FAA
Air Traffic Organization

The Economic Impact of Civil Aviation on the U.S. Economy

October 2008

Foreword

Aviation boosts local economies and creates new markets at home and abroad. From the business trips and vacations we take, to the products and services we enjoy, aviation makes it all happen.

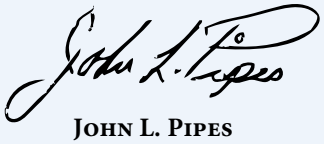
In 2006, aviation accounted for just over $1.2 trillion in economic activity, contributing 5.6 percent to the U.S. economy. More importantly, aviation provides jobs to hardworking Americans. Eleven million Americans were employed in aviation-related fields in 2006, resulting in $369 billion in earnings.

FAA's Air Traffic Organization (ATO) is committed to providing the safest and most efficient air transportation system possible. While factors such as the rising price of fuel and a sluggish economy may be slowing air traffic growth in the short run, we fully anticipate that long-term trends will reassert themselves. These trends point to significant increases in passenger demand, and the emergence of new and different types of airborne vehicles.

We intend to use this time to fully transform our infrastructure to meet the future growth and the industry's dynamic requirements. Our plan is the Next Generation Air Transportation System (NextGen). As we continue to implement NextGen, proper safety improvements and careful investment is an essential priority.

While meeting the challenge, the ATO is committed to operating more like a business. This means that ATO is dedicated to prioritizing strategies, managing costs, and producing results with greater efficiency.

This report is a detailed discussion of civil aviation's contribution to the U.S. economy. With the right planning, the right programs and the dedication of ATO's employees, we are continuing to improve America's aviation system for future generations to come.



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Spurring American Commerce

Civil aviation contributes in unique and significant ways to U.S. commercial interests and activities worldwide.

• **In 2006, almost 40 billion** revenue ton-miles of freight traversed American skies.

• **The U.S. continues** to be the world's leader in commercial jet manufacturing with the Boeing Company reporting 1,044 orders at a value of $115 billion (at list prices) in 2006. Boeing ended the year with a 57 percent market share by units and 63 percent market share by value.

• **American and international** passengers and goods flow over an air transportation network that links the U.S. to 145 foreign points-of-entry with regularly scheduled, non-stop service.

Leading Other Sectors into a New Era

In the new millennium, we will continue to look to our vast skies for solutions to transportation constraints. With continuing innovation and energy, there will be further beneficial effects for passengers and for industries that rely directly on the air transport network, such as tourism and freight. More generally, the highly capital intensive civil aviation industry will continue to attract attention and investment as the services it provides distribute goods and services throughout the broader economy.

• **In 2006, U.S. airspace** handled over 738 million passengers and almost 50,000 flights per day.

• **U.S. Commercial Air Carriers'** growth is expected to average 3.0 percent annually between 2008 and 2025.

Supporting Economic Performance and Growth

Civil aviation promotes and relies upon technological innovation. Jobs in this sector tend to require high skill sets that foster intellectual and human capital formation, benefiting the entire economy.

In 2006, civil aviation activity within the overall economy contributed:

- **11 million jobs,**
- **$1.2 trillion in economic activity, and**
- **5.6 percent of the gross domestic product (GDP).**

The growth of civil aviation activity is intertwined and closely related to developments in the overall U.S. economy.

OVER RECENT DECADES, aviation has become an accepted part of everyday life, and civil aviation is now a vital component of the national and global transportation system. But however pervasive aviation becomes, in nearly all cases air transportation serves as a means for achieving some other end, such as a family visit, a client meeting or an overnight delivery of a much-needed component. For this reason demand for aviation services is termed a *derived* demand which is shaped to a significant degree by the underlying consumer preferences for the goods, services and activities made available through the use of air transportation. This report summarizes estimates of the impact and role of civil aviation within the U.S. economy in 2006 and also discusses changes and trends that have occurred in these estimates over the past few years.

The growth of civil aviation activity is intertwined and closely related to developments in the overall U.S. economy. As GDP rises, so too does the demand for all modes of transportation, including air transportation. Thus, the growth in air traffic demand and capacity is in large part a direct consequence of a vital and growing economy. Figure 1 illustrates the close tie between overall U.S. economic growth and the demand for scheduled passenger air service over the past two decades. However, the downturn in aviation activity around the time of the 9/11 attacks shows that industry-specific factors also matter for year-to-year growth patterns.

In 2007, annual revenue passenger miles (RPM) for commercial air carriers, a commonly used measure of demand for scheduled passenger service, were roughly 842 billion, while the capacity or supply provided by scheduled airlines, which is measured by available seat miles (ASM), increased to approximately 1,060 billion.[1] Although capacity has expanded slightly, the average airfare has increased slightly and annual RPM grew at a slightly faster rate.

In addition to the growth in commercial passenger service, air cargo has also experienced considerable growth. Between 2002 and 2007, air cargo carriers responded to a surge in the demand for the air transportation of freight. In 2007, U.S. carriers moved 39.9 billion ton-miles of freight, an increase of 0.3 percent of total revenue ton miles (RTM) compared to 39.8 billion in 2006[2] and compared to 30.5 billion RTMs in 2002, a total increase of 30.7 percent.

International trade is an important factor for the growth in air transportation. The nation's trade balance is based on the value of goods and services being transported to and from the U.S. The trade balance is the difference in dollars between U.S. imports and U.S. exports in dollars, and is a concept that can refer either to aggregate trade flows or to disaggregated flows within specific commodities or industries. Trade balance measures are significant, not only as statements of the volume and composition of trade, but because these flows set the pace of demand for the transport of cargo.

For the U.S., the value of the top five imported commodities greatly exceeds the value of the top five exports.[3] Figure 2 shows that the dollar value of oil imports alone is double the total value of the top five U.S. exports. However, it is important to note that as in most recent years, aerospace products and parts

[1] Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, www.bts.gov
[2] Ibid
[3] United States International Trade Commission (USITC) www.usitc.gov

Figure 1 **Real GDP and Demand for Air Travel**

Source: Bureau of Economic Analysis and DOT

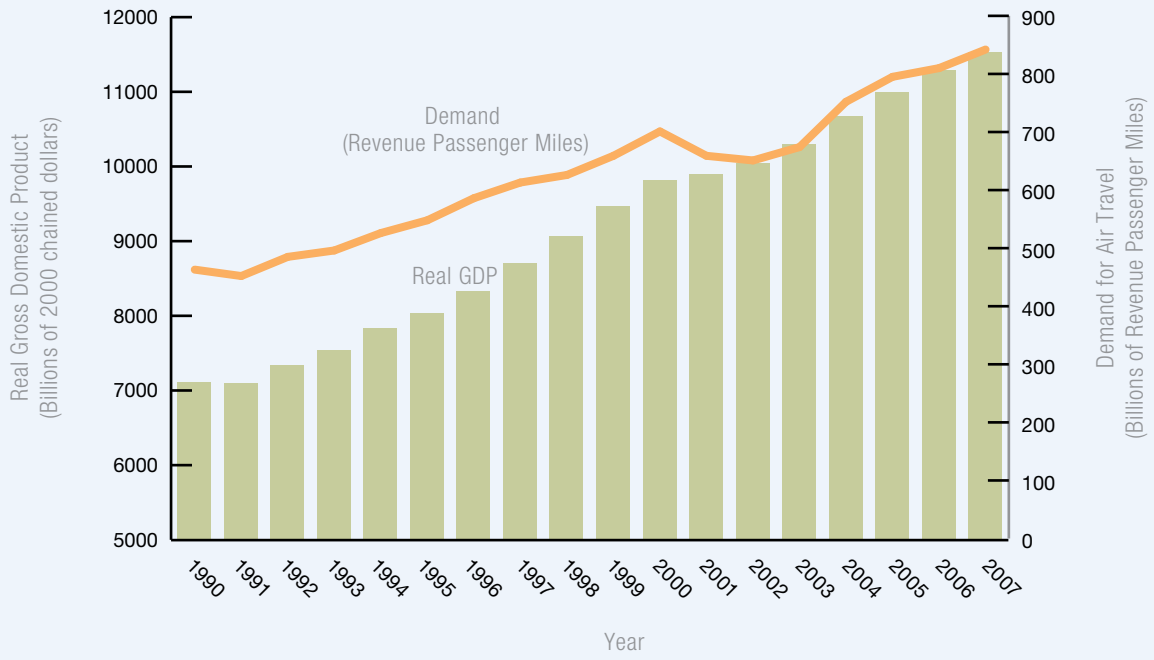
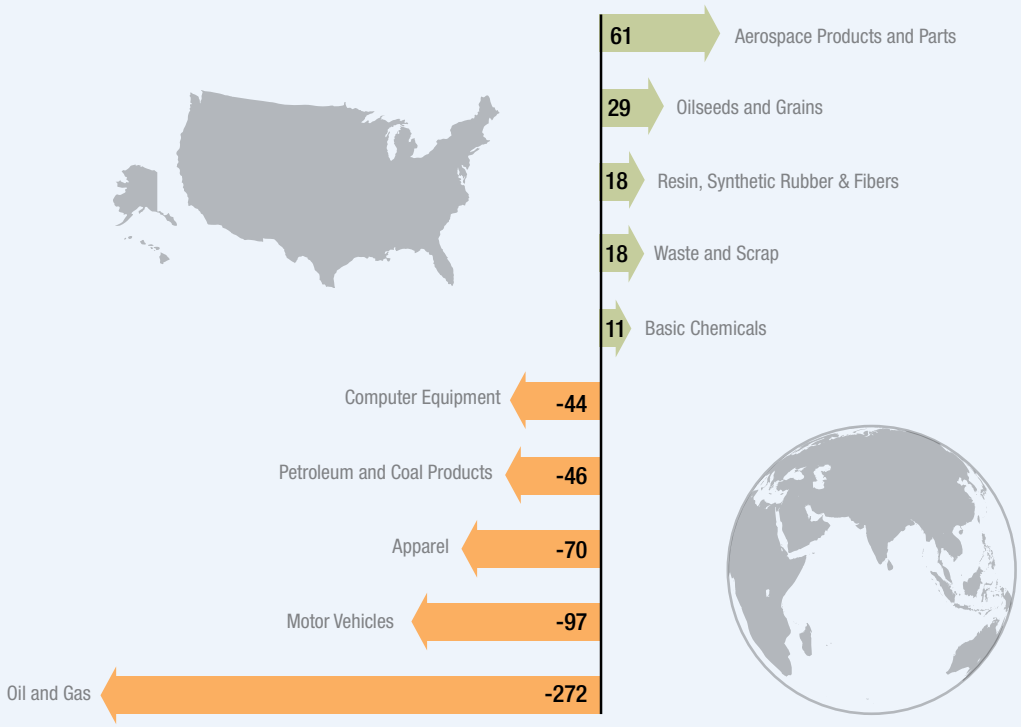


Figure 2 **U.S. Trade Balance by Industry, 2007 – Best Five vs. Worst Five** | Billions of Dollars

Source: Bureau of Labor Statistics



made up the highest contributor to the value of U.S. exports in 2007.

The air transportation sector has not only grown in the U.S., but the world over. The International Air Transport Association (IATA) reports that scheduled carriers' worldwide revenues were $452 billion in 2006 compared to $413 billion in 2005.[4] The International Civil Aviation Organization (ICAO) reports that in 2006, 2 billion passengers and 40 million tons of cargo were transported around the world which is an increase from 2005.[5] U.S. aviation manufacturers are seizing the opportunity provided by this growth to cultivate sales and business relationships abroad, contributing further to economic growth at home.

For example, the U.S. government's export-credit agency. The Export-Import Bank of the United States (Ex-Im Bank), contributes to the financing for international purchases of U.S. made goods and services. The bank's goal is to facilitate and increase U.S. exports, thereby supporting U.S. jobs and manufacturing capacity. In FY 2006, Ex-Im Bank authorized $4.5 billion in loan guarantees to support the export of 79 U.S. manufactured, large commercial aircraft and 10 spare engines to a total of 19 airlines and one aircraft leasing company located in 17 different countries (Table 1).[6] In that same year, the bank had a credit exposure of $24.4 billion in air transport related goods – 42.3 percent of the agency's total credit exposure.

Since 2003, the price of fuel has risen beyond expectations, and today the cost of fuel is the primary concern of all aircraft operators. By 2007, jet fuel prices had reached record levels and this trend continued into the first half of 2008. As the price of fuel rises, airlines and other operators face higher operating costs, which has encouraged airlines to find ways to become more fuel efficient. The data in Figure 3 reflects the fact that more passengers and freight are being transported per gallon of fuel burned as airlines continue to improve fuel efficiency (RTMs per gallon of fuel). Unfortunately, continued increases in fuel prices eat away at these efficiency improvements as quickly as they can be made. In response to these continued fuel price trends, airlines are beginning to alter their daily operations. Many carriers have begun to reduce flight schedules and increase each flight's load factor by trying to accommodate additional passengers on each flight. Many analysts believe that the price of oil will remain at high levels and that fuel costs will therefore continue to be a significant factor driving industry behavior for years to come.

[4] IATA Financial Forecast, June 2008
[5] ICAO, Press release PIO 13/07, 21 December, 2007
[6] Export-Import Bank of the United States, FY 2006 Annual Report, pg. 14

Figure 3 **Fuel Efficiency vs. Fuel Prices (U.S. Passenger and Cargo Airlines)**

Source: BTS and EIA

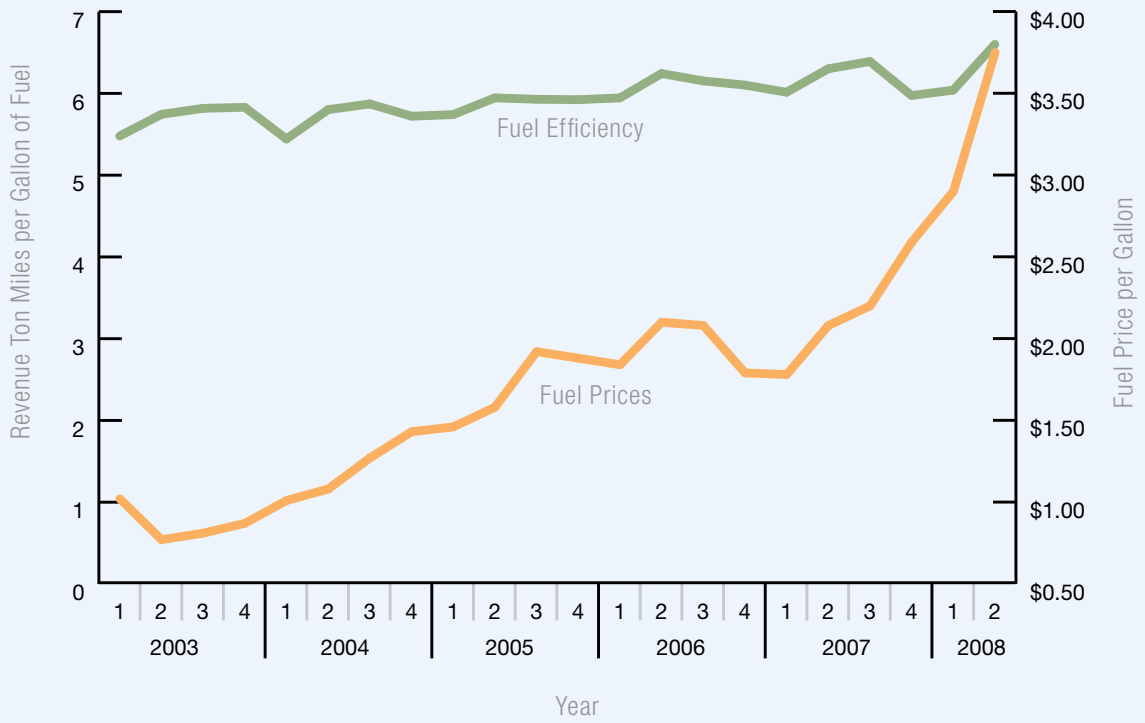


Table 1 **FY 2006 Loans and Long-Term Guarantees Authorizations**

PRODUCT	LOANS ($ Millions)	LONG-TERM GUARANTEES ($ Millions)
Commercial Aircraft and Spare Engines	—	1,798
Commercial Aircraft	—	2,710
Executive Aircraft	—	31
Helicopters and Spare Parts	41	—
New Airport Construction	4	—
Total	**45**	**4,539**

NextGen will be a source of further economic productivity improvements as the industry moves toward greater reliance on digital and automated services…

IN ECONOMIC ANALYSIS, productivity refers to the efficiency with which an economy's productive inputs are utilized to produce economic goods and services. Improvements to productivity, especially labor productivity, is one of the most important sources of economic growth. Economists at the Bureau of Labor Statistics (BLS) estimate changes in productivity by examining year to year changes in the ratio of output to inputs or factors of production (e.g., output per hour of labor). Changes in productivity reflect changes in how inputs are utilized in the production process, and include changes in technology, worker skills, capital utilization and economies of scale, among other things. Measures of productivity in the economy provide a quantitative picture of overall economic efficiency and its sources.

Two measures of productivity that BLS frequently uses are labor productivity and multifactor productivity (MFP). Labor productivity refers to the quantity of output produced per unit of labor input. MFP goes beyond labor productivity to include the effects of intermediate purchases and capital. Both labor productivity and MFP consider the contributions of research and development (R&D), new technologies, economies of scale, managerial skill and changes in the organization of production. However, multifactor productivity is a more comprehensive measure of productivity, due to the broader range of productive inputs considered in its calculation.

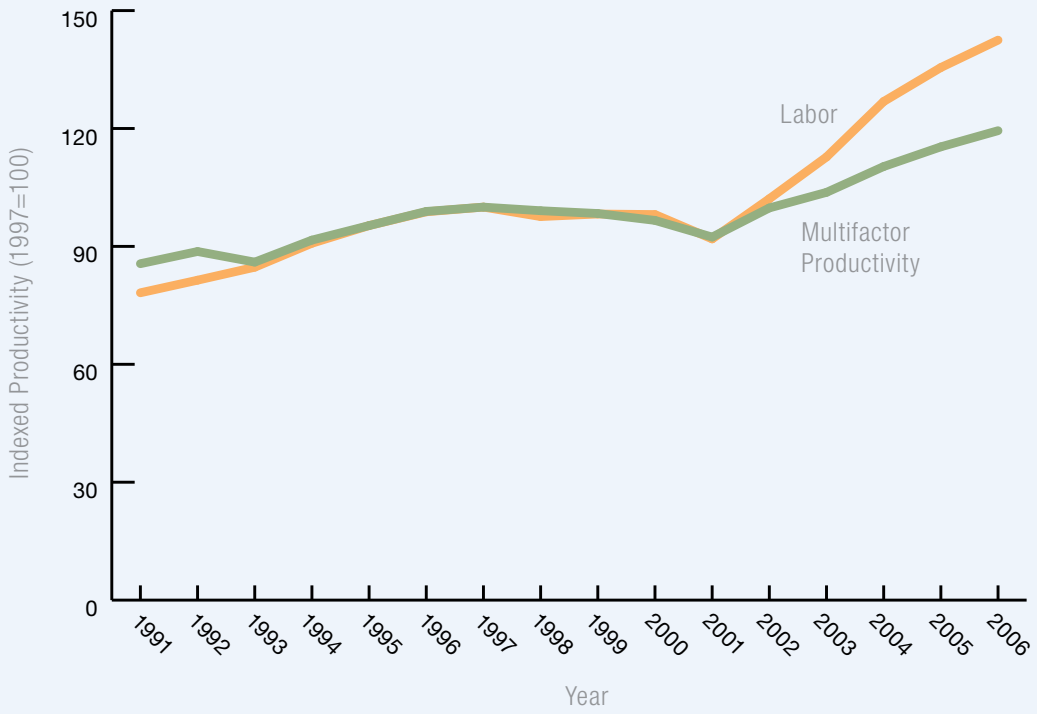
BLS publishes productivity data series for a variety of U.S. industries and sectors. For the air transportation industry, output is calculated using a weighted sum of passenger-miles and freight ton-miles for both domestic and international services; the weights are created from the revenue figures associated with each of the respective components. Labor productivity is measured by taking the ratio of output to the sum of labor hours devoted to the production of the weighted output sum.

Similarly, MFP for the air transportation industry is measured by taking the ratio of output to the combined inputs (labor, capital and intermediate purchases) devoted to the production of that output. Output is the same as that used in the labor productivity measure. The MFP measure accounts for the contribution of all of the physical inputs to output growth; the remaining output growth is attributed to increases in productivity of the input, i.e. technical change. The intermediate purchases input is measured using the aggregation of real values for 13 items that include materials, fuels, electricity and purchased services. Finally, the capital input measure is comprised of aircraft-related capital, non-aircraft capital and inventories of parts and supplies; the components are aggregated into an overall measure of capital by using weights based on factor income shares.

Productivity in the air transportation industry, measured using data provided to government regulators by the Form 41 air carriers, has shown an overall increase in both measures over the years 1990 to 2006, as shown in Figure 4, contributing also to overall U.S. productivity growth. Growth in both productivity measures flattened in the late 1990's and

Figure 4 **Trends in Air Transport Productivity**

Source: Bureau of Labor Statistics



fell sharply in the immediate aftermath of the 9/11 terrorist attacks. However, in the years following the attacks the challenges that the industry continues to face have necessitated swift increases in productivity to ensure survival and even profitability. Labor productivity has outpaced MFP every year since 2001, as airlines have made painful adjustments to both the size of their labor forces and the compensation received by the remaining workforce.

In the coming years, the Next Generation Air Transportation System (NextGen) will be a source of further economic productivity improvements as the industry moves toward greater reliance on digital and automated services for air-to-ground communications, navigation and surveillance. The objective of NextGen is to increase the capacity, safety and efficiency of the air transportation system in order to enable continued growth in air transportation services. The technologies and concepts to bring this about are being put into place today. By making these investments, the FAA is setting the stage for continued productivity improvements. These productivity gains will rely on capabilities provided by such technologies as:

1. Automatic Dependent Surveillance - Broadcast (ADS-B) will enable both pilots and controllers to see the same real-time displays of air traffic, substantially improving safety while increasing system capacity.

2. System Wide Information Management (SWIM) will reduce redundancy and better facilitate information sharing. It will also enable new and faster modes of decision making.

3. NextGen Data Communications technologies will allow for the exchange of routine controller-pilot messages and clearances via digital data transmission. This will enable controllers to safely handle more traffic, improving air traffic controller productivity while enhancing the capacity and safety of the nation's airspace.

The current air traffic control system will not be able to manage the anticipated growth in the system. NextGen is the solution.

BY 2025, U.S. AIR TRAFFIC is predicted to increase up to two times over the current level. The existing air traffic control system will not be able to cope with growth on such a scale. NextGen is the solution for this shortfall between the capabilities of the existing air traffic system and the level of flight activity that forecasters anticipate for these future years. NextGen will increase the system's adaptability, enabling aircraft to quickly adjust to changes in factors affecting flight itineraries, such as weather, traffic congestion, aircraft position, flight trajectory patterns and security issues. By 2025, all aircraft and airports in U.S. airspace will be a part of the NextGen network, able to share information in real time as necessary to improve efficiency and safety while accommodating the predicted increase in air transportation demand.

An undertaking of the magnitude of NextGen will require a significant investment by both the U.S. government and private enterprise. FAA's current reauthorization request for the NextGen investment portfolio is $4.6 billion over the next 5 years. These key investments will enable FAA to transform from the current ground-based air traffic control system to a satellite based system. That total is made up of $4.3 billion in ATO capital and $300 million in research.

Based on the current NextGen plan, major investments are also expected for the period from FY 2013 to FY 2017. Total FAA spending over the first 10 years is expected to range from $8 billion to $10 billion, and estimates through 2025 range from $15 billion to $22 billion in FAA investments. Such an infrastructure project will, without doubt, have a significant economic impact on the U.S. for years to come in regards to the increased productivity generated for beneficiaries of the system and the financial commitment to put the system in place.

The cost of not implementing NextGen could lead to significant losses in productivity in the skies and in the economy. By 2022, the FAA estimates that failure to implement NextGen could cost the U.S. economy $22 billion annually in lost economic activity. Should no action be taken, the cost to the economy could grow to over $40 billion by 2033.[7] An FAA simulation shows that even as early as 2015, without some of the initial elements of NextGen, U.S. airspace will experience delays far greater than what we are seeing today.

The importance of aviation cannot be overemphasized to keep the economy vital and healthy in the future. The next section reports the results of economic impact of civil aviation on the U.S. economy for 2006.

[7] Joint Planning and Development Office, Making the NextGen Vision a Reality: 2006 Progress Report to the Next Generation Air Transportation System Integrated Plan. pg. 8

Methodology and Results

THIS REPORT ESTIMATES the economic impact of civil aviation on the U.S. economy. Civil aviation has far-reaching economic impacts. The FAA's ATO carefully and conservatively attempts to capture all of the economic activity generated by direct and indirect air transport of passengers and cargo. A special effort is also made to include the important contributions of general aviation (GA) to the economy. GA operates in every community of the U.S.; however, exact data is sparse on the vital economic activity generated by this sector of the aviation community. Numerous survey studies and special attention to GA's operations were used to estimate the economic contribution.

The total economic impact of an industry is a summation of primary impacts (direct and indirect) and induced impacts of that particular industry. The definition is standard for economic impact studies and is used to accommodate aviation's unique economic contribution to the national economy. The data used to measure the primary economic impacts of civil aviation are collected from reliable government and national studies. This study estimates those impacts by looking at industry output, earnings and jobs. This data is entered into the Bureau of Economic Analysis Regional Input-Output Modeling System (RIMS- II) to derive the secondary impacts and then primary and secondary impacts are added together to measure the total impact to the U.S. economy.

Types of Economic Impacts

PRIMARY IMPACTS

The primary impacts of aviation are a summation of direct and indirect impacts of civil aviation on the U.S. economy. For example:

- Airlines and supporting services
- Aircraft, engines and parts manufacturing
- Air-visitor travel and other trip-related expenditures

Direct:

Direct impacts of civil aviation are created through manufacturing and air transportation activities as measured by the employment, payroll and sales/output associated with the following industries/entities:

- Scheduled and non-scheduled commercial airlines (passenger and cargo) and air couriers.
- Airport and aircraft service providers (including FAA and other government services)
- Air cargo service providers
- GA (non-commercial) aircraft operators (including flight schools)
- Aircraft and components manufacturing

Indirect:

Indirect impacts are derived from the expenditures of air passengers, in addition to airfares and associated charges. Visitor expenditures translate into sales, payroll and employment for the following industries:

- Traveler accommodations (hotels, motels, etc.)
- Food and beverage providers (restaurants, bars, fast-food outlets and stores)
- Arts, entertainment and recreation (museums, theatres and amusement parks)
- Visitor travel services (sightseeing and other tourist services and travel agencies)
- Ground transportation (to/from airport)
- Other on-and-off airport purchases of goods and services (souvenirs)

INDUCED IMPACTS

Induced impacts result from expenditures made by the direct and indirect impact industries to supporting businesses and entities, as well as the spending of direct and indirect employees. Induced impacts capture the secondary impacts to the economy as direct/indirect sales, and payroll impacts are circulated to supporting industries through multiplier effects.

Measures of Economic Impacts

THE RIMS-II MODEL identifies primary and induced effects. The model uses output, earnings and payroll to measure the effects, which this study uses to calculate the impact of civil aviation.

Output:
The value of goods and services produced in the economy.[8]

Earnings:
Wages and salaries, other labor income and proprietors' income paid to all employed persons that deliver final demand output and services.

Jobs:

The number of people employed in the industry that provide civil aviation services, manufacture aircraft and aircraft engines, plus other industries that support the civil air transportation sector.

Results

THE STUDY EVALUATES the U.S. civil aviation's contribution to the U.S. economy by estimating the value of civil aviation and comparing it to GDP. GDP is a national statistic that measures the size of the economy by accounting for all final goods and services produced in a given country. The direct output of the air transport sector includes commercial aviation, GA and aircraft manufacturing, repair and development, was valued at approximately $229 billion in 2006. This value cannot be directly measured against GDP as it is inclusive of intermediate goods and services.

Other than the total direct output, Table 2 also includes the total impact of output, earnings and jobs. Civil aviation related goods and services (total output) for 2006 accounted for approximately $1,223 billion, which generated well over 10 million jobs, and $369 billion in earnings.

Table 2 **Summary of U.S. Civil Aviation Economic Impacts**
Total Impact by Type – 2006

	OUTPUT ($ Billions)	**EARNINGS** ($ Billions)	**JOBS**
Direct	229	53	1,116,264
Indirect	216	65	2,216,939
Induced	779	250	7,445,137
Total Impacts	**1,223**	**369**	**10,778,340**

[8] Includes the sum of all of the intermediate goods and services needed to produce aviation services plus the induced impacts of increased consumption.

Economic Activity Impacts

TO FULLY UNDERSTAND the effects of commercial and GA services on the U.S. economy, this study provides both an overview and a detailed look at civil aviation by impact type. Using national data sources and studies, the primary direct and indirect impacts as well as induced impacts from the RIMS-II model are shown in Table 3a and 3b.

• **Airline operations account for nearly half** of the primary direct impact in dollar value as seen in Table 3 with $108 billion. Visitor expenditures account for most of the indirect impact with $205 billion. These two primary impacts yield $779 billion in secondary impacts. In the total economic impact, the largest impact is from commercial aviation use ($556 billion of the $1,223 billion) followed by commercial aviation provision.

• **Commercial aviation makes up the bulk** of the impact under civil aviation. Commercial aviation generates $108 billion in direct impacts and $205 billion in indirect impacts, for a total of $313 billion. Total commercial aviation impacts account for 93 percent of civil aviation's total economic impact, followed by GA and airport operations.

• **GA also makes a sizable impact**, as shown in Table 3. GA contributes $14 billion in direct impacts and $4 billion in indirect impacts. Although the total economic impact of GA is less than that of their commercial counterparts, GA contributes $81 billion, which is a significant contribution for non-scheduled service that includes all aircraft activity excluding major airlines and the military. In the United States, GA accounts for more than 5 percent of aviation-related services. GA has access to more than 5,300 public-use airports and a significant number of private airports making it one of the largest users of airports.[9]

To highlight the effects of commercial and GA services on the U.S. economy, aircraft manufacturing impacts are determined for two forms of air transport. Civil aircraft engines and parts manufacturing are also included in the economic impact of aviation. In addition, due to the new industry classifications, express air cargo carriers are identified as a separate category in the national data and thereby are included to better define the impact of civil aviation on the U.S. economy.

Table 4 provides the induced (secondary) impacts of various aviation-related activities. The largest impacts are in the aviation-manufacturing category for both commercial and GA. Jobs in GA are multiplied almost seven times to arrive at the primary impact of 152,674 jobs. In absolute terms, commercial aviation manufacturing generates 763,255 jobs. Visitor expenditures by far have the largest single component of the induced impact, with some $330 billion in revenue and over 3.5 million jobs. In total, this revenue is attributed to visitor expenditures over $500 billion and sustains 5.7 million U.S. jobs.

[9] Aircraft Owners and Pilots Association. (n.d.) There's A Community Airport Near You. Retrieved 20:21, April 2, 2008, from http://www.gaservingamerica.org/Serving_Your_Community/airport_near_you.htm

Table 3a

Civil Aviation by Impact Type ($ Billions) – 2006

PRIMARY DIRECT IMPACTS	
108.2	Airline Operations
21.2	Airport Operations
13.8	General Aviation
60.4	Aircraft Manufacturing
24.9	Air Cargo
228.5	Total Direct Impacts
PRIMARY INDIRECT IMPACTS	
205.2	Visitor Expenditures
4.4	General Aviation Passengers
6.7	Travel Arrangements
216.4	Total Indirect Impacts
SECONDARY ECONOMIC IMPACTS	
427.5	From Direct Impacts
351.0	From Indirect Impacts
778.5	Total Induced Impacts

Table 3b

Civil Aviation by Sector ($ Billions) – 2006

TOTAL ANNUAL ECONOMIC IMPACTS	
Commercial Aviation	
427.7	Aviation Provision
556.0	Aviation Use
158.7	Aircraft Manufacturing
1,142.3	Total Commercial Impacts
General Aviation	
38.0	Aviation Provision
11.4	Aviation Use
31.6	Aircraft Manufacturing
81.1	Total GA Impacts
1,223.4	Total Aviation Annual Impacts

Visitor expenditures by far have the largest single component of induced impact, with some $329.6 billion in revenue and over 3.5 million jobs.

AVIATION ACTIVITY
COMMERCIAL SERVICE
Direct
Airlines
Airport
Aircraft Manufacturing
Air Cargo
Subtotal
Indirect
Visitor Expenditures
Travel Arrangements
Subtotal
Total Commercial Service
GENERAL AVIATION
Direct
General Aviation Operations
Aircraft Manufacturing
Subtotal
Indirect
Visitor Expenditures
Total General Aviation
Total Commercial & General Aviation

Table 4 | **U.S. Civil Aviation Economic Impact Study Detail – 2006**

PRIMARY			INDUCED			TOTAL		
Output ($ Billions)	**Earnings** ($ Billions)	**Jobs**	**Output** ($ Billions)	**Earnings** ($ Billions)	**Jobs**	**Output** ($ Billions)	**Earnings** ($ Billions)	**Jobs**
108.2	23.0	457,000	190.1	62.8	1,678,189	298.3	85.8	2,135,189
21.2	3.4	155,300	37.6	18.7	416,865	58.8	22.1	572,165
50.7	14.1	170,060	108.0	28.5	763,255	158.7	42.6	933,315
24.9	6.4	193,759	45.7	15.8	502,797	70.6	22.1	696,556
205.0	46.9	976,119	381.3	125.7	3,361,107	586.4	172.6	4,337,226
205.2	63.0	2,140,955	329.6	104.0	3,531,764	534.8	167.0	5,672,719
6.7	1.1	30,191	14.4	5.7	169,063	21.1	6.8	199,254
212.0	64.1	2,171,146	344.0	109.7	3,700,826	556.0	173.8	5,871,973
417.0	111.0	3,147,265	725.3	235.4	7,061,933	1,142.3	346.4	10,209,199
13.8	4.7	117,358	24.2	6.2	154,989	38.0	10.9	272,347
9.7	1.9	22,787	21.9	6.3	152,674	31.6	8.2	175,460
23.5	6.6	140,145	46.1	12.5	307,663	69.7	19.1	447,808
4.4	1.3	45,793	7.1	2.2	75,541	11.4	3.6	121,334
27.9	7.9	185,938	53.2	14.7	383,204	81.1	22.7	569,142
444.9	**118.9**	**3,333,203**	**778.5**	**250.1**	**7,445,137**	**1,223.4**	**369.1**	**10,778,340**

Express air cargo has overall increased the standards of living throughout the United States and the world.

THE U.S. GDP WAS $13,195 BILLION in 2006. Total civil aviation economic activity estimated in this study was $1,223 billion and includes intermediate purchases, which are not included in GDP. To compare civil aviation's contribution to GDP, aviation's total economic activity must be adjusted to only represent the final demand for civil aviation. To do this, an analysis of value-added economic activity was completed using data from the Bureau of Economic Analysis. On average, value-added economic activity comprised nearly $741 billion of total economic activity in the U.S. economy in 2006 as we can see in Table 5. Using this estimate, civil aviation's contribution to GDP was 5.6 percent in 2006.

The three measures of the economic impact shown in Table 6 each present a different aspect of the contribution of the sector: the value of the output, the earnings paid to employees and the number of jobs maintained. The primary impact of civil aviation, in terms of output, was $1,223 billion – a significant 7.3 percent year-over-year increase from 2005. Of this value, 93 percent of the output ($1,142 billion) is attributable to commercial air carrier services. Overall, yearly earnings in the sector increased at a slower rate of 7.1 percent for a total of $369 billion in 2006, with 94 percent being contributed to commercial services. Further, employment growth in the sector has remained strong despite outliers in the indirect primary impacts. While GA's contribution to the impact is not large enough to cause significant changes in the aggregated values, it should be noted that GA's

Table 5 | **Contributions to GDP – 2006**

IMPACT TYPE	GDP	
	Amount ($ Billions)	% of Total GDP
PRIMARY IMPACTS		
COMMERCIAL SERVICE		
Direct		
Certified Airlines	65.5	0.5
Airport Operation	12.8	0.1
Aircraft Manufacturing	30.7	0.2
Air Couriers	15.1	0.1
Subtotal	124.2	0.9
Indirect		
Commercial Visitor Expenditure	124.3	0.9
Travel Arrangements	4.1	0.0
Subtotal	128.4	1.0
Total Commercial Service	252.6	1.9
GENERAL AVIATION		
Direct		
General Aviation Operations	8.4	0.1
Aircraft Manufacturing	5.9	0.0
Subtotal	14.2	0.1
Indirect		
General Aviation Visitor Expenditures	2.7	0.0
Total General Aviation	16.9	0.1
Total Primary	269.5	2.0
SECONDARY IMPACTS		
Commercial Service	439.4	3.3
General Aviation	32.2	0.2
Total Secondary	471.6	3.6
Total Impacts	**741.1**	**5.6**

contribution grew at the rate of 14.5 percent according to all three economic performance measures seen in Table 6.

Travel arrangement expenditures showed an across-the-board decrease over 2005 (Table 6). This is due primarily to a shift away from travel agencies to online booking, which is less expensive because it eliminates the agent's commission and the airlines' expenses to maintain call centers. However, this was a contributor to overall higher industry productivity and an important vehicle for achieving cost savings.

Express air cargo is a growth industry that encourages effective networking and collaboration between companies. It has overall increased the standards of living throughout the United States and the world. Many communities within the U.S. strongly promote air cargo development as a means to enhance their ability to attract high-tech industries that prefer to ship their products by air. From 2005 to 2006, the air cargo industry increased by 7.7 percent in its output, earnings change and job change. Air cargo operations can provide a competitive advantage to regional economic development efforts. Efficient air cargo access can provide a tangible marketing tool for attracting new businesses. Developing economies have become major players in the world trade due to growth in the air cargo business.

Express air cargo carries high value finished goods quickly from manufacturer to consumer, cutting inventory costs and driving high levels of customer satisfaction. The primary benefit of these cargo services is that they facilitate the success of other parts of the national and global economy. It enables businesses dependent on fast delivery to customers to locate in regions that are not necessarily close to their market. Express delivery services are increasingly important as they continually boost the competitiveness of companies, assist in winning export markets and encourage investment. Today for example, more than 90 percent of all U.S. zip codes are covered by FedEx express air cargo.

AVIATION ACTIVITY
COMMERCIAL SERVICE
Direct
Airlines
Airport
Aircraft Manufacturing
Air Cargo
Subtotal
Indirect
Visitor Expenditures
Travel Arrangements
Subtotal
Total Commercial Service
GENERAL AVIATION
Direct
General Aviation Operations
Aircraft Manufacturing
Subtotal
Indirect
General Aviation Visitor Expenditures
Total General Aviation
Total Commercial & General Aviation

Table 6 | **U.S. Civil Aviation Economic Impact Comparison - 2005 vs. 2006**

OUTPUT			EARNINGS			JOBS		
2005	2006	Change 05 - 06	2005	2006	Change 05 - 06	2005	2006	Change 05 - 06
275.1	298.3	7.8%	79.1	85.8	7.8%	1,968,933	2,135,189	7.8%
55.4	58.8	5.7%	20.8	22.1	5.7%	539,626	572,165	5.7%
135.1	158.7	14.9%	36.3	42.6	14.9%	739,876	933,315	14.9%
65.2	70.6	7.7%	20.4	22.1	7.7%	643,190	696,556	7.7%
530.8	586.4	9.5%	156.6	172.6	9.3%	3,945,625	4,337,225	9.0%
507.2	534.8	5.2%	158.3	167.0	5.2%	5,379,133	5,672,718	5.2%
21.5	21.1	-1.9%	6.9	6.8	-1.9%	203,096	199,254	-1.9%
528.7	556.0	4.9%	165.3	173.8	4.9%	5,582,229	5,871,973	4.9%
1,059.4	1,142.3	7.3%	321.9	346.4	7.1%	9,527,854	10,209,198	6.7%
32.5	38.0	14.5%	9.4	10.9	14.5%	232,877	272,347	14.5%
30.3	31.6	4.3%	7.8	8.2	4.3%	167,913	175,460	4.3%
62.8	69.7	9.9%	17.2	19.1	10.1%	400,790	447,807	10.5%
11.9	11.4	-4.2%	3.7	3.6	-4.2%	126,447	121,334	-4.2%
74.7	**81.1**	**7.9%**	**20.9**	**22.7**	**7.9%**	**527,237**	**569,141**	**7.4%**
1,134.2	**1,223.4**	**7.3%**	**342.8**	**369.1**	**7.1%**	**10,055,091**	**10,778,340**	**6.7%**

Manufacturing

CIVIL AIRCRAFT MANUFACTURING, in terms of total impact, underwent growth across the board between 2005 and 2006. Output rose 15 percent year-over-year to $190 billion. Tables 7a and 7b show that both earnings and employment increased by the same percentage to $50.8 billion and 1.1 million, respectively. The primary impact saw a 15 percent increase ($8 billion) in the value of output while earnings saw a modest 5 percent gain and employment actually saw a decrease of 2,105 people or 1 percent. While GA saw an increase of nearly 1,000 jobs, cuts on the commercial side of over 3,100 overshadowed this gain to yield the overall decrease. Secondary impact growth was led by earnings, which saw an increase of 20 percent or $6 billion. This was followed closely by a 19 percent increase in employment, which totaled almost 150,000 jobs. The value of output rose by some 15 percent to $130 billion.

With respect to primary economic impact, GA saw an increase in economic activity to $9.7 billion in 2006 and a commensurate increase in the number of jobs. The economic activity per job showed a slight increase even though earnings per job decreased. Higher economic activity per job is a sign of increased productivity even though the revenue per job decreased.

Table 7a | **Civil Aircraft Manufacturing Impact by Type - 2005**

IMPACT TYPE	ECONOMIC ACTIVITY ($ Billions)	EARNINGS ($ Billions)	JOBS
Primary			
Commercial	43.1	13.2	173,164
General Aviation	9.3	2.0	21,788
Total Primary	52.4	15.2	194,952
Secondary	112.9	28.9	766,837
Total Impacts	**165.3**	**44.1**	**961,789**

Table 7b | **Civil Aircraft Manufacturing Impact by Type - 2006**

IMPACT TYPE	ECONOMIC ACTIVITY ($ Billions)	EARNINGS ($ Billions)	JOBS
Primary			
Commercial	50.7	14.1	170,060
General Aviation	9.7	1.9	22,787
Total Primary	60.4	16.0	192,847
Secondary	129.9	34.8	915,929
Total Impacts	**190.3**	**50.8**	**1,108,776**

The emergence of supply chain management techniques and its reliance on "just-in-time" shipping has bolstered the importance of air transport to U.S. manufacturing.

CIVIL AVIATION IS A LARGE SECTOR in the economy, and its impact resonates throughout the economy. Industries that are seemingly unrelated to civil aviation benefit directly or indirectly by spending in the aviation sector. Table 8 reports the distribution of the impact of civil aviation throughout the U.S. Economy by industry group, and illustrates industries that benefits from civil aviation economic activity.

In Table 8, three industry groups stand out as most impacted by civil aviation: Accommodation and Food services, Manufacturing, and Transportation and Warehousing. The impact to the Transportation and Warehousing sector – the smallest of the top three impacts, with output valued at $208 billion – is 2.5 times the impact of the next largest impacted sector in that regard. The contribution of the civil air transport sector to the top three impacted industries was 55 percent of the total impact to U.S. industry at $668.3 billion.

It is no surprise to see the industry group, Accommodation and Food Services, having the highest ranked impact from civil aviation. The emergence of supply chain management techniques and its reliance on "just-in-time" shipping has bolstered the importance of air transport to U.S. manufacturing, which has the second largest impact at $223 billion.

The primary impacts under the aspect of earnings is similar to output with the same top three impacted industries realizing an impact of $196.6 billion, which is 53 percent of the total impact. Overall, the earnings are more evenly distributed between the high and low ends when compared to output.

Civil aviation's impact on jobs differs in that the Administrative and Waste Management Services sector displaces Manufacturing among the top three impacted industries by providing 60,000 more jobs. Consistent with the other two measures, the top three industry groups bore 55 percent of the impact of civil aviation on jobs in the U.S. with a subtotal of 6 million. The total impact of civil aviation in 2006 was approximately 10.8 million jobs. This aspect of the economic impact has the largest spread of the three, with the largest impact (Accommodations and Food Services) employing well over twice as many as the second largest impact (Transportation and Warehousing) with nearly 3.6 million jobs.

Table 8 | **Aviation Impact by Industry – 2006**

INDUSTRY GROUPS	**Output** ($ Billions)	**Earnings** ($ Billions)	**Jobs** (Thousands)
Agriculture, Forestry, Fishing & Hunting	11.9	2.2	138
Mining	12.0	2.2	28
Utilities	19.4	2.9	36
Construction	6.6	2.6	66
Manufacturing	223.0	46.2	780
Wholesale Trade	35.9	12.3	235
Retail Trade	45.4	16.4	727
Transportation & Warehousing	208.0	69.1	1,559
Information	47.1	9.9	170
Finance & Insurance	70.0	21.9	374
Real Estate & Rental & Leasing	87.5	7.0	248
Professional, Scientific & Technical Service	50.0	22.8	418
Management of Companies & Enterprises	18.1	8.0	115
Administrative & Waste Management Service	49.5	20.0	840
Educational Services	8.9	4.2	170
Health Care & Social Assistance	54.9	26.3	728
Arts, Entertainment & Recreation	8.7	3.5	168
Accommodation & Food Services	237.3	81.3	3,569
Other Services	29.3	9.8	409
Total Impacts	**1,223.4**	**368.6**	**10,778**

In 2006, the number of visitors from China increased 19 percent over 2005.

ACCORDING TO the U.S. Department of Commerce (DOC), overseas arrivals (excluding Canada and Mexico) totaled 21.7 million in 2006. In that same year, foreign nationals visiting the United States (inbound) contributed approximately $108 billion[10] to our economy. Further, the travel and tourism trade surplus continued, with international travelers outspending U.S. travelers abroad by $8.4 billion.[11] The Office of Travel and Tourism Industries (OTTI) at the DOC constructs comprehensive market profiles on non-U.S. residents traveling to the United States from origin countries. These profiles are based upon data from:

1. Survey of International Air Travelers Program Visitor Arrivals Program (I-94 Form)
2. International Travel Receipts and Payments Program
3. U.S. International Air Travel Statistics Program (I-92 Data)

The Survey of International Air Travelers program provides a comprehensive survey on overseas travel patterns, characteristics and spending patterns on international travelers to and from the U.S., while the U.S. International Air Travel Statistics Program provides data on official U.S. monthly and final overseas visitor arrivals. The third program, International Travel Receipts and Payments, collects data on spending by international visitors to the U.S. and what U.S. residents pay for travel-related goods and services while outside the U.S.

Figure 5.1 reports the number of visitors by five increasingly important U.S. trade partners in 2006: Australia, the United Kingdom (UK), Germany, Japan, and China. Most notable is the rapidly increasing number of arrivals from China, reflecting the increasing growth of the Chinese economy. In 2006, the number of visitors from China increased 19 percent over 2005, although China contributes a smaller absolute number of visitors than the other countries in this report.

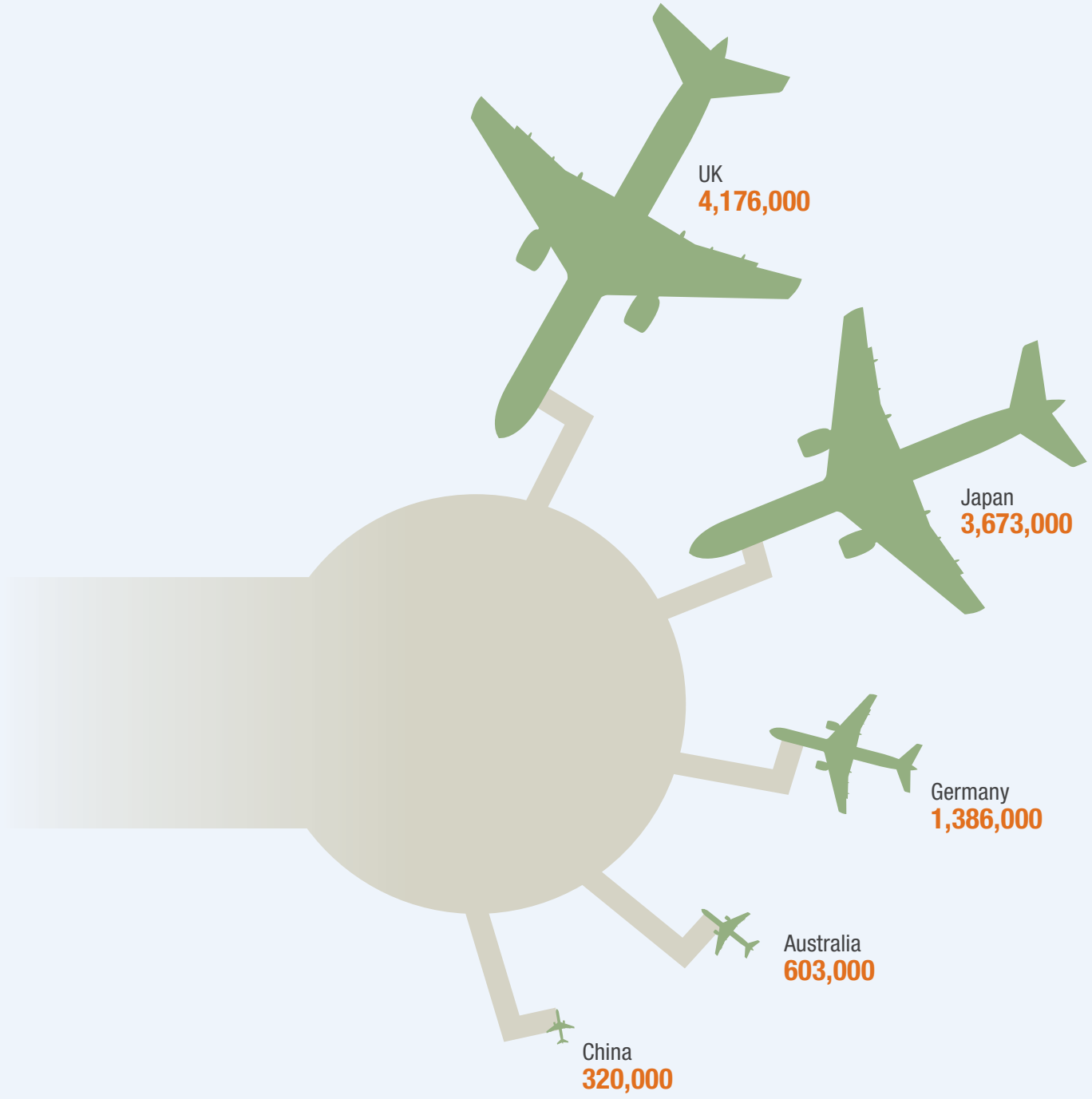
Unlike their counterparts (Figure 5.2), nearly three-quarters of the visitors from China reported the main purpose of their visit was either business (60%) or conference attendance (13%). Most of the other countries' visitors reported leisure and visits to family and friends as the main purposes of their trips to the United States. German visitors reported that major purposes of their trips were business (28%) and conference attendance (5%), a distant second to visitors from China.

Broadly speaking, higher income households have a higher demand for leisure. The OTTI collects data on household income of visitors to the U.S. (Figure 5.3). Relatively short flight times, more flights, an increasingly favorable exchange rate, and competitive fares partially explain why 63 percent of visitors from the UK indicated that leisure was the main purpose for their trip. German and Australian visitors reported slightly lower incomes than those from the UK and reported a lower percentage of leisure travel, but their conference attendance trends were similar.

[10] Foreign spending in the U.S. is classified as an export.
[11] United States Travel and Tourism Exports, Imports, and the Balance of Trade: 2007, U.S. International Trade Administration, March 2008, pg. 4

Figure 5.1 | **2006 Visitor Arrivals by Country**[12]

Source: Department of Commerce



[12] Source: U.S. Department of Commerce, ITA, Office of Travel and Tourism Industries

Figure 5.2 **Main Purpose of Trip – 2006**

Source: Department of Commerce

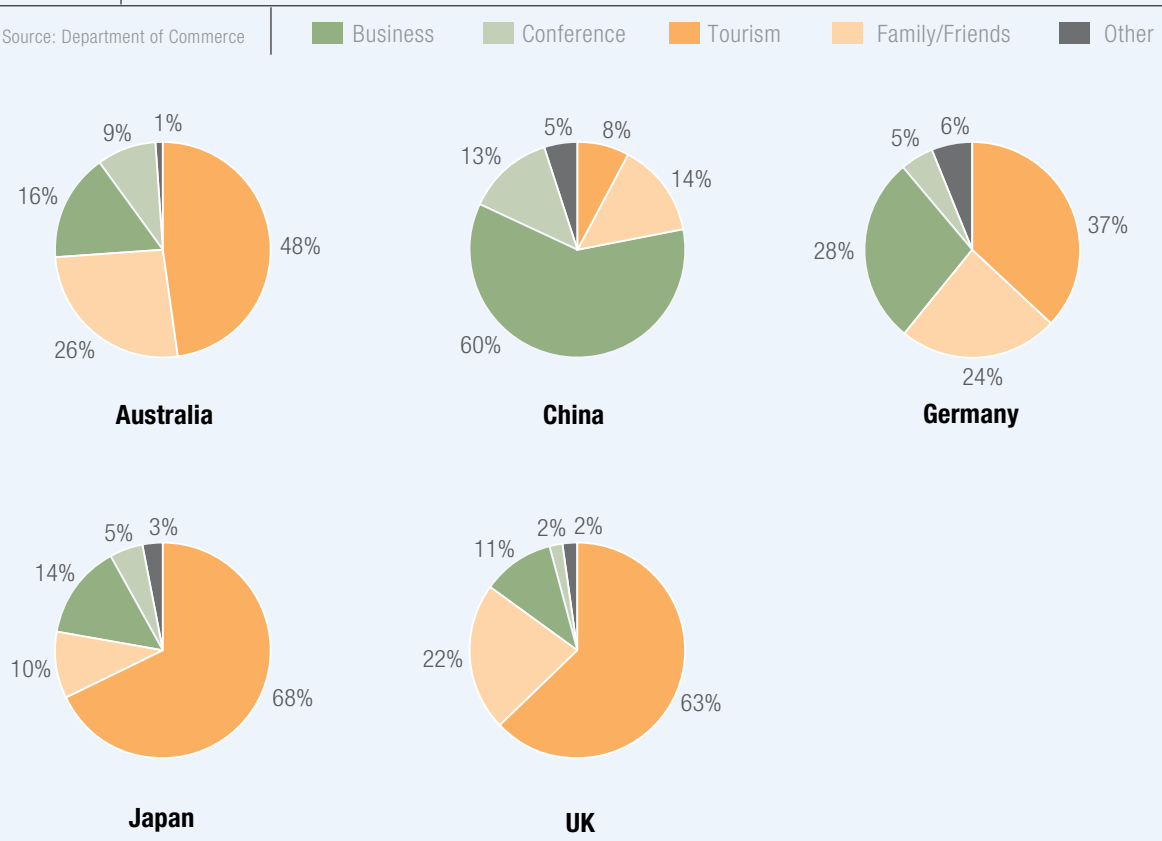
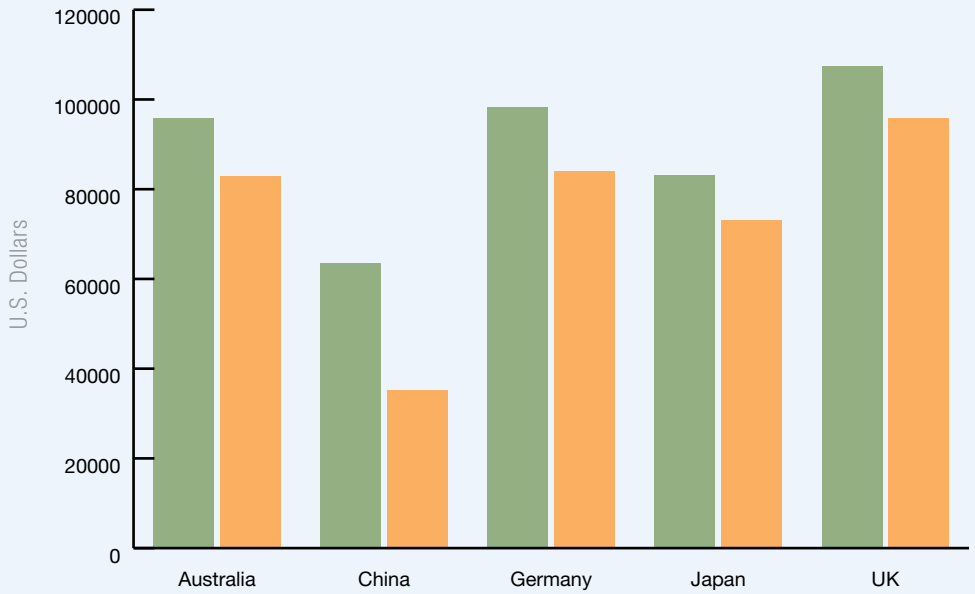


Figure 5.3 **Household Income of International Travellers – 2006**

Source: Department of Commerce



Of the five countries, Japan supplied the largest percentage of leisure-oriented travelers. The relatively high percentage of visitors from Japan arrives with prepaid vacation packages. Japan has a relatively more mature economy than others in the Asia Pacific region and demand for business travel is not as high on a percentage basis for Japan as it is for China. Japan is also home to a major transit hub in the trans-Pacific market, which provides for competitive pricing.

For U.S. citizens traveling abroad, monthly departures statistics are collected and reported by OTTI's U.S. International Air Travel Statistics (I-92 data) program. The data reflect the U.S. Citizens' preferences for international travel by country. Table 9 presents the annual outbound traffic broken down by region. Europe is the number one destination with over 43 percent of U.S. overseas air travelers and just under 33 percent of total travelers. The largest increase in overseas travel on a percentage basis in 2006 over 2005 was Asia, with 8 percent. Africa and the Middle East, which see relatively little traffic, continued to fall year-over-year. Overall, however, outbound international air travel grew 4 percent from 2006 to 2007, and that growth is projected to continue.

Table 9 | **U.S. Citizens' International Air Destinations**[13]

REGIONS	ANNUAL	% CHANGE 2005-2006
Europe	12,995,893	4
Caribbean	5,780,787	7
Asia	5,207,977	8
South America	2,317,921	6
Central America	2,371,223	3
Oceania	828,799	6
Middle East	478,282	-14
Africa	167,490	-18
Total Overseas	30,148,372	5
Mexico	5,747,999	1
Canada	3,861,639	-1
Grand Total	39,758,010	4

[13] U.S. Department of Commerce, International Trade Administration, Office of Travel and Tourism Industries. Released: May 2007 http://tinet.ita.doc.gov

Conclusion

Every region of the U.S. depends on civil aviation to stimulate its economic growth and to strengthen global and local markets.

THE CIVIL AIR TRANSPORT INDUSTRY offers many economic benefits for the United States and the world. In a world of increasing trade in high value goods, the U.S. civil aviation industry provides capabilities that bring tremendous benefits and opportunities to all Americans. Aviation keeps the nation competitive providing it with a unique engine for technological development. The report found that civil aviation represented a 5.6 percent share of the U.S. economy in 2006, once all impacts are fully accounted for. U.S. civil aviation contributes to economic growth and to stronger global and local markets for every region of the nation.

The total output of civil aviation related goods and services amounted to $1.2 trillion in 2006 and generated nearly 11 million jobs with earnings of $369 billion. Specific areas of civil aviation, such as air cargo, have encouraged effective networking and collaboration between companies.

However, in order to maintain and keep this system viable, profitability of commercial air carriers is a concern in today's economy. The cost of fuel is a continuing concern for airlines today, leaving many analysts to believe that the price of oil and the shaky economy will continue to influence the airline industry and other industries for years to come.

The role of air transportation will continue to grow for the U.S. and global economy, just as it has in the past century. The economic impacts of civil aviation summarized in this report represent several ways to quantify the benefits made possible by a vital and changing industry. The industry contributes positively to the US trade balance, creates high paying jobs, keeps just-in-time business models viable, and connects us to friends, family and commercial opportunities. As the role of air transportation evolves and becomes even more intertwined with our way of life, it is clear that a safe and efficient air transportation system will continue to be a vital component in a strong and healthy American economy in the 21st century.

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