9 |
| EWR | | | | | | | | | | | |
| FAI | | | | | | | | | | | |
| FLL | Extend 9R/27L | 3,800 | $300.0 | | | 2005 | $208.0 | | $208.0 | | $208.0 |
| HNL | | | | | | | | | | | |
| HOU | | | | | | | | | | | |
| HPN | | | | | | | | | | | |
| IAD | 12R/30L | 9,900 | $217.0 | Jan 2006 | $144.6 | | $144.6 | | $144.6 | | $144.6 |
| IAD | 1L/19R | 11,500 | $200.0 | | | | | Dec 2011 | $89.3 | 2007 | $121.1 |
| IAH | 8L/26R | 9,900 | $130.0 | 2003 | $103.2 | | $103.2 | | $103.2 | | $103.2 |

## Investment Scenario Capital Costs: Airports and Runways (continued)

| Code | Add'l/Extended Runway[1] | Length (Feet) | | Estimated Cost ($Million) | | Discount Rate 7% | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Committed | | Moderate | | Aggressive | | Accelerated | |
| | | | | | | Completed | NPV | Completed | NPV | Completed | NPV | Completed | NPV |
| IAH | 9R/27L | 9,900 | | $284.1 | T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| IND | 5R/23L | 9,100 | | $80.0 | | | | | | 2008 | $45.3 | 2007 | $48.4 |
| JFK | new 4R/22L S of and indep. of cur. 4R/22L | 10,200 | a | $284.1 | T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| LAS | | | | | | | | | | | | | |
| LAX | new 7R/25L 3400' S of cur. 7R/25L, or 6L/24R 3400' N of cur. 6L/24R | 10,000 | a | $284.1 | T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| LGA | 4L/22R N of and indep. of 4/22 | 7,000 | a | $284.1 | T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| MCI | | | | | | | | | | | | | |
| MCO | 17L/35R | 9,000 | | $115.0 | | 2003 | $91.3 | | $91.3 | | $91.3 | | $91.3 |
| MDW | | | | | | | | | | | | | |
| MEM | 18R/36L [2] | 10,600 | a | $103.0 | | 2001 | $93.6 | | $93.6 | | $93.6 | | $93.6 |
| MIA | 8/26 | 8,600 | | $206.0 | | 2002 | $174.9 | | $174.9 | | $174.9 | | $174.9 |
| MSP | 17/35 | 8,000 | | $490.0 | | 2003 | $388.9 | | $388.9 | | $388.9 | | $388.9 |
| MSY | 18/36 | 7,600 | | $400.0 | | | | | | 2010 | $197.7 | 2007 | $242.2 |
| OGG | | | | | | | | | | | | | |
| ONT | | | | | | | | | | | | | |
| ORD | 9N/27N | 9,200 | a | $284.1 | T | | | | | 2008 | $160.8 | 2007 | $172.0 |
| PBI | | | | | | | | | | | | | |
| PDX | | | | | | | | | | | | | |
| PHL | Extend 8/26 | 4,500 | a | $284.1 | T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| PHX | | | | | | | | | | | | | |
| PIT | 10S/28S | 8,600 | | $150.0 | | | | 2006 | $97.2 | | $97.2 | | $97.2 |

## Investment Scenario Capital Costs: Airports and Runways (continued)

| | | | | Discount Rate | 7% | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Add'l/Extended | Length | Estimated Cost | Committed | | Moderate | | Aggressive | | Accelerated | |
| Code | Runway[1] | (Feet) | ($Million) | Completed | NPV | Completed | NPV | Completed | NPV | Completed | NPV |
| RDU | 5W/23W | 8,000 | $284.1 T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| SAN | | | | | | | | | | | |
| SAT | 12N/30N | 8,500 | $400.0 | | | | | 2012 | $172.7 | 2007 | $242.2 |
| SEA | 16/34 | 8,500 | $760.0 | 2006 | $492.3 | | $492.3 | | $492.3 | | $492.3 |
| SFO | new 10L/28R NE of and indep. of cur. 10L/28R | 12,000 a | $284.1 T | | | | | 2008 | $160.8 | 2007 | $172.0 |
| SJC | | | | | | | | | | | |
| SJU | | | | | | | | | | | |
| SLC | | | | | | | | | | | |
| STL | 12R/30L | 8,600 | $850.0 | 2006 | $550.6 | | $550.6 | | $550.6 | | $550.6 |
| TEB | | | | | | | | | | | |
| TPA | 17/35 | 10,160 | $284.1 T | | | | | 2012 | $122.6 | 2007 | $172.0 |
| **Total** | | **292,560** | **$9,376.0** | **16 Runways** | **$3,539.0** | **18 Runways** | **$3,844.1** | **33 Runways** | **$5,736.7** | **33 Runways** | **$6,309.0** |

1 New runway number unless otherwise indicated. ATA improvement designations in consultation with airports supersede those of FAA from ACE. Runway extensions excluded unless noted otherwise.

2 ACE shows reconstruction and extension of Runway 18C/36C.

a Assumed.

T Detailed costs were not available from FAA. The average of FAA runway cost estimates was employed to make these estimates.

Sources: OPSNET, 2000, US DOT, FAA; *FAA Aviation Capacity Enhancement Plan, Year 2000 (ACE)*, US DOT, FAA; *Airport Capacity and Delay Advisory Circular,* AC: 150/5060-5, 9/23/83, US DOT, FAA; *Airport Capacity Benchmark Report 2001*, US DOT, FAA; Air Transport Association of America, Inc.

# APPENDIX E

# The Authors

## DRI·WEFA, Inc.

**DRI·WEFA**, a Global Insight company, was created in May 2001 from the integration of DRI and WEFA, two of the most respected economic information companies in the world. DRI and WEFA had many complementary capabilities. Bringing together DRI and WEFA was a merger that created the most comprehensive coverage of countries, regions, and industries available from any source. DRI•WEFA brings a common analytical framework and a consistent set of assumptions to these diverse capabilities and products.

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The Campbell-Hill Aviation Group was formed by **Dr. Brian M. Campbell**, as the successor to the aviation practice of Leeper, Cambridge & Campbell, Inc. (LCC), of which Dr. Campbell was co-founder and president. Dr. Campbell has been engaged in aviation consulting continuously since 1982.

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